

UPSC CSE Mains 2026

GENERAL STUDIES PAPER III

Complete Model Answers - All 20 Questions

Economy • Agriculture • Science & Technology • Environment • Disaster
Management • Internal Security

Paper conducted 23 August 2026, 9:00 AM - 12:00 Noon, 250 marks total. Each answer follows the structure:
Directive-verb Approach → Introduction → Numbered body points → Diagram (where relevant) → Conclusion.
Questions reproduced as printed on the official paper; model answers are independently written for exam practice.

Section A — 10 Marks / 150 Words Each (Q1–Q10)

Q1. What do you mean by Digital Rupee? In this context, explain the working and progress of India's Central Bank Digital Currency (CBDC).

[10 marks | Answer in 150 words]

Approach: Two-part: (a) define Digital Rupee, (b) explain working mechanism and progress/pilots.

Introduction: The Digital Rupee (e₹) is India's Central Bank Digital Currency (CBDC) - a digital form of the Reserve Bank of India's sovereign currency, representing a direct RBI liability, launched in pilot mode from November-December 2022 in wholesale and retail variants.

Body:

1. Definition: e₹ is legal tender issued digitally by the RBI, distinct from private cryptocurrencies (no central issuer) and from bank deposits (which are commercial bank liabilities, not central bank liabilities).
2. Two-tier distribution model: RBI issues e₹ to banks, who distribute it to end-users via digital wallets, mirroring how physical cash is distributed today.
3. Wholesale CBDC (e₹-W): piloted from November 2022 for interbank settlement of government securities transactions, reducing settlement risk.
4. Retail CBDC (e₹-R): piloted from December 2022, using a token-based architecture offering cash-like features; began in select cities with select banks and has since been progressively expanded.
5. Progress: offline transaction functionality has been introduced for areas with poor connectivity; programmability features have been piloted for targeted welfare-payment use cases; interoperability with UPI QR codes has eased merchant acceptance.

Figure: Two-tier distribution model of the Digital Rupee (e₹)



Two-tier model mirrors physical cash distribution

Figure: Two-tier distribution model of the Digital Rupee (e₹).

Conclusion: The Digital Rupee reflects RBI's calibrated, phased approach to sovereign digital currency, balancing payment-system innovation with monetary and financial stability, though full nationwide scale-up remains gradual pending further pilot learnings.

Q2. Examine the view that financial inclusion is an integral part of social and economic inclusion in a country like India. Also throw light on the usefulness of the R.B.I.'s Financial Inclusion Index.

[10 marks | Answer in 150 words]

Approach: 'Examine' -> analyse the linkage, then explain the Index's construction and usefulness.

Introduction: Financial inclusion - ensuring universal access to formal financial services - is widely regarded as a foundational condition for broader social and economic inclusion in a country like India with historically large unbanked and underbanked populations.

Body:

1. Linkage to economic inclusion: access to savings, credit and insurance enables income smoothing, entrepreneurship and resilience to income shocks, directly enabling fuller economic participation.

2. Linkage to social inclusion: financial inclusion via Jan Dhan accounts has enabled Direct Benefit Transfers, reducing leakages and empowering marginalised groups and women beneficiaries.
3. RBI's Financial Inclusion Index (FI-Index): a comprehensive, single-value composite index (0-100), published annually since 2021, without a fixed base year, making it comparable over time.
4. Construction: aggregates indicators across three weighted parameters - Access (35%), Usage (45%) and Quality (20%) - of financial services.
5. Usefulness: helps policymakers track the effectiveness of financial-inclusion measures over time and across regions, enabling calibrated, evidence-based interventions.
6. Limitation: as an aggregate index, it can mask significant rural-urban, inter-state and gender disparities that persist beneath the headline number.

Conclusion: Financial inclusion functions as an enabling foundation for both economic participation and social empowerment, and the RBI's Financial Inclusion Index offers a valuable evolving tool for monitoring this process, though disaggregated tracking remains necessary to address persistent disparities.

Q3. Describe the various Technology Missions initiated in Indian agriculture and examine their role in food security.

[10 marks | Answer in 150 words]

Approach: 'Describe' -> list missions with brief detail; 'examine' -> assess contribution to food security.

