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IMPORTANT INSIGHTS

CCEA Approves National Investment Policy for Urea (NIPU)-2026 to Enhance India's Fertilizer Security

Recent Developments:

- The **Cabinet Committee on Economic Affairs (CCEA)** approved the **National Investment Policy for Urea (NIPU)-2026** to promote investment in the urea manufacturing sector, enhance domestic production capacity and reduce dependence on imported urea.
- The policy has been introduced amid concerns regarding fertilizer supply stability due to **geopolitical tensions, global supply chain disruptions, rising fertilizer demand and excessive urea consumption**.
- NIPU-2026 aims to create an investment-friendly framework for establishing new **gas-based urea manufacturing plants** and strengthening India's long-term fertilizer security.

Background and Need for NIPU-2026:

India's Dependence on Imported Urea:

- **Urea** is the most widely consumed nitrogen-based fertilizer in India and plays a crucial role in maintaining agricultural productivity and food security.
- Although India has expanded domestic fertilizer production, domestic output remains insufficient to meet the increasing demand, resulting in continued dependence on imports.
- Global fertilizer market volatility, international price fluctuations and geopolitical uncertainties have highlighted the need for greater self-reliance in fertilizer production.
- Excessive dependence on imported urea creates challenges related to:
 - Foreign exchange expenditure,
 - Supply chain vulnerability,
 - Price instability.

Objectives of NIPU-2026:

- The policy aims to encourage fresh investment in **gas-based urea manufacturing units** to increase indigenous production.
- It seeks to reduce import dependence, strengthen fertilizer availability and support the objective of **Atmanirbhar Bharat** in the fertilizer sector.
- The policy intends to provide a stable regulatory framework for participation of both **public sector and private sector entities**.

Key Features of National Investment Policy for Urea-2026:

Major Reforms Introduced Under NIPU-2026:

- **Separation of Fixed and Variable Costs:**
 - The policy separates fixed costs and variable costs to improve transparency in production cost calculation and fertilizer pricing.

- **Return on Equity (RoE) Framework:**
 - NIPU-2026 introduces a structured **Return on Equity (RoE)** mechanism with a minimum floor of **12%** and maximum ceiling of **16%** to provide investment certainty.
- **Foreign Exchange Risk Management:**
 - The policy allows conversion of fixed costs into **Indian Rupees after four years** based on prevailing exchange rates to reduce foreign exchange-related risks.
- **Investment Promotion Framework:**
 - The policy provides an investor-friendly environment to attract new projects from public sector undertakings and private companies.

Evolution of India's Urea Investment Policy:

Earlier Policy Initiatives:

- The **National Investment Policy, 2012** was introduced to encourage fresh investment in the urea sector and promote expansion of domestic manufacturing capacity.
- The policy was amended in **2014** to provide additional incentives for new fertilizer projects.
- The **2015 amendment** focused on improving efficiency and increasing production from existing gas-based urea plants.

Major Outcomes of Earlier Policies:

- Six new urea plants were established under earlier policy measures.
 - Four plants were developed through **Joint Venture Companies (JVCs)** of nominated **Public Sector Undertakings (PSUs)**.
 - Two plants were established by private sector companies.
- India currently has **33 operational urea manufacturing units** with an installed/reassessed capacity of **269.42 Lakh Metric Tonnes (LMT)**.
- Production from existing gas-based plants increased by approximately **20–25 LMT annually** after reforms introduced in 2015.
- Domestic urea production increased from **225 LMT in 2014–15** to **314.07 LMT in 2023–24**, indicating significant growth in domestic capacity.

India's Current Urea Production and Availability Scenario:

Domestic Production Capacity:

- India has strengthened its fertilizer manufacturing ecosystem through revival of closed plants and establishment of new production facilities.
- Domestic production capacity expansion has reduced import dependence; however, imports remain necessary due to increasing agricultural demand.
- Production fluctuations continue because of:
 - Natural gas availability,
 - Operational efficiency of plants,
 - Raw material constraints,
 - International market conditions.

Fertilizer Availability During Kharif Season:

- The estimated urea requirement during **2025–26** was around **370.84 LMT**.
- Total available quantity was around **432.44 LMT**, exceeding projected demand.

- Fertilizer sales under the **Direct Benefit Transfer (DBT)** system reached approximately **381.59 LMT**.
- The government has maintained that adequate availability has been ensured to prevent shortages during the agricultural season.

Fertilizer Subsidy Burden and DBT Reforms:

Growing Fertilizer Subsidy Challenge:

- Fertilizer subsidy remains one of the largest components of agricultural support due to controlled fertilizer prices.
- The estimated fertilizer subsidy burden for **2025–26** includes:
 - **Total Fertilizer Subsidy:** ₹2,17,281.10 crore.
 - **Urea Subsidy:** ₹1,42,175.74 crore.
 - **Phosphatic and Potassic (P&K) Fertilizer Subsidy:** Approximately ₹75,000 crore.
- The increasing subsidy burden reflects continued dependence on subsidised chemical fertilizers, particularly urea.
- High fertilizer subsidies create challenges related to:
 - Fiscal management,
 - Efficient fertilizer consumption,
 - Sustainable agricultural practices.

Direct Benefit Transfer (DBT) in Fertilizers:

- Under the fertilizer **DBT system**, subsidy payment is linked with actual fertilizer sales recorded through authorised retail outlets.
- Fertilizer transactions are monitored through **Point of Sale (PoS)** devices.
- Farmer authentication is carried out through:
 - **Aadhaar**,
 - **Kisan Credit Card (KCC)**,
 - **Voter Identity Card**,
 - Other approved identity documents.
- The DBT mechanism improves subsidy targeting, transparency and monitoring of fertilizer distribution.

