Topic 1: Telangana Likely to Secure Five Additional Geographical Indication (GI) Tags

Why is it in the news?

Telangana is on the verge of obtaining five additional Geographical Indication (GI) registrations following the completion of field verification, documentation, and technical scrutiny. The products nearing GI recognition include Narayanpet jewellery making, Hyderabad pearls, Banjara tribal jewellery, Banjara needle craft, and Batik paintings.
In addition, several GI applications from the State remain under consideration, such as Armoor turmeric, Nalgonda chitti dosakai, Kollapur Benishan mango, Mahadevpur tussar silk, Jagtial sesame, and Nayakpod masks.
Over the past two years, Telangana has already secured two new GI tags — Hyderabad lac bangles in 2024 and Warangal chapata chilli in 2025 — raising the total number of GI-tagged products from the State to 18.

Relevance

GS III – Economy (Inclusive Growth, MSMEs, Rural Development)
GI-led value addition, livelihood generation through craft clusters, integration with FPOs, and expansion of women-led artisanal enterprises.

GS I – Indian Culture & Heritage
Preservation of traditional crafts, protection of tribal art forms, and safeguarding cultural identity.

Telangana's GI Landscape

- Existing GI-tagged products: 18
- Notable examples include Pochampally Ikat, Adilabad Dokra, Warangal Durries, Hyderabad Haleem, among others.
- GI registration authority: Geographical Indications Registry, Chennai (under DPIIT).
- Legal framework: Geographical Indications of Goods (Registration and Protection) Act, 1999.

Economic and Ownership Implications

GI registration:

- Protects region-specific identity and brand value.
- Grants exclusive usage rights to producers within the designated geography.
- Enables product authentication, traceability, and market differentiation.

Economic Linkages

Empirical evidence suggests GI clusters often demonstrate:

- Price premiums ranging from 10–30% across Indian handicraft and food GI products.
- Higher rural employment multipliers, particularly in craft-based local economies.

Cultural and Social Significance

GI recognition contributes to:

- Preservation of intangible cultural heritage and artisanal knowledge systems.
- Strengthening of community identity and inter-generational transmission of skills.

Sectoral Importance of Proposed GI Products

- **Banjara jewellery and needle craft**: Secures tribal livelihood chains and strengthens women-led craft entrepreneurship.
- **Hyderabad pearls**: Reinforces the city's historical trade legacy and enhances export and tourism branding.
- **Narayanpet jewellery making**: Formal recognition of region-specific artisanal metalwork traditions.
- **Batik paintings**: Expands handloom–art convergence and encourages design innovation.

Key Takeaways

- GI is a collective, place-based intellectual property right, not an individual trademark.
- GI registration is administered by DPIIT, valid for 10 years, and renewable.
- Prominent Telangana GIs include Pochampally Ikat, Adilabad Dokra, Warangal Durries, and Hyderabad Haleem.
- Recent additions: Hyderabad lac bangles (2024) and Warangal chapata chilli (2025).
- Upcoming GI pipeline includes Armoor turmeric, Kollapur Benishan mango, Mahadevpur tussar silk, and others.

Topic 2: Why Manufacturing Has Lagged in India

Why is it in the news?

A renewed discussion, triggered by economist Arvind Subramanian's work *A Sixth of Humanity*, revisits the reasons behind India's failure to industrialise at the scale achieved by countries such as China and South Korea, despite similar initial conditions.
The argument applies a modified 'Dutch Disease' framework to India, suggesting that elevated public-sector wages distorted labour markets, diverted workers away from manufacturing, increased domestic prices, appreciated the real exchange rate, and eroded manufacturing competitiveness.
The debate also reopens broader questions related to technology adoption, wage–productivity alignment, inequality, and India's long-term structural transformation model.

Relevance

GS III – Economy (Growth, Employment, Structural Change)
Manufacturing stagnation, labour absorption challenges, wage dynamics, and inequality patterns.

GS III – Industry & Infrastructure / Industrial Policy
Export orientation, technology upgrading, PLI schemes, R&D ecosystem strength.

Key Data and Comparative Context

- Manufacturing share in GDP:
    - India: Persistently around 15–17% for three decades, with recent relative decline.
    - China: Increased from ~25% in the 1990s to over 28–30% during industrial expansion.
    - South Korea: Sustained 25–27% during export-led industrialisation.
- Employment structure:
    - India: Manufacturing employs ~11–12% of the workforce, largely informal.
    - China and South Korea: Manufacturing central to productivity growth and wage expansion.