Introduction: The Government of India has launched several technology-driven missions in agriculture aimed at improving productivity, resilience and value-chain efficiency, in turn strengthening national food security.

Body:

1. Digital Agriculture Mission (2021): uses AI, remote sensing and the farmer database ('Agristack') to provide precision advisories and improve targeting of schemes.
2. Sub-Mission on Agricultural Mechanization (SMAM): promotes farm-machinery access through Custom Hiring Centres, raising productivity per unit of labour.
3. National Food Security Mission (NFSM): technology-backed interventions - certified seed distribution, cropping-system demonstrations - to boost rice, wheat, pulses and coarse-cereal output.
4. National Mission on Edible Oils - Oil Palm (NMEO-OP): technology and area-expansion mission aimed at reducing India's edible-oil import dependence.
5. Rashtriya Krishi Vikas Yojana (RKVY): technology-linked state-level investment in agricultural infrastructure.
6. Role in food security: these missions have collectively driven yield gains, crop diversification and reduced post-harvest losses, directly underpinning India's transition from a food-deficit to a food-surplus, exporting economy.

Conclusion: These technology missions collectively form the backbone of India's modern agricultural strategy, translating scientific and digital innovation into on-ground productivity gains essential for sustained food security.

Q4. Explain the factors responsible for inefficiency of agri-produce marketing. How e-commerce helps to reduce inefficiency of agri-produce marketing? Explain.

[10 marks | Answer in 150 words]

Approach: Two-part: (a) explain causes of inefficiency, (b) explain e-commerce's remedial role.

Introduction: Indian agricultural-produce marketing continues to suffer structural inefficiencies rooted in fragmented value chains, regulatory constraints and weak infrastructure, though e-commerce platforms are increasingly helping bridge these gaps.

Body:

1. Fragmented land holdings and multiple intermediaries (commission agents, wholesalers, retailers) inflate the price spread between farm-gate and consumer prices.
2. The traditional APMC mandi system historically confined farmers to selling within notified market yards, limiting competition and price discovery.
3. Poor post-harvest infrastructure - inadequate cold storage, warehousing and grading facilities - causes high wastage, estimated at 10-15% for perishables.
4. Information asymmetry: farmers often lack real-time price data across markets, weakening their bargaining position.
5. e-NAM (electronic National Agriculture Market): an online trading platform integrating APMC mandis, giving farmers access to wider buyer pools and better price discovery.
6. Direct-to-consumer and B2B agri-e-commerce platforms bypass multiple intermediary layers, improving farmer price realisation, while partnerships with cold-chain and last-mile logistics reduce spoilage and transaction costs.

Conclusion: While structural and infrastructural inefficiencies remain deep-rooted, expanding e-commerce and digital market platforms like e-NAM offer a scalable pathway toward more transparent, competitive and efficient agricultural marketing in India.

Q5. Explain by giving two examples, how biotechnology has helped the Indian farmers in processing their perishable crops.

[10 marks | Answer in 150 words]

Approach: 'Explain by giving two examples' -> pick two clear, distinct biotech applications and explain each.

Introduction: Biotechnology has given Indian farmers tools to extend shelf life, reduce post-harvest losses and add value to perishable crops, addressing a major bottleneck in the country's fruit and vegetable economy.

Body:

1. Example 1 - Delayed-ripening technology: biotechnology interventions (such as RNA-interference techniques that suppress ripening-related genes) extend the shelf life of climacteric fruits like tomato, reducing spoilage during transport and storage.
2. This directly benefits farmers by widening their effective marketing window and reducing distress sales immediately after harvest.
3. Example 2 - Bio-based edible coatings: biotechnology-derived edible coatings (such as chitosan-based coatings, produced from crustacean or fungal biomass) applied to fruits and vegetables slow respiration and microbial spoilage, extending shelf life significantly without chemical preservatives.
4. Complementary applications: tissue-culture-based disease-free planting material (e.g. for banana and potato) improves crop quality and post-harvest durability at the source, while biotech-derived enzymes (pectinases, cellulases) improve yield and quality in fruit-juice processing.

Conclusion: By addressing spoilage and quality degradation at multiple stages - from field to processing - biotechnology applications are helping Indian farmers convert the perishability of horticultural produce from a liability into a manageable, value-added opportunity.