Balanced Fertilizer Use and Environmental Concerns:

Problems Due to Excessive Urea Consumption:

- Excessive application of urea has resulted in:
 - Soil nutrient imbalance,
 - Declining soil fertility,
 - Reduced nutrient use efficiency,
 - Environmental degradation.
- India's fertilizer consumption pattern remains highly tilted towards nitrogenous fertilizers, creating imbalance among nutrients such as **Nitrogen, Phosphorus and Potassium (NPK)**.

Government Measures for Sustainable Fertilizer Management:

- The government promotes **Integrated Nutrient Management (INM)** to encourage balanced use of:
 - Chemical fertilizers,
 - Organic manure,
 - Bio-fertilizers.

- **Soil Health Management** programmes promote scientific nutrient application and long-term soil fertility improvement.
- The government has promoted **Nano Urea** as an alternative technology; however, wider adoption remains limited due to concerns regarding scientific validation and field-level effectiveness.

Challenges and Way Forward:

Major Challenges:

- Continued dependence on imported urea despite expansion of domestic production capacity.
- Increasing fertilizer subsidy burden affecting government finances.
- Excessive urea consumption causing soil degradation and environmental challenges.
- Limited adoption of sustainable alternatives such as organic fertilizers, bio-fertilizers and Nano Urea.
- Exposure of fertilizer supply chains to international geopolitical disruptions.

Policy Recommendations:

- Accelerate investment in efficient **gas-based fertilizer plants** under NIPU-2026.
- Promote balanced nutrient application through **Integrated Nutrient Management (INM)** and soil health initiatives.
- Strengthen domestic production capacity to reduce dependence on global fertilizer markets.
- Encourage scientific research, field-level evaluation and farmer awareness regarding alternative fertilizers.
- Improve subsidy efficiency while gradually shifting towards sustainable fertilizer practices.
- Promote cleaner fertilizer technologies such as **Green Ammonia-based fertilizers** to reduce environmental impact.

Value Addition for UPSC:

Prelims Facts:

- **NIPU-2026** stands for **National Investment Policy for Urea-2026**.
- The policy is approved by the **Cabinet Committee on Economic Affairs (CCEA)**.
- The concerned ministry is the **Ministry of Chemicals and Fertilizers**.
- The major focus of NIPU-2026 is promotion of **gas-based urea manufacturing plants**.
- India has **33 operational urea manufacturing units** with **269.42 LMT** installed/reassessed capacity.
- The **RoE framework** under NIPU-2026 provides a return range of **12% to 16%**.

Mains Answer Enrichment (GS Paper III):

- **Fertilizer Security:** Domestic production capacity is essential to reduce vulnerability to global supply shocks.
- **Agricultural Sustainability:** Higher production must be accompanied by balanced nutrient management and soil conservation.
- **Subsidy Reform:** Rationalisation of fertilizer subsidies is necessary for fiscal sustainability and efficient resource use.
- **Way Forward Statement:** "India's fertilizer security requires a balanced approach combining domestic production expansion, efficient subsidy management and sustainable nutrient practices."

Methane Explosion in Teesta Stage-VI Tunnel Raises Concerns Over Himalayan Infrastructure Safety

Recent Developments:

- A suspected **methane gas explosion** occurred inside the under-construction **Head Race Tunnel (HRT)** of the **Teesta Stage-VI Hydropower Project** at Samardung in Sikkim's Namchi district, resulting in the death of several workers and trapping others inside the tunnel.
- The incident has highlighted the **geological instability, underground gas risks and occupational safety challenges** associated with large infrastructure projects in the fragile Himalayan region.
- The accident has raised concerns regarding the effectiveness of **geological surveys, underground gas detection systems, tunnel safety standards and emergency response mechanisms** during major construction activities.

Methane Accumulation in Mountainous Regions:

Characteristics and Explosion Mechanism of Methane:

- **Methane (CH₄)** is a **colourless, odourless and highly flammable gas** that can naturally accumulate in underground rock formations and confined spaces such as tunnels and mines.
- Methane becomes explosive when it mixes with air within a specific concentration range and comes into contact with an ignition source such as drilling equipment, electrical sparks or construction machinery.
- During tunnel excavation, drilling and blasting activities can disturb methane-bearing rocks, allowing trapped gas to escape suddenly and accumulate inside enclosed underground spaces.

Sources of Methane in Geological Formations:

- Methane can occur as natural gas trapped within porous rocks or as isolated gas pockets in young and structurally complex geological formations.
- In **coal-bearing and carbon-rich strata**, methane may form through the decomposition of ancient organic matter over millions of years under suitable geological conditions.
- Waterlogged valleys and mountainous depressions may create **anaerobic conditions**, where microorganisms decompose organic matter and release methane.
- **Fault lines, cracks and natural fissures** can act as pathways for methane migration from underground sources and allow gas accumulation in tunnels.
- Poorly managed waste disposal sites in hilly regions can also generate methane through the decomposition of organic waste under oxygen-deficient conditions.