Wage and Labour Market Dynamics

- Entry-level IT wages in India have remained largely stagnant in real terms since the early 2000s.
- Platform-based firms (Swiggy, Zomato, Ola, Blinkit) rely on labour-intensive, low-productivity models rather than capital-deepening technologies.
- Wealth and corporate profit growth at the top has outpaced median wages and productivity, signalling uneven growth outcomes.

Dutch Disease Framework

Originally conceptualised to explain the Netherlands' post-1959 gas boom, the mechanism involves:

- Resource windfalls driving wage increases and capital reallocation.
- Currency appreciation making exports less competitive.
- Manufacturing stagnation as imports become cheaper.

Application to India

In India's policy context:

- Expansion of high-wage public employment reduced manufacturing's ability to compete for skilled labour.
- Rising incomes pushed up domestic prices, appreciating the real exchange rate without nominal rupee movement.
- Consumption tilted towards imports, weakening domestic manufacturing.

Critical Assessment

Strengths:

- Explains labour-market distortions and manufacturing competitiveness decline.
- Links wages, prices, and structural transformation coherently.

Limitations:

- Classical Dutch Disease stems from natural-resource shocks, not wage policy.
- Fails to fully explain why firms did not upgrade technology to sustain higher wages.
- Public-sector wages may be a symptom rather than the root cause.

Technology–Wage Relationship

- Induced-innovation theory suggests high wages incentivise automation and productivity gains, as seen in Germany, Japan, and South Korea.
- India's large labour surplus reduced incentives for automation, resulting in labour-absorbing but low-productivity manufacturing.
- Services-sector productivity gains failed to diffuse across the wider economy.

Additional Structural Constraints

- Weak export discipline compared to East Asia.
- Absence of firm-size scaling ("missing middle").
- Inconsistent industrial policy and cluster support.
- Low R&D intensity and delayed technology adoption.
- Historically high logistics, power, and compliance costs.

Policy Implications

- Transition from labour-abundance reliance to technology-intensive manufacturing.
- Strengthen export-linked manufacturing clusters and firm scale-up pathways.
- Invest in skills, automation readiness, and design-led R&D.
- Align wage growth with productivity gains rather than wage suppression.
- Leverage PLIs, semiconductor ecosystems, electronics, and green manufacturing with deeper technology absorption.

Topic 3: Bureau of Port Security (BoPS) and Its Role

Why is it in the news?

The Union government has established the Bureau of Port Security (BoPS) as a statutory authority under Section 13 of the Merchant Shipping Act, 2025, aimed at reinforcing port and coastal security in response to rising maritime crime, smuggling, piracy, and cyber threats. This development coincides with broader maritime governance reforms, including the Indian Ports Act, 2025, the Coastal Shipping Act, 2025, and modernised merchant shipping legislation.

Relevance

GS III – Internal Security & Infrastructure
Port security architecture, cyber-maritime threats, and trade protection.

GS II – Federalism & Regulation
Centre–State jurisdiction over ports and regulatory governance.

Institutional Design and Mandate

- Statutory body under the Ministry of Ports, Shipping and Waterways.
- Modelled on the Bureau of Civil Aviation Security (BCAS).
- Mandated to enforce the International Ship and Port Facility Security (ISPS) Code and related global standards.

Core Responsibilities

- Centralised regulatory oversight and coordination across ports and vessels.
- Standardised security audits, risk assessments, certifications, and compliance mechanisms.
- CISF designated as Recognised Security Organisation for security planning and training.
- Graded security implementation across major and non-major ports.

Cyber and Intelligence Functions

- Dedicated cybersecurity wing for port IT and OT systems.
- Intelligence collection and sharing with national cyber and security agencies.

Threat Spectrum

Includes maritime terrorism, arms and drug smuggling, human trafficking, illegal migration, piracy, wildlife poaching, and cyber-sabotage of port operations.

Security Challenges Addressed

- Fragmented multi-agency coastal security architecture.
- Non-uniform standards across ports.
- Rising maritime crime and grey-zone threats.
- Cyber vulnerabilities amid port digitisation.
- Rapid cargo growth outpacing legacy security frameworks.

BoPS Mitigation Framework

- Unified oversight to minimise coordination failures.
- Standardised CISF-led security architecture.
- Integrated intelligence and cyber defence systems.
- Continuous compliance with ISPS and international benchmarks.