Q6. Distinguish between a Fast Breeder Reactor (FBR) and a thermal nuclear reactor. In the context of first indigenously developed prototype FBR at Kalpakkam, explain the term 'criticality'. What are its implications for clean energy future of our country?

[10 marks | Answer in 150 words]

Approach: Three-part: (a) distinguish FBR vs thermal reactor, (b) explain criticality, (c) explain implications for clean energy.

Introduction: India's first indigenously developed Prototype Fast Breeder Reactor (PFBR) at Kalpakkam marks a critical step in Stage II of India's three-stage nuclear power programme, distinct in design and fuel strategy from conventional thermal reactors.

Body:

1. Thermal reactor: uses slow ('thermalised') neutrons, moderated by materials such as heavy water or graphite, to sustain fission chiefly in Uranium-235.
2. Fast Breeder Reactor (FBR): uses fast, unmoderated neutrons and can convert fertile Uranium-238/Thorium-232 into fissile Plutonium-239/Uranium-233, thereby 'breeding' more fuel than it consumes.
3. Fuel-cycle difference: FBRs use a mixed-oxide (MOX) fuel core surrounded by a fertile-material 'blanket', unlike a thermal reactor's enriched-uranium fuel rods.
4. Criticality: the state at which a nuclear chain reaction becomes self-sustaining - the number of neutrons produced by fission exactly balances neutrons lost to absorption and leakage (effective multiplication factor, $k = 1$). The PFBR achieving 'first criticality' validates that its indigenous design can sustain a controlled chain reaction.
5. Implication - fuel multiplication: FBRs can multiply India's usable nuclear-fuel reserves manifold by eventually utilising the country's abundant domestic thorium reserves in Stage III, reducing import dependence on uranium.
6. Implication - clean baseload power: FBRs support low-carbon baseload generation that complements the intermittency of renewables, supporting India's net-zero-by-2070 target.

Conclusion: The PFBR's criticality milestone marks India's transition toward long-term energy self-sufficiency through its unique three-stage nuclear programme, positioning fast breeder technology as a cornerstone of the country's clean-energy security.

Q7. Discuss how the contradiction between 'rapid infrastructure development' and 'disaster-risk reduction' in ecologically-sensitive areas of India can be managed, with suitable examples.

[10 marks | Answer in 150 words]

Approach: 'Discuss how it can be managed' -> briefly state the tension, then focus mainly on reconciliation measures with examples.

Introduction: Rapid infrastructure development in India's ecologically sensitive regions - the Himalayas, Western Ghats, coastal zones - often proceeds without adequate disaster-risk assessment, creating a persistent tension between developmental and safety imperatives, as seen in recurring Himalayan landslides and subsidence events.

Body:

1. Nature of the contradiction: road, hydropower and tourism infrastructure in fragile terrain often involves slope destabilisation and altered drainage, increasing landslide and flood vulnerability - as with the Char Dham road project cutting through unstable Himalayan slopes.
2. Example: the Joshimath land-subsidence episode has been linked partly to unregulated construction and hydropower tunnelling in a geologically sensitive zone, illustrating the cost of bypassing disaster-risk assessment.
3. Management measure - mandatory, rigorous Environmental and Disaster Impact Assessments before project clearance in Eco-Sensitive Zones, backed by carrying-capacity studies, as recommended for Himalayan states.
4. Management measure - eco-sensitive engineering (bioengineering slope stabilisation, tunnel-boring instead of open-cut construction) to minimise ecological disturbance.
5. Management measure - empowering the National and State Disaster Management Authorities with a statutory say in infrastructure clearances within high-risk zones, alongside hazard-based zonation planning

(landslide susceptibility, flood-plain zoning).

6. Management measure - integrating community-based early-warning systems with infrastructure projects, as piloted in some Himalayan states.

Conclusion: Managing this contradiction requires embedding disaster-risk reduction as a non-negotiable design parameter - not an afterthought - within infrastructure planning in ecologically sensitive regions, backed by science-based zonation and strengthened institutional oversight.

Q8. Discuss the aim and goals of Kunming-Montreal global biodiversity framework. Mention India's commitments and initiatives to achieve the goals and targets of this framework giving suitable examples.