Geological Context of Sikkim and Infrastructure Vulnerability:

Geological Characteristics of Sikkim:

- Sikkim is located in the **young and tectonically active Himalayan region**, making it vulnerable to earthquakes, landslides and slope instability.
- The region is characterised by:
 - Active tectonic movements,
 - Fragile rock formations,
 - High erosion rates,

- Complex geological structures.
- Although Sikkim does not have major coalfields, parts of southern Sikkim, including Namchi, contain small coal deposits and fall within the geologically significant **Rangit Tectonic Window**.
- Such complex geological conditions make the identification of small and localised methane pockets difficult before excavation.

Challenges in Underground Gas Detection:

- Conventional geological and engineering surveys mainly examine:
 - Rock stability,
 - Groundwater conditions,
 - Fault zones,
 - Structural weaknesses.
- Small methane pockets may remain undetected because of their irregular distribution and limited size.
- High-risk tunnel projects require advanced geological investigation and continuous underground gas monitoring systems.

Why Himalayan Infrastructure Projects Face High Risks:

Impact of Natural Hazards:

- The Himalayas are highly disaster-prone due to:
 - Active tectonic processes,
 - Weak geological formations,
 - Heavy rainfall,
 - Rapid erosion,
 - Frequent landslides.
- Construction activities such as blasting and tunnelling for dams, highways and railways can disturb unstable mountain slopes and increase the probability of landslides.

Previous Disasters in Sikkim:

- Sikkim's hydropower infrastructure has previously suffered damage from extreme natural events.
- The **2023 South Lhonak Lake Glacial Lake Outburst Flood (GLOF)** caused severe destruction in the Teesta basin and damaged major hydropower infrastructure.
- The **1200 MW Teesta Stage-III Hydroelectric Project** was severely affected by the disaster.
- The **510 MW Teesta Stage-V Hydropower Project** also suffered damage from natural hazards and later faced additional impacts due to landslide-related events.
- The Teesta Stage-VI tunnel incident represents a new category of risk involving suspected underground gas-related hazards.

Role of Climate Change:

- Climate change is increasing risks in Himalayan regions through:
 - Glacier retreat,
 - Expansion of glacial lakes,
 - Extreme rainfall events,
 - Cloudbursts.
- These changes increase vulnerability of hydropower projects and other critical infrastructure.

Challenges Associated with Tunnel Construction in India:

High Geological and Engineering Risks:

- Tunnel construction in Himalayan and northeastern regions is highly challenging because of:
 - Unstable rock structures,
 - Active fault zones,
 - High groundwater pressure,
 - Landslide-prone terrain.
- Underground conditions may change rapidly during excavation, making prediction and risk management difficult.

Limitations in Risk Assessment:

- Tunnel disasters are often caused by a combination of geological uncertainties and weaknesses in planning, construction and monitoring.
- Major challenges include:
 - Incomplete geological surveys,
 - Outdated assessment methods,
 - Limited predictive modelling,
 - Inadequate identification of underground hazards.
- Detailed geological mapping and real-time monitoring are essential throughout the tunnel construction process.

Occupational Safety Challenges:

- Underground workers face risks due to:
 - Poor ventilation,
 - Fire and explosion hazards,
 - Limited emergency exits,
 - Insufficient safety monitoring.
- Lack of specialised training, inadequate protective equipment and unclear responsibility among contractors increase worker vulnerability.

Measures Required for Safer Himalayan Infrastructure Development:

Strengthening Safety and Governance Framework:

- Large infrastructure projects in fragile Himalayan regions should undergo comprehensive **geological and environmental risk assessment** before approval.
- Continuous monitoring systems should be established to detect:
 - Underground gases,
 - Rock movement,
 - Water pressure changes,
 - Structural instability.
- Modern technologies such as:
 - Real-time geological monitoring,
 - Remote sensing,
 - Artificial Intelligence-based prediction systems should be integrated into tunnel safety management.

Improving Disaster Preparedness:

- Specialised rescue teams equipped with advanced technology should be developed for underground emergencies.
- Safety standards related to ventilation, emergency evacuation, fire protection and worker training should be strictly enforced.
- Clear accountability should be established among contractors, project developers and regulatory authorities.

Promoting Sustainable Himalayan Development:

- Infrastructure development in Himalayan states should follow the principle of **carrying capacity-based planning**.
- Economic development must be balanced with:
 - Environmental protection,
 - Disaster resilience,
 - Ecosystem conservation.
- Sustainable infrastructure planning is essential to reduce long-term risks in fragile mountain ecosystems.

Value Addition for UPSC:***Prelims Facts:***

- **Methane (CH₄)** is a major **greenhouse gas** and has a higher short-term global warming potential than carbon dioxide.
- **Glacial Lake Outburst Flood (GLOF)** occurs when a glacial lake suddenly releases a large volume of water due to failure of its natural barrier.
- The **Himalayas** are among the youngest and most tectonically active mountain systems in the world.
- **Teesta River** is an important Himalayan river flowing through Sikkim and West Bengal before entering Bangladesh.

Mains Answer Enrichment:

- **Infrastructure Development:** Himalayan infrastructure requires a balance between economic growth, ecological conservation and disaster resilience.
- **Disaster Management:** Risk identification, early warning systems and preventive measures are more effective than only post-disaster response.
- **Environmental Governance:** Development projects in fragile ecosystems must be based on scientific assessment and sustainable planning.
- **Conclusion:**
“Safe Himalayan infrastructure development requires integration of advanced geological studies, strict safety standards and ecological sustainability at every stage of project planning and execution.”