Legislative Context and Data Signals

- Cargo handled increased from 974 MMT (2014) to 1,594 MMT (2025).

- Port capacity expanded by 57% over the decade.
- Ship turnaround time reduced to ~48 hours.
- Coastal shipping volumes increased by 118%.
- Inland waterways cargo grew nearly eightfold.
- Nine Indian ports ranked in the World Bank Container Port Performance Index.

Critiques

Concerns include increased centralisation affecting State-run ports and broad inspection powers lacking explicit judicial safeguards.

Topic 4: Did an Ancient Flood Contribute to Keezhadi's Abandonment?

Why is it in the news?

A recent study by the Physical Research Laboratory, Ahmedabad, and the Tamil Nadu Department of Archaeology employed Optically Stimulated Luminescence (OSL) dating to establish when flood sediments buried parts of the Keezhadi settlement along the Vaigai river.
Published in *Current Science* (October 25), the study suggests burial occurred around 1,000 years ago, helping differentiate habitation phases from later environmental burial.

Relevance

GS I – Indian Culture & Archaeology
Urban settlements, Sangam-era material culture.

GS I & GS III – Geography–Environment Interface
River dynamics, flooding, settlement relocation, late-Holocene climate variability.

Archaeological Context

- Location: Keezhadi, Sivaganga district, Tamil Nadu, on the Vaigai floodplain.
- Excavations reveal brick structures, drains, clay floors, and pottery, indicating urban planning and craft-based economy.

Study Focus and Methodology

- Examined sediment layers overlying structures rather than construction materials.
- Used OSL dating, which measures luminescence accumulated in quartz grains since last sunlight exposure.
- Four samples from two pits indicated flood-borne burial around 1,000 years ago.

Environmental Interpretation

Late Holocene climate variability and river course migration likely caused infrastructure damage and settlement disruption, contributing to abandonment or relocation.

Significance and Limitations

- Distinguishes between habitation and burial timelines.

- Does not date construction or imply modern climate change.
- Requires integration with ceramic typology, radiocarbon dating, and stratigraphy.

Topic 5: ISRO's LVM-3 Launches 6-Tonne U.S. Satellite

Why is it in the news?

ISRO's LVM-3 successfully placed the 6,000-kg U.S. communications satellite BlueBird Block-2 into orbit, marking the heaviest foreign satellite launched by India.
This was LVM-3's third consecutive commercial mission under NewSpace India Limited (NSIL), reinforcing India's position in the global heavy-lift launch market.

Relevance

GS III – Science & Technology / Space Sector
Heavy-lift capability, cryogenic propulsion, and commercial launch services.

Mission Facts

- Launch vehicle: LVM-3 (GSLV-Mk III).
- Payload: ~6,000 kg.
- Customer: AST SpaceMobile (USA).
- Orbit: Near-equatorial Low Earth Orbit.
- Satellite released below target orbit and raised via onboard propulsion.

Launcher Configuration

- Two S200 solid strap-on boosters.
- L110 liquid core stage.
- C25 cryogenic upper stage using LOX and LH_2 .
- Payload capacity: ~8–10 tonnes to LEO, ~4–5 tonnes to GTO.

Significance

- Demonstrates heavy-satellite launch capability comparable to Falcon-9 and Ariane-6.
- Cost-competitive positioning enhances India's commercial attractiveness.
- Builds credibility for Gaganyaan and deep-space missions.

Payload Utility

BlueBird Block-2 supports direct-to-mobile satellite broadband for remote areas, disaster response, and maritime connectivity.

Strategic Outlook

- Expands India's space-economy exports.
- Strengthens public-private integration via NSIL and IN-SPACe.

- Highlights need to increase launch cadence, develop reusability, and deepen domestic supply chains.

Topic 6: Only One in Four Marginal Farmers in India Linked to Cooperatives, Report Finds

Why is it in the news?

The *State of Marginal Farmers in India 2025* report, released by the Forum of Enterprises for Equitable Development (FEED) on Kisan Diwas (December 23, 2025), reveals that fewer than 25% of marginal farmers in India are active members of agricultural cooperatives.
This finding is significant because marginal farmers constitute approximately 60–70% of India's total agricultural households.
The report draws evidence from six states — Andhra Pradesh, Bihar, Himachal Pradesh, Maharashtra, Tripura, and Uttarakhand — and highlights structural exclusion, digital divides, governance capacity gaps, and gender disparities within India's cooperative ecosystem.