[10 marks | Answer in 150 words]

Approach: Two-part: (a) discuss aim/goals of the GBF, (b) mention India's commitments and initiatives with examples.

Introduction: The Kunming-Montreal Global Biodiversity Framework (GBF), adopted at CBD COP15 in December 2022, sets out an ambitious global roadmap to halt and reverse biodiversity loss by 2030, with India as an active signatory aligning its national action accordingly.

Body:

1. Overarching aim: to put biodiversity on a path to recovery by 2030 (the '30-by-30' vision) and achieve a world living in harmony with nature by 2050.
2. Key target - protection: conserve at least 30% of terrestrial, inland-water and coastal/marine areas through effective, equitable protected-area systems by 2030.
3. Key target - restoration: restore at least 30% of degraded terrestrial, inland-water and marine ecosystems by 2030.
4. Key target - finance: mobilise at least USD 200 billion annually for biodiversity from all sources, including USD 20-30 billion annually to developing countries.
5. India's commitment: an updated National Biodiversity Strategy and Action Plan (NBSAP), aligned with the GBF targets, submitted to the CBD.
6. India's initiatives: expansion of the Protected Area network; species-recovery programmes (Project Tiger, Project Cheetah, Project Elephant); mainstreaming biodiversity through instruments such as the Green Credit Programme, which incentivises ecosystem restoration.

Conclusion: The Kunming-Montreal GBF provides a comprehensive, measurable global framework for biodiversity conservation, and India's updated NBSAP and conservation initiatives reflect a serious, evolving effort to align domestic action with these ambitious international commitments.

Q9. Explain how fake news and disinformation pose threat to Internal Security and Public Order in Indian context? In this regard, discuss salient features of amendments in respect of Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules 2021.

[10 marks | Answer in 150 words]

Approach: Two-part: (a) explain the threat, (b) discuss salient features of the IT Rules amendments.

Introduction: Fake news and disinformation, amplified by social media's speed and reach, have emerged as significant non-traditional threats to India's internal security and public order, prompting the government to strengthen the regulatory framework under the IT Rules.

Body:

1. Threat to public order: fabricated content can trigger communal tension and mob violence by spreading rumours, as seen in various social-media-triggered incidents.

2. Threat to national security: disinformation campaigns, including suspected cross-border operations, can undermine public trust in institutions, the armed forces and electoral processes.
3. Economic/social threat: fake financial news can trigger market panic, while health-related disinformation (as during the COVID-19 pandemic) undermines public-health response.
4. IT (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, as amended, establish a due-diligence framework for social-media intermediaries and digital media.
5. Fact-checking mechanism: amendments empower a government-notified fact-check unit to identify 'fake or false' government-related content, with intermediaries required to remove it or lose safe-harbour protection - a provision under ongoing judicial scrutiny.
6. Grievance redressal and traceability: mandatory Grievance Officers, a three-tier grievance-redressal mechanism including Grievance Appellate Committees, and a traceability requirement for significant social-media intermediaries to identify the first originator of flagged messages.

Conclusion: While the IT Rules amendments strengthen the institutional toolkit against disinformation-driven threats to internal security, their implementation must be carefully balanced against free-speech safeguards - a balance still being worked out through ongoing judicial review.

Q10. Ladakh is strategically located between China and Pakistan. As a measure to win hearts and minds of locals, discuss the Border Area Development Programmes (BADP) by the Central Government and civic actions by the Army. Also discuss demand of promulgation of provision of the Sixth Schedule of constitution for Ladakh.

[10 marks | Answer in 150 words]

Approach: Three-part: (a) discuss BADP, (b) discuss Army civic action, (c) discuss the Sixth Schedule demand.

Introduction: Ladakh's strategic location bordering both China and Pakistan makes winning local trust central to India's border-management strategy, pursued through developmental programmes and Army civic action, even as its status as a Union Territory without a legislature has fuelled demands for Sixth Schedule protection.