India's Sporting Transformation Through Policy Reforms, Global Achievements and Grassroots Development

Recent Developments:

- India's sports ecosystem is undergoing a significant transformation through **policy reforms, infrastructure expansion, grassroots talent development and increased investment** aimed at making sports a sustainable career option.
- The **Commonwealth Games 2026** is being held in Glasgow, Scotland, from **23 July to 2 August 2026**, with participation from athletes representing **74 countries and territories** across **10 sports**, including six fully integrated **Para Sports** disciplines.
- India has participated with a contingent of **124 athletes**, comprising **78 men and 46 women**, reflecting the increasing participation of Indian athletes in global sporting competitions.
- Recent policy measures such as **Khelo Bharat Niti 2025**, sports governance reforms and increased focus on sports manufacturing highlight India's objective of developing a strong sporting ecosystem and supporting its ambition to host the **Olympic Games 2036**.

Evolution of Sports in India:

Ancient and Medieval Sporting Traditions:

- India has a rich sporting heritage, with references to **archery, wrestling (Malla-Yuddha), horse riding, swimming, hunting and chess (Chaturanga)** found in ancient texts such as the **Mahabharata, Ramayana, Manasollasa and Mallapurana**.
- During the medieval period, Mughal rulers promoted sports such as **Chaugan (Polo), chess, Chaupar and hunting**, while wrestling continued as a popular traditional sport.

Colonial Influence and Sports Nationalism:

- The British introduced modern organised sports such as **cricket, football, tennis and golf**, which contributed to the institutional development of sports in India.
- Sports also became a symbol of nationalism during the freedom movement, with **Mohun Bagan's historic football victory against a British regiment** representing Indian confidence against colonial authority.

Post-Independence Sporting Growth:

- After Independence, India achieved important milestones such as winning the **Olympic hockey gold medal in 1948**, hosting the first **Asian Games in 1951** and witnessing increased participation of women athletes in international competitions.

India's Rise on the Global Sporting Stage:

Olympic Games:

- India's Olympic performance has shown considerable improvement between **2016 and 2024** due to better athlete preparation, institutional support and targeted training programmes.
- India improved its medal tally from **2 medals at Rio 2016** to **7 medals at Tokyo 2020** and secured **6 medals at Paris 2024**.
- **Neeraj Chopra** became India's first Olympic athletics gold medallist after winning the javelin throw event at **Tokyo 2020**.

- **Mirabai Chanu** has emerged as one of India's most consistent Olympic performers through her achievements in weightlifting.

Paralympic Games:

- India's Paralympic performance has witnessed exceptional growth, with the medal tally increasing from **4 medals at Rio 2016 to 19 medals at Tokyo 2020**.
- The **Paris 2024 Paralympic Games** marked India's best-ever campaign with **29 medals**, demonstrating the growth of para-sports in the country.
- Athletes such as **Avani Lekhara, Sumit Antil and Pramod Bhagat** have played a significant role in strengthening India's position in Paralympic sports.
- Initiatives such as **Target Olympic Podium Scheme (TOPS)** and **Khelo India Para Games** have improved financial, technical and training support for para-athletes.

Asian Games and Commonwealth Games:

- India has consistently improved its Asian Games performance through larger contingents and stronger medal-winning performances.
- India increased its Asian Games medal tally from **57 medals at Incheon 2014 to 69 medals at Jakarta 2018**.
- India has remained one of the strongest performers at the **Commonwealth Games**, winning **64 medals at Glasgow 2014, 66 medals at Gold Coast 2018 and 61 medals at Birmingham 2022**.
- Sports such as **wrestling, weightlifting, table tennis, badminton and athletics** have consistently contributed to India's international success.

Importance of a Strong Sports Ecosystem:

Social, Economic and Strategic Significance:

- Sports provide a constructive platform for India's large young population by promoting **mental well-being, leadership qualities, discipline and teamwork**.
- The sports sector acts as an economic driver by generating employment opportunities in **event management, sports technology, physiotherapy, sports medicine, manufacturing and performance analytics**.
- International sporting success enhances India's **soft power** by strengthening national pride and improving its global diplomatic presence.
- Promotion of grassroots sports participation can help reduce **Non-Communicable Diseases (NCDs)** and contribute towards creating a healthier workforce.

Constitutional Framework of Sports:

- Sports is a **State Subject** under the Constitution of India, and the primary responsibility for promotion and development of sports lies with respective **State and Union Territory Governments**.
- The Union Government plays a role at national and international levels through its **residuary powers**, including fulfilling international obligations and supporting elite sporting programmes.

Government Initiatives for Sports Development:

Khelo India Scheme:

- The **Khelo India Scheme** was launched in **2017** to create a strong foundation for sports development through grassroots participation, talent identification and infrastructure improvement.
- The scheme integrated three earlier programmes:
 - **Rajiv Gandhi Khel Abhiyan,**
 - **Urban Sports Infrastructure Scheme,**
 - **National Sports Talent Search Scheme.**

Target Olympic Podium Scheme:

- The **Target Olympic Podium Scheme (TOPS)** was launched in **September 2014** to improve India's performance at the **Olympic and Paralympic Games**.
- The scheme was strengthened in **April 2018** through a dedicated technical support team that provides comprehensive assistance to elite athletes.
- TOPS supports athletes through **foreign training, international competitions, coaching camps, specialised equipment and a monthly stipend of ₹50,000.**

Khelo India Rising Talent Identification Initiative:

- The **Khelo India Rising Talent Identification (KIRTI)** initiative identifies and nurtures sporting talent among children aged between **9 and 18 years** through scientific talent identification methods.