Relevance

GS III – Agriculture, Inclusive Growth, Rural Institutions
Role of Primary Agricultural Credit Societies (PACS), access to credit and services, livelihood resilience.

GS II – Social Justice and Participation Gaps
Gender exclusion, digital divide, elite capture, and governance effectiveness.

Who Are Marginal Farmers?

- Definition: Farmers owning less than 1 hectare of land.
- Share in agrarian structure: 60–70% of India's agricultural households.
- Despite forming the backbone of smallholder agriculture, only about one in four marginal farmers are linked to cooperatives, indicating weak institutional inclusion.

Role of Cooperatives and PACS

- Primary Agricultural Credit Societies (PACS) constitute the lowest tier of India's cooperative system and serve as the closest institutional interface for rural households.
- PACS provide:
    - Credit and financial services
    - Input supply (seeds, fertilisers)
    - Procurement and marketing support
    - Increasingly, digital and public services such as PDS delivery and e-governance linkages
- In several states, PACS function as integrated rural service hubs, associated with improved livelihood outcomes.

Findings from the Six-State Study

- Cooperative participation is especially low in Bihar, Tripura, and Himachal Pradesh.

Barriers to Inclusion

- Complex membership procedures and documentation requirements
- Long distances to PACS and weak last-mile presence
- Limited working capital, reducing service reliability
- Persistent social exclusion based on caste, class, and gender

Consequences

- Higher dependence on informal credit and markets
- Slower income growth and increased vulnerability to climate and price shocks

Digital Divide

- Tripura: 77.8% of cooperatives use no digital tools.
- Bihar: 25% of cooperatives report zero digital adoption.
- Where digital tools exist, usage is largely informational rather than transformational.
- Women and elderly farmers face skill and access constraints, limiting benefits from digitisation.

Gender and Leadership Gaps

- Women members registered: 21.25 lakh.
- Women directors on cooperative boards: only 3,355.
- Conversion from membership to leadership remains extremely weak.
- Barriers include restrictive social norms, mobility constraints, and unpaid care burdens, resulting in male-dominated decision-making.

Impact Where Cooperative Access Exists

Income Outcomes

- 45% of cooperative-linked marginal farmers report income increases.
- Around 21% report income stagnation or decline.

Livelihood Security

- 49% of members report improved livelihood security.
- About 16% remain insecure.

Financial Inclusion

- 67% of members access credit and financial services through cooperatives.

Productivity

- 42% report improved crop yields.
- 22.5% report yield decline.

States where PACS operate as integrated service centres demonstrate stronger positive outcomes.

Why Are Marginal Farmers Excluded?

- Institutional design gaps: complex procedures, documentation barriers, capital constraints.
- Geographical inequity: uneven distribution of PACS and high travel costs.
- Social hierarchies: elite capture and limited voice for marginal groups.
- Capability deficits: low digital literacy and weak management capacity.
- Policy–practice gap: reforms emphasise scale and digitisation rather than inclusion.

Policy Relevance and Way Forward

- Strengthen last-mile cooperative presence in low-coverage districts.
- Simplify membership norms and improve grievance redressal and transparency.
- Capital infusion and professionalisation of PACS operations.
- Targeted digital capacity-building, particularly for women and elderly farmers.
- Promote integrated PACS models combining credit, inputs, procurement, and services.

Topic 7: Large Share of India's PM2.5 Is Chemically Formed in the Atmosphere, Not Directly Emitted — CREA Study

Why is it in the news?

A recent analysis by the Centre for Research on Energy and Clean Air (CREA) finds that a substantial share of India's PM2.5 pollution is not emitted directly at the source, but is formed secondarily in the atmosphere through chemical reactions involving precursor gases. The study highlights sulphur dioxide (SO_2) emissions from coal-based power plants as a major driver and estimates that up to 42% of India's PM2.5 consists of secondary particulate matter, primarily ammonium sulphate.
The findings warn that without targeting SO_2 and other precursor emissions, air-quality improvements under the National Clean Air Programme (NCAP) will remain limited and short-lived.

Relevance

GS III – Environment and Air-Pollution Governance
Secondary PM2.5 formation, SO_2 regulation, NCAP strategy gaps.