Body:

1. Border Area Development Programme (BADP): a Centrally Sponsored Scheme funding infrastructure - roads, schools, health centres, drinking water - in villages along the international border/LAC, aimed at reducing alienation and discouraging outmigration from border villages.
2. In Ladakh specifically, BADP funds connectivity and livelihood projects in remote border villages, strengthening both development and civilian presence near the border.
3. Army civic action ('Operation Sadbhavana' in Ladakh): running schools, medical camps and vocational-training and youth-engagement programmes, building goodwill in a strategically sensitive zone.
4. Sixth Schedule demand: following Ladakh's reorganisation into a Union Territory without a legislature in 2019, local groups (Leh Apex Body, Kargil Democratic Alliance) have demanded Sixth Schedule status to protect land, culture and jobs, and provide greater local autonomy through Autonomous District/Hill Councils.
5. The demand also reflects concerns over demographic and ecological protection given Ladakh's fragile Himalayan environment; the government has engaged Ladakhi representatives through a high-powered committee, though a final decision remains pending.

Conclusion: A combination of sustained BADP-funded development, proactive Army civic engagement and a responsive political process addressing the Sixth Schedule demand is essential to consolidate Ladakh's strategic and emotional integration with the national mainstream.

Section B — 15 Marks / 250 Words Each (Q11–Q20)

Q11. Explain the key challenges for India's energy security. What measures do you suggest for ensuring energy security along with economic growth and sustainability?

[15 marks | Answer in 250 words]

Approach: Two-part: (a) explain challenges, (b) suggest measures balancing growth and sustainability.

Introduction: Energy security - ensuring uninterrupted availability of energy at affordable prices - remains a critical challenge for India given heavy import dependence, rising demand, and the need to balance growth with sustainability commitments.

Body:

1. Challenge - High import dependence: India imports over 85% of its crude oil and roughly half of its natural gas requirement, exposing the economy to global price volatility and supply-chain risk.
2. Challenge - Coal dependence: despite large domestic reserves, quality issues and logistics bottlenecks necessitate coking-coal imports for steel, and periodic thermal-coal shortages strain power supply.
3. Challenge - Infrastructure gaps: limited strategic petroleum reserve cover, transmission losses, and grid-integration difficulties for variable renewable energy.
4. Challenge - Geopolitical vulnerability: reliance on a few supplier regions (Middle East, Russia) exposes India to disruption from conflicts and sanctions regimes.
5. Challenge - Renewable intermittency: solar/wind variability requires complementary storage and grid-balancing solutions not yet available at scale.
6. Challenge - Critical-mineral dependence: import reliance on lithium, cobalt and rare earths needed for battery, EV and renewable-equipment manufacturing.
7. Measure - Diversifying import sources and expanding strategic petroleum reserves toward international benchmarks (around 90 days of consumption).
8. Measure - Accelerating renewable capacity (targeting 500 GW non-fossil by 2030) alongside battery storage and the National Green Hydrogen Mission.
9. Measure - Expanding domestic exploration (Open Acreage Licensing Policy) and nuclear capacity, including fast breeder reactors, for low-carbon baseload power.
10. Measure - Securing critical-mineral supply chains through overseas asset acquisition (e.g. KABIL) and domestic exploration incentives.
11. Measure - Promoting energy efficiency (PAT scheme, UJALA) and demand-side management to reduce the overall energy intensity of GDP.

Conclusion: Ensuring energy security while sustaining growth and meeting climate commitments requires an integrated strategy combining diversification, domestic capacity-building, storage/grid innovation and efficiency - a balance India is actively calibrating through missions like the National Green Hydrogen Mission and its Panchamrit climate targets.

Q12. How are startups in India promoting entrepreneurship, innovation and employment? Discuss the global and domestic challenges in their working and suggest suitable measures to overcome these challenges.

[15 marks | Answer in 250 words]

Approach: Three-part: (a) discuss startups' contribution, (b) discuss domestic and global challenges, (c) suggest measures.

Introduction: India's startup ecosystem, the world's third largest, has emerged as a significant engine of entrepreneurship, innovation and employment generation, propelled substantially by the Startup India initiative launched in 2016.