Recent Policy Measures:

- The **Union Budget 2026–27** announced a dedicated initiative for sports goods manufacturing with an allocation of **₹500 crore** to strengthen domestic sports production.
- The **National Sports Governance Act, 2025** aims to improve athlete welfare and transparency by requiring National Sports Bodies to adopt **Safe Sports Policy, Code of Ethics and internal grievance redressal mechanisms.**
- The **Khelo Bharat Niti, 2025** provides a long-term roadmap to transform sports into a mass movement and support India's vision of becoming a developed nation.

Challenges in Indian Sports Ecosystem:

Infrastructure and Governance Issues:

- India faces unequal access to quality sports infrastructure, as world-class facilities are concentrated mainly in metropolitan cities while rural and tier-2/tier-3 regions often lack standard training facilities and equipment.
- Some **National Sports Federations (NSFs)** face challenges related to transparency, litigation, professional management and delayed implementation of athlete support programmes.

Skill Development and Career Challenges:

- India continues to face shortages of high-performance coaches, biomechanists, sports psychologists and nutrition experts, creating dependence on expensive foreign specialists.

- Non-cricket sports are still perceived by many families as financially uncertain career options despite improving sponsorship opportunities and professional leagues.

Way Forward for Strengthening Indian Sports:

Institutional and Infrastructure Reforms:

- The **National Education Policy (NEP)** should integrate sports into the core academic curriculum to identify and nurture talent from an early age.
- National Sports Federations should adopt **independent athlete representation, transparent financial audits and professional management structures** to improve governance.
- Regional sports science centres should be developed in collaboration with medical institutions to train local physical trainers, physiotherapists and performance analysts.

Private Sector Participation and Sports Economy:

- **Public-Private Partnerships (PPP)** should be encouraged to increase investment in sports infrastructure, athlete development and specialised training facilities.
- Greater private sector participation can provide sustainable financial support and reduce excessive dependence on government funding.

Value Addition for UPSC:

Prelims Facts:

- **Sports** is included in the **State List** under the Constitution of India.
- The **Khelo India Scheme** was launched in **2017** to promote grassroots sports development.
- The **Target Olympic Podium Scheme (TOPS)** supports elite athletes preparing for Olympic and Paralympic competitions.
- **National Sports Day** is observed on **29 August** every year to commemorate the birth anniversary of **Major Dhyan Chand**.

Mains Answer Enrichment:

Best Institute for OAS/IAS

- **GS Paper II:** Sports governance, institutional reforms, transparency and welfare mechanisms.
- **GS Paper III:** Sports economy, youth development, employment generation, infrastructure development and public-private investment.
- India's sporting transformation requires a shift from medal-focused policies towards a comprehensive ecosystem based on **grassroots participation, scientific training, professional governance and sustainable investment**.

Conclusion:

- India's journey towards becoming a global sporting power depends on strengthening grassroots systems, improving sports science, ensuring transparent governance and creating an ecosystem where sporting excellence becomes a sustainable career pathway.

K Radhakrishnan Committee Report Highlights Need for Comprehensive Reforms in India's Examination System

Recent Developments:

- Following the **NEET-UG 2026 paper leak controversy**, the Supreme Court heard petitions seeking reforms in examination conduct, after which the Union Government informed the court about the constitution of a new high-powered committee under **Nandan Nilekani** to recommend the next phase of examination reforms.
- The government also introduced the **Public Examinations (Prevention of Unfair Means) Amendment Bill, 2026** in the Lok Sabha to strengthen the legal framework against paper leaks and unfair practices in public examinations.
- These developments have renewed focus on the earlier **K Radhakrishnan Committee Report (2024)**, which provided a comprehensive blueprint for improving examination security, institutional capacity and transparency of the **National Testing Agency (NTA)**.

Background and Formation of K Radhakrishnan Committee:

Need for Examination Reforms:

- The **K Radhakrishnan Committee** was constituted in **2024** after the **NEET-UG 2024 paper leak controversy**, which created widespread concerns regarding the credibility, transparency and security of national-level entrance examinations.
- The committee was established to restore public confidence in competitive examinations and recommend measures for creating a reliable, technology-driven and error-free testing system.

Mandate and Consultation Process:

- The committee was headed by former **ISRO Chairman Dr K Radhakrishnan** and submitted its report to the **Ministry of Education** in October 2024.
- The committee conducted **23 full-day physical meetings** and received more than **37,000 public responses** through the **MyGov platform** to understand stakeholder concerns.
- Its vision was to transform the **National Testing Agency (NTA)** into a **nimble, zero-error, adaptive and integrative examination organisation** capable of conducting large-scale assessments securely.
- The initial mandate included improving examination processes, strengthening data security and reviewing the structure and functioning of the NTA.
- Following directions of the Supreme Court in **Vanshika Yadav vs Union of India**, the committee's scope was expanded to include:
 - Examination security and administration,
 - Technological safeguards,
 - Policy and stakeholder engagement,
 - International collaboration,
 - Staff training,
 - Student mental-health support.

Key Findings of the Committee:

Examination Life Cycle Vulnerabilities:

- The committee rejected the idea that paper leaks are isolated incidents and identified weaknesses throughout the entire **Testing Life Cycle**, including question paper preparation, printing, transportation, candidate verification, examination centre management and grievance resolution.
- It emphasised that examination security requires an integrated approach covering technology, institutional capacity and human resource management.
- The report highlighted that vulnerabilities at any stage of the examination process can compromise the credibility of the entire system.