GS III – Energy–Environment Trade-offs
Coal-based power generation, FGD policy, public-health externalities.

Key Facts on PM2.5 Composition

- National share of secondary PM2.5: up to 42%, largely ammonium sulphate.

- Primary precursor: sulphur dioxide (SO_2), which reacts with ammonia and atmospheric oxidants to form sulphate aerosols.
- India is the world's largest SO_2 emitter.
- Around 60% of national SO_2 emissions originate from coal-fired thermal power plants.
- FGD policy gap: nearly 78% of coal plants are exempted from installing Flue Gas Desulphurisation systems, weakening source-level SO_2 control.

State-Level Evidence (CREA Analysis using NASA MERRA-2, 2024)

- Chhattisgarh: ammonium sulphate contributes about 42% of PM2.5.
- Odisha: about 41%.
- Across states, ammonium sulphate accounts for 17–42% of PM2.5 mass, with most states clustering around 30–40%.

Seasonal Pattern (Pan-India)

- Winter: 31–52% of PM2.5.
- Post-monsoon: 27–53%.
- Summer: 11–36%.
- Monsoon: 4–26%.
  Secondary PM2.5 remains significant throughout the year and dominates during high-pollution months.

Delhi Case Study

- About 33% of Delhi's annual PM2.5 load is secondary ammonium sulphate.
- Seasonal dominance:
  - Post-monsoon: 49%
  - Winter: 41%
  - Summer and monsoon: around 21%
- Severe pollution episodes are driven largely by regional SO_2 plumes and secondary formation, not only local primary emissions.

Key Implications of the Findings

- India's PM2.5 challenge is not limited to road dust or directly emitted particulates.
- Secondary particulate matter is a central driver of air pollution.
- Controlling coal-based SO_2 emissions is critical for sustained air-quality improvement.
- FGD exemptions undermine health outcomes and NCAP effectiveness.
- States with dense clusters of thermal power plants exhibit the highest secondary sulphate burdens.

Policy and Monitoring Gaps

- Current strategies focus heavily on PM10 and visible dust sources.
- Chemical composition and precursor gases such as SO_2 , NO_2 , and NH_3 remain under-regulated.

CREA's Evidence-Based Policy Recommendations

- Reinstate mandatory FGD installation across all coal-based thermal power plants.
- Integrate precursor-gas reduction targets into future NCAP revisions.
- Expand speciated PM monitoring, including sulphates, nitrates, and ammonium, alongside mass concentration measurements.
- Coordinate regional emission controls during winter and post-monsoon high-risk periods.

What Is Secondary PM2.5?

- **Primary PM2.5**: Emitted directly from sources such as dust, combustion, and vehicle exhaust.
- **Secondary PM2.5**: Formed in the atmosphere through chemical reactions:
  - SO_2 → sulphates (ammonium sulphate)
  - NOx → nitrates
  - NH_3 from agriculture and waste reacts with sulphates and nitrates
- Secondary particles are finer, more toxic, travel longer distances, and drive regional pollution episodes.

26th December 2026: Daily MCQs

1. With reference to **Geographical Indication (GI) tags in India**, consider the following statements:

1. GI protection in India is granted for a period of 10 years and can be renewed indefinitely.
2. GI rights are individual intellectual property rights similar to patents.
3. Hyderabad lac bangles received GI status after Warangal chapata chilli.
4. The GI Registry functions under the Department for Promotion of Industry and Internal Trade (DPIIT).

Which of the statements given above are correct?

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

Answer: a)

Explanation:

- Statement 1 is Correct – GI validity is 10 years, renewable.
- Statement 2 ✗ Incorrect – GI is a **collective right**, not individual IP.
- Statement 3 ✗ Incorrect – Hyderabad lac bangles (2024) came **before** Warangal chapata chilli (2025).
- Statement 4 ✔ Correct – GI Registry is under DPIIT.

2. Consider the following statements regarding **India's manufacturing performance**:

1. India's manufacturing share in GDP has remained broadly stagnant at around 15–17% for nearly three decades.
2. The "Dutch Disease" argument applied to India attributes manufacturing stagnation primarily to a natural resource export boom.
3. High public-sector wages may appreciate the real exchange rate even without nominal currency appreciation.
4. East Asian economies responded to rising wages by suppressing labour costs rather than upgrading technology.

Which of the statements given above are correct?