Body:

1. Entrepreneurship promotion: Startup India's tax exemptions, self-certification-based compliance and simplified registration lower entry barriers for first-generation entrepreneurs.
2. Innovation: sectors like fintech, healthtech, agritech and deep-tech have seen startups develop indigenous solutions, often filling gaps unaddressed by larger incumbents.
3. Employment: DPIIT-recognised startups have created substantial direct employment, with indirect multipliers across logistics, gig-work platforms and ancillary services.
4. Regional spread: Tier-2/3 city startup hubs are emerging, aided by the Fund of Funds for Startups (FFS) and state-level startup policies, broadening the geographic base of entrepreneurship.
5. Domestic challenge - funding access: cyclical venture-funding slowdowns disproportionately affect early-stage and non-metro startups.
6. Domestic challenge - residual compliance burden and slow contract enforcement/dispute resolution despite reforms.
7. Domestic challenge - skewed sectoral concentration (fintech, e-commerce), with a relatively weaker, capital-intensive deep-tech and hardware startup ecosystem.
8. Global challenge - profitability pressure and governance lapses at some startups have dented investor confidence.
9. Global challenge - competition for global capital amid tighter monetary conditions in advanced economies, reducing foreign VC inflows.
10. Measure - deepening domestic venture-capital and credit-guarantee mechanisms to reduce dependence on foreign capital.
11. Measure - strengthening the IP regime and deep-tech-specific funding (e.g. the National Deep Tech Startup Policy) to diversify beyond services-based startups, alongside stronger corporate-governance norms.

Conclusion: Sustaining the startup ecosystem's contribution to jobs and innovation requires deepening domestic capital markets, strengthening governance standards, and rebalancing the sectoral mix toward deep-tech and manufacturing-oriented ventures, ensuring resilience against global funding cycles.

Q13. How Indian agriculture has been transformed from food scarcity to food surplus level? Explain the various government policies implemented for diversification of Indian agriculture.

[15 marks | Answer in 250 words]

Approach: Two-part: (a) explain the scarcity-to-surplus transformation, (b) explain diversification policies.

Introduction: India's transformation from a food-deficit nation dependent on imports to a food-surplus, net agri-exporting economy represents one of independent India's most significant developmental achievements, driven by successive waves of policy intervention.

Body:

1. Green Revolution (mid-1960s onward): high-yielding-variety seeds, irrigation expansion and fertiliser use transformed wheat and rice productivity, particularly in Punjab, Haryana and western Uttar Pradesh.
2. White Revolution (Operation Flood): the cooperative dairy model made India the world's largest milk producer, diversifying rural income beyond foodgrains.
3. Procurement policy: Minimum Support Price (MSP) and Food Corporation of India procurement ensured price stability and incentivised surplus production.
4. Infrastructure expansion: growing irrigation coverage, rural roads and electrification progressively raised cropping intensity and yield stability.
5. Current status: India is now the world's largest milk producer, among the largest producers of rice, wheat, sugarcane and fruits/vegetables, and a net exporter of several agri-commodities.

6. Diversification policy - National Food Security Mission and Rashtriya Krishi Vikas Yojana: support diversification into pulses and oilseeds to reduce import dependence.
7. Diversification policy - National Mission on Edible Oils (including Oil Palm): targeted area expansion to reduce the edible-oil import bill.
8. Diversification policy - Per Drop More Crop/micro-irrigation under PMKSY: encourages a shift toward horticulture and high-value, less water-intensive crops.
9. Diversification policy - allied-sector promotion: the Blue Revolution, Pradhan Mantri Matsya Sampada Yojana and the honey/beekeeping mission diversify farm incomes beyond staple grains.
10. Diversification policy - market reforms: e-NAM and contract-farming provisions support diversification by improving price realisation for non-staple crops.

Conclusion: India's journey from scarcity to surplus reflects a sustained interplay of technology adoption, procurement-price support and infrastructure investment, with current diversification policies now aiming to make this surplus more nutritionally balanced, climate-resilient and export-competitive.

Q14. Discuss the different types of subsidies and supports provided by the Government of India to agricultural sector. Examine the related issues pertaining to Agreement on Agriculture of World Trade Organisation (WTO).

[15 marks | Answer in 250 words]

Approach: Two-part: (a) discuss types of subsidies/support, (b) examine related WTO Agreement on Agriculture issues.

Introduction: The Government of India extends a wide array of subsidies and support measures to the agricultural sector to ensure farmer income security and food self-sufficiency, several of which have become contentious under the WTO's Agreement on Agriculture (AoA).