Challenges in National Testing Agency:

- The committee observed that the **NTA** was functioning as a **single-window agency** despite conducting more than **240 examinations involving approximately 5.4 crore candidates** since its establishment.
- It concluded that the agency required major enhancement of capacity, specialised expertise and institutional restructuring to manage large-scale examinations effectively.
- The committee recommended reducing excessive dependence on outsourced agencies for critical examination-related activities to improve accountability and security.

Major Technological Recommendations:

Computer-Assisted Secure Pen-and-Paper Testing:

- The committee proposed **Computer-Assisted Secure Pen-and-Paper Testing (CPPT)** as a major technological solution to reduce paper leak risks.
- Under this model, encrypted question papers would be transmitted electronically to secure examination centre servers and printed shortly before the examination begins.
- The system would allow candidates to continue writing conventional pen-and-paper examinations while eliminating the risks associated with long-distance transportation and storage of printed question papers.
- This approach aims to protect the examination process during sensitive stages such as printing, storage and movement of question papers.

DIGI-EXAM Authentication Framework:

- The committee recommended **DIGI-EXAM**, a digital authentication framework inspired by **Digi Yatra**, to ensure that the same candidate who appears for the examination continues through the admission process.
- It proposed multi-stage authentication using:
 - **Aadhaar-based verification,**
 - **Biometric authentication,**
 - **Artificial Intelligence-based analytics.**
- The framework aims to strengthen identity verification during application submission, examination participation and final admission stages.

Institutional Reforms for National Testing Agency:

Strengthening Governance Structure:

- The committee recommended restructuring the **NTA Governing Body** into an empowered and accountable **Apex Body** responsible for strategic direction and oversight.
- It proposed that the NTA should be headed by a **Director General** not below the rank of **Additional Secretary to the Government of India**.
- The committee suggested creating **10 dedicated institutional verticals**, including:
 - Nationwide Testing Centre Infrastructure,
 - Information Security,
 - Vigilance and Forensics,
 - Research and Development.
- These specialised divisions would improve operational efficiency, security management and innovation in examination systems.

Testing Centre Infrastructure Reforms:

- The committee recommended establishing at least **1,000 Secure Testing Centres** in phases at reputed government institutions.
- These centres should provide:
 - Reliable electricity supply,
 - Adequate seating arrangements,
 - Technical support,
 - Phone lockers,
 - Proper ventilation,
 - Help desks,
 - Waiting areas for families.
- It also proposed mobile testing centre buses equipped with laptops and servers for remote and underserved regions, with each unit capable of serving around **150 candidates**.
- For large-scale examinations, the committee recommended **Multi-Session Testing** across several days or weeks with transparent and scientifically justified score normalisation methods.
- It also suggested a gradual transition towards **Computer Adaptive Testing**, where question difficulty changes according to the candidate's performance level.

Student-Centric Examination Reforms:

Mental Health and Grievance Redressal Mechanism:

- The committee recognised increasing examination-related stress among students and recommended establishing a dedicated **mental health support system** within the NTA.
- It suggested:
 - Tele-counselling services,
 - Student assistance helplines,
 - Teacher sensitisation programmes.
- The committee also recommended strengthening the **Grievance Reporting and Redressal Cell** through Artificial Intelligence and Machine Learning-based chatbots capable of responding in candidates' preferred languages.

Regulation of Coaching Ecosystem:

- The committee suggested developing a regulatory mechanism for coaching institutions due to concerns related to excessive student pressure, financial burden on families and unhealthy competition.
- It emphasised creating a balanced educational environment where examination preparation does not negatively affect students' mental well-being.

Implementation Framework and Way Forward:***Mission Mode Implementation Mechanism:***

- Recognising that expert recommendations often remain partially implemented, the committee proposed establishing a high-powered steering committee under the **Ministry of Education**.
- The proposed mechanism would:
 - Monitor implementation progress,
 - Guide the NTA,
 - Resolve administrative bottlenecks,
 - Submit regular progress reports.
- The committee recommended implementing reforms in a time-bound manner through a mission-oriented approach.

Ensuring Secure and Transparent Examination System:

- India requires a comprehensive examination reform framework based on:
 - Secure technology adoption,
 - Institutional accountability,
 - Transparent governance,
 - Strong grievance mechanisms.
- Examination systems should balance technological innovation with accessibility, fairness and student welfare.
- Effective implementation of reforms is essential because public examinations directly influence educational opportunities, employment prospects and social mobility.

Value Addition for UPSC: Best Institute for OAS/IAS***Prelims Facts:***

- The **National Testing Agency (NTA)** was established in **2017** as an autonomous organisation under the **Ministry of Education** to conduct entrance examinations.
- The **K Radhakrishnan Committee** was constituted in **2024** following concerns regarding examination integrity after the **NEET-UG 2024 paper leak controversy**.
- The **Public Examinations (Prevention of Unfair Means) Act, 2024** provides legal measures against unfair practices in public examinations.
- Secure examination systems require integration of **cyber security, data protection, biometric authentication and institutional accountability**.

Mains Answer Enrichment:

- **GS Paper II:** Examination reforms are linked with governance, transparency, accountability and institutional efficiency.

- **GS Paper III:** Technology-based solutions, cyber security and digital governance play an important role in improving examination systems.
- **Essay Linkage:** Competitive examinations represent equal opportunity and social mobility; therefore, maintaining their integrity is essential for public trust.