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

Answer: a)

Explanation:

- Statement 1 ✔ Correct.
- Statement 2 ✗ Incorrect – India's case is a **policy-induced variant**, not resource-led.
- Statement 3 ✔ Correct – domestic price rise can cause real appreciation.
- Statement 4 ✗ Incorrect – East Asia invested in **automation and technology**.

MCQ 3:

With reference to the **Bureau of Port Security (BoPS)**, consider the following statements:

1. BoPS is a statutory body established under the Merchant Shipping Act, 2025.
2. BoPS directly performs operational security duties at ports in place of CISF.
3. Enforcement of the International Ship and Port Facility Security (ISPS) Code falls within BoPS's mandate.
4. BoPS has a dedicated role in addressing cybersecurity threats to port IT systems.

Which of the statements given above are correct?

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

Answer: b)

Explanation:

- Statement 1 ✔ Correct.
- Statement 2 ✘ Incorrect – CISF remains the operational arm; BoPS is regulator.
- Statement 3 ✔ Correct.
- Statement 4 ✔ Correct – cyber-port security is explicit.

MCQ 4:

Consider the following statements regarding the **Keezhadi archaeological site**:

1. Optically Stimulated Luminescence (OSL) dating determines the age of brick structures directly.
2. The recent study dated flood-deposited sediments rather than habitation layers.
3. The findings suggest burial of the settlement around 1,000 years ago.
4. The Vaigai river's course shift supports the flood-burial hypothesis.

Which of the statements given above are correct?

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

Answer: b)

Explanation:

- Statement 1 ✘ Incorrect – OSL dates **sediments**, not bricks.
- Statements 2, 3, 4 ✔ Correct.

MCQ 5:

With reference to **ISRO's LVM-3 rocket**, consider the following statements:

1. LVM-3 uses a cryogenic upper stage powered by liquid oxygen and liquid hydrogen.
2. The BlueBird Block-2 satellite placed into orbit was the heaviest foreign satellite launched by India.
3. LVM-3 is primarily designed for small satellite launches under rideshare missions.
4. NewSpace India Limited (NSIL) handles ISRO's commercial launch contracts.

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, 3 and 4 only

Answer: b)

Explanation:

- Statement 1 ✔ Correct.
- Statement 2 ✔ Correct.
- Statement 3 ✘ Incorrect – LVM-3 is a **heavy-lift launcher**.
- Statement 4 ✔ Correct.

MCQ 6: Marginal Farmers & Cooperatives

Consider the following statements:

1. Marginal farmers constitute less than half of India's agricultural households.
2. Less than 25% of marginal farmers are members of cooperatives.
3. States where PACS function as integrated service centres show better income outcomes.
4. Digital adoption in cooperatives is uniformly high across Indian states.

Which of the statements given above are correct?

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

Answer: a)

Explanation:

- Statement 1 ✘ Incorrect – marginal farmers are **60–70%**.
- Statement 2 ✔ Correct.
- Statement 3 ✔ Correct.
- Statement 4 ✘ Incorrect – digital divide is severe.

MCQ 7:

With reference to **PM2.5 pollution in India**, consider the following statements:

1. Secondary PM2.5 is formed through chemical reactions involving precursor gases in the atmosphere.

2. Sulphur dioxide emissions from coal-based power plants are a major contributor to secondary PM2.5.
3. Flue Gas Desulphurisation (FGD) systems directly reduce particulate matter emissions at the tailpipe.
4. Secondary PM2.5 particles are generally finer and travel longer distances than primary PM.

Which of the statements given above are correct?

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

Answer: b)

Explanation:

- Statement 1 ✔ Correct.
- Statement 2 ✔ Correct.
- Statement 3 ✘ Incorrect – FGDs reduce **SO_2** , not PM directly.
- Statement 4 ✔ Correct.

MCQ 8:

Which of the following best explains why **India's air-quality gains under NCAP may be short-lived**?

a) Over-emphasis on PM10 monitoring rather than PM2.5
b) Failure to regulate precursor gases such as SO_2 and NH_3
c) Seasonal variability of monsoon rainfall
d) Limited public awareness about air pollution

Answer: b)

Explanation:
CREA study highlights that **secondary PM2.5** driven by precursor gases remains largely unaddressed.

Mains: The Supreme Court's ruling that forest land cannot be diverted for non-forestry purposes reinforces the doctrine of environmental rule of law. Discuss the constitutional and federal implications of this judgment. 150 words.