Conclusion:

- The **K Radhakrishnan Committee Report** provides a comprehensive roadmap for transforming India's examination system through technology, institutional restructuring and student-focused reforms.
- However, the success of these reforms depends not only on policy design but also on sustained implementation, accountability and effective governance.

AI Empowerment of India's Informal Women Workers for Inclusive Digital Growth and Gender Equality

Recent Developments:

- The growing adoption of **Artificial Intelligence (AI)** in India has renewed discussions on ensuring that technological productivity gains reach informal women workers, who constitute a significant part of the country's labour force.
- Without **gender-responsive AI governance and inclusive technology design**, rapid digital expansion may deepen existing inequalities by excluding women facing barriers related to language, mobility, digital literacy and access to resources.
- India's broader AI strategy, including the **IndiaAI Mission**, multilingual digital platforms and emerging AI governance frameworks, highlights the need to ensure that technological transformation supports inclusive growth and the vision of **Viksit Bharat 2047**.

Understanding AI and India's Informal Women Workforce:***Role of Gender-Responsive Artificial Intelligence:***

- Integrating **Artificial Intelligence** with India's informal female workforce involves using technologies such as real-time advisory systems, natural language processing and automated decision-support tools to improve productivity in agriculture, domestic work and micro-enterprises.
- A gender-responsive AI approach focuses on designing technologies according to women's specific needs, including regional languages, local livelihood patterns, limited mobility and unequal access to economic resources.
- Instead of replacing human labour, inclusive AI can democratise economic opportunities by providing women workers with better access to information, markets, financial services and skill development.

Key Data and Statistics:

- Approximately **82% of employed women in India** are engaged in the informal sector, including agriculture, home-based production, domestic work and small-scale enterprises.

- According to the **Periodic Labour Force Survey (PLFS) 2023–24**, around **76.9% of rural working women** are involved in agriculture, making them a major potential user group for AI-based agricultural advisory services.
- A **2024 study** on the multilingual AI platform **Farmer.Chat**, conducted across **12 states**, found that **61% of female users** experienced improved quality of life within **45 days**, while female engagement rates were **2 to 3 times higher** than male users.
- These findings indicate that properly designed AI tools can significantly improve women's access to knowledge, productivity-enhancing services and livelihood opportunities.

Potential of AI in Women-Led Informal Economy:

Agriculture and Rural Livelihood Transformation:

- Women farmers often face challenges related to limited access to agricultural information, credit facilities, markets and extension services, which can be addressed through AI-enabled advisory platforms.
- Voice-based AI tools can provide women farmers with personalised information related to crop management, weather forecasts, pest control, market prices and government schemes in their preferred languages.
- AI-based systems can reduce information gaps by delivering timely recommendations without requiring advanced digital literacy.
- In rural areas, AI can support women-led self-help groups and micro-enterprises by improving financial planning, market access and business decision-making.

Digital Public Infrastructure Support:

- India has developed important digital foundations, including the **IndiaAI Mission**, the **Bhashini multilingual translation platform** and national AI governance initiatives, which can support inclusive AI adoption.
- Multilingual digital infrastructure can help overcome language barriers by enabling women workers to interact with technology in regional languages.
- Public digital platforms can become effective tools for improving access to welfare schemes, financial services, agricultural support and entrepreneurship opportunities.

Governance Priorities for Women-Centric AI Adoption:

Ensuring Fairness and Accountability in AI Systems:

- The government should introduce mandatory **Gender Impact Assessments** for AI systems affecting economic welfare to examine whether outcomes differ across gender, caste, location and disability groups.
- AI governance frameworks should ensure that automated decisions related to credit access, employment opportunities and welfare delivery do not reinforce existing social inequalities.
- Public expenditure on AI should follow **Gender-Responsive AI Budgeting** by evaluating whether investments address barriers related to language, safety, affordability and accessibility.
- Transparent AI systems are essential because unexplained automated decisions can reduce trust among vulnerable communities.

Building Digital Skills and Safety Mechanisms:

- AI literacy programmes should be integrated into existing community-based initiatives such as **Deendayal Antyodaya Yojana–National Rural Livelihood Mission (DAY-NRLM)**, **Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY)**, **Skill India** and **Mission Shakti's Sakhi networks**.

- Community-level training should focus on practical outcomes such as accessing government services, using digital platforms, improving livelihoods and adopting AI-based tools.
- Digital safety should become a fundamental requirement for women's participation in AI-enabled economic activities.
- Effective implementation of the **Information Technology (Amendment) Rules, 2021** and mandatory identification of AI-generated synthetic content can help protect women from technology-enabled gender-based violence.

Challenges Associated with AI Adoption Among Informal Women Workers:

Algorithmic Bias and Lack of Transparency:

- AI systems trained on incomplete or unrepresentative datasets may reproduce existing gender stereotypes, social discrimination and economic exclusion.
- Algorithmic decision-making in areas such as employment selection, financial services and welfare distribution can negatively affect marginalised women if adequate safeguards are absent.
- The **black-box nature** of some AI systems creates difficulties in understanding how decisions are made, reducing accountability and public trust.

Digital Divide and Online Safety Concerns:

- Many informal women workers face barriers due to limited digital literacy, lack of access to smartphones, poor internet connectivity and regional language limitations.
- Conventional digital interfaces often fail to consider women's time constraints, household responsibilities and specific livelihood conditions.
- Online harassment, deepfakes and non-consensual digital content can discourage women from participating actively in digital economic spaces.
- Technology-related violence can create a **digital chilling effect**, where fear of misuse prevents women from adopting beneficial digital tools.

Way Forward for Inclusive AI Transformation:

Strengthening Gender-Responsive AI Ecosystem:

- Government procurement policies should require AI platforms to include gender-responsive testing, regional language support and explainable decision-making mechanisms.
- AI systems should be evaluated not only on technical efficiency but also on their social impact, accessibility and ability to reduce inequalities.
- Expanding multilingual AI models based on **Bhashini** can enable women farmers and entrepreneurs to receive customised advice regarding crops, credit facilities and market opportunities.

Community-Based Digital Empowerment:

- Self-help groups and local community institutions should become important channels for AI literacy, digital training and technology adoption among informal women workers.
- Skill development programmes should focus on measurable outcomes, including improved income opportunities, better access to services and increased participation in digital markets.
- Inter-ministerial cooperation should strengthen cyber safety mechanisms and establish quick grievance redressal systems in regional languages, following recommendations related to women's digital safety.

Value Addition for UPSC:

Prelims Facts:

- **Artificial Intelligence** refers to the capability of machines to perform tasks that generally require human intelligence, including learning, reasoning and decision-making.
- The **IndiaAI Mission** aims to develop a comprehensive AI ecosystem in India through infrastructure development, innovation support and responsible AI adoption.
- **Bhashini** is a multilingual digital language platform aimed at enabling access to digital services in Indian languages.
- Women's empowerment through technology is linked with **Sustainable Development Goal 5 (Gender Equality)** and **Sustainable Development Goal 8 (Decent Work and Economic Growth)**.

Mains Answer Enrichment:

- **GS Paper II:** AI governance requires balancing technological innovation with transparency, accountability, privacy protection and social justice.
- **GS Paper III:** AI can enhance agricultural productivity, promote digital economy, improve financial inclusion and support employment generation.
- **Essay Linkage:** The success of India's AI transformation will depend on whether technological benefits reach vulnerable groups, especially women at the base of the economic pyramid.

Conclusion:

- The integration of **gender-responsive Artificial Intelligence** with India's informal women workforce can transform technology into a powerful instrument of inclusive growth.
- However, achieving this potential requires accessible digital infrastructure, responsible AI governance, community-based skill development and strong protection against digital harms.
- By ensuring that women workers are not merely consumers but active participants in the AI ecosystem, India can make technological advancement a pathway towards economic empowerment and sustainable development.

QUESTIONS

1. With reference to the features introduced under NIPU-2026, consider the following statements:

- (1) Separation of fixed and variable costs has been introduced to improve pricing transparency.
- (2) A Return on Equity (RoE) framework has been provided with a floor of 12% and ceiling of 16%.
- (3) Fixed costs will be converted into Indian Rupees after four years based on prevailing exchange rates.
- (4) The policy allows participation only by Public Sector Undertakings (PSUs).

Which of the statements given above are correct?

- (A) 1 and 2 only
- (B) 1, 2 and 3 only
- (C) 2, 3 and 4 only
- (D) 1 and 4 only

2. The term "anaerobic conditions" in the context of methane generation refers to:

- (A) Conditions where oxygen availability is very low or absent
- (B) Conditions with extremely high atmospheric pressure
- (C) Conditions where rocks completely lose their mineral composition
- (D) Conditions where microorganisms cannot survive

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3. Consider the following statements regarding India's participation in international sporting events:

- (1) Glasgow hosted the Commonwealth Games in 2014.
- (2) Gold Coast hosted the Commonwealth Games in 2018.
- (3) Birmingham hosted the Commonwealth Games in 2022.
- (4) Glasgow is hosting the Commonwealth Games in 2026.

Which of the statements given above are correct?

- (A) 1 and 2 only
- (B) 2 and 3 only
- (C) 1, 2 and 3 only

(D) 1, 2, 3 and 4

4. Consider the following statements regarding the K Radhakrishnan Committee:

- (1) It was constituted in 2024 following concerns regarding the integrity of entrance examinations.
- (2) It was headed by former ISRO Chairman Dr K Radhakrishnan.
- (3) The committee submitted its report to the Ministry of Education in October 2024.
- (4) The committee was constituted exclusively to design a new examination syllabus for NEET-UG.

How many of the above statements are correct?

- (A) Only one
- (B) Only two
- (C) Only three
- (D) All four

5. Consider the following statements regarding AI-based agricultural advisory systems:

- (1) Local language integration is important for improving accessibility among rural women workers.
- (2) Hyper-local AI models can provide customised crop and market advisories.
- (3) Regional language support is not necessary because Hindi-based platforms are widely accessible.
- (4) BHASHINI can support multilingual AI applications in India.

Which of the statements given above are correct?

- (A) 1 and 2 only
- (B) 1, 2 and 4 only
- (C) 2, 3 and 4 only
- (D) 1 and 3 only

ANSWER KEY

1 – Answer (B), 2 – Answer (A), 3 – Answer (D), 4 – Answer (C), 5 – Answer (B)



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In today's fast-changing world, staying updated with current affairs is essential for both academic success and professional growth. Awareness of national and international events not only broadens general knowledge but also sharpens critical and analytical thinking skills. It enables individuals to form well-informed opinions, which are crucial for competitive examinations, group discussions, interviews, and impactful essay writing.

Being well-informed reflects adaptability, awareness, and intellectual curiosity—qualities that are highly valued in a competitive environment. A strong grasp of contemporary issues enhances confidence, widens perspective, and prepares individuals to tackle real-world challenges effectively, ultimately opening the door to better opportunities and long-term personal and career advancement.

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