Body:

1. Input subsidies: fertiliser subsidy (Nutrient-Based Subsidy scheme), subsidised electricity for irrigation, and subsidised crop-insurance premiums under PMFBY.
2. Price support: Minimum Support Price (MSP) procurement for over 20 crops, chiefly benefiting rice and wheat farmers in select states.
3. Credit support: interest subvention on crop loans under the Kisan Credit Card scheme, lowering the effective cost of farm borrowing.
4. Direct income support: PM-KISAN, providing direct cash transfers to landholding farmer families.
5. Infrastructure/investment support: the Agriculture Infrastructure Fund and capital subsidies for cold storage and warehousing.
6. AoA classification: support is classified into 'boxes' - Green Box (non/minimally trade-distorting, e.g. research, infrastructure), Amber Box (trade/production-distorting, e.g. MSP-based procurement), and Blue Box (production-limiting support).
7. De minimis limits: developing countries like India are permitted Amber Box support up to 10% of the value of production, calculated using an outdated external reference price based on 1986-88 prices.
8. India has repeatedly exceeded the de minimis limit for rice procurement under WTO's own calculation methodology, though temporarily shielded by the 'Peace Clause' agreed at the 2013 Bali Ministerial, pending a permanent solution.
9. India, along with the G-33 group of developing countries, has consistently pushed for a permanent solution on public stockholding for food security, arguing the outdated reference price unfairly inflates the calculated subsidy.
10. India views developed countries' continuing high absolute support under Green Box exemptions as an asymmetry in the AoA framework, since India's welfare-driven food-security programmes face comparatively stricter scrutiny.

Conclusion: While India's agricultural subsidy architecture is essential for farmer welfare and food security, its interface with the WTO's AoA remains a site of persistent negotiation, with India advocating a permanent, equitable solution on public stockholding that reflects current economic realities rather than a decades-old reference price.

Q15. Mention salient features of 'Mission Drishti'. Discuss the imaging techniques used in the satellite launched on 3rd May 2026. Why it is being considered world's first satellite of its kind?

[15 marks | Answer in 250 words]

Approach: Three-part: (a) salient features, (b) discuss imaging techniques, (c) explain why it is a world first.

Introduction: Mission Drishti, launched on 3 May 2026 aboard a SpaceX Falcon 9 from Vandenberg Space Force Base, is India's largest privately built Earth-observation satellite, developed by the Bengaluru-based startup GalaxEye, and is recognised as the world's first operational OptoSAR satellite.

Body:

1. Salient feature - developer and scale: built by GalaxEye (an IIT Madras-linked startup), weighing about 190 kg, making it India's largest privately developed Earth-observation satellite.
2. Salient feature - launch: placed in orbit on a SpaceX Falcon 9 rocket, reflecting India's growing private space sector alongside other milestones such as Skyroot's Vikram-S and Agnikul Cosmos's 3D-printed rocket engine.
3. Salient feature - dual-sensor payload: carries both an optical (electro-optical, multi-spectral) camera and a Synthetic Aperture Radar (SAR) sensor on the same platform.
4. Salient feature - AI-assisted imaging: uses artificial intelligence to reconstruct optical-like images from SAR data when cloud cover blocks the optical sensor, making radar data more intuitively usable.
5. Imaging technique - Optical sensing: provides high-resolution, colour visual imagery, but cannot see through cloud cover or in darkness.
6. Imaging technique - Synthetic Aperture Radar (SAR): an active radar-imaging technique that sends out microwave pulses and interprets the reflected signal, enabling imaging through clouds and at night, addressing the major 'tropical cloud cover' limitation faced by optical-only satellites over countries like India.
7. Imaging technique - Synchronised fusion: a proprietary 'SyncFused' technology stack aligns and merges the optical and SAR data streams captured from different sensor angles at the same instant, producing a single composite, all-weather image without manual post-processing alignment.
8. Why a 'world first': Mission Drishti is the first satellite globally to physically place both an optical camera and a SAR sensor on the exact same platform and fuse their data in synchronised, real time, rather than combining separately orbiting optical and SAR satellites' data after the fact.
9. Applications: border surveillance and defence, disaster response (flood, cyclone and landslide damage assessment), agriculture monitoring, infrastructure planning and insurance-risk assessment - all benefiting from continuous, all-weather, day-and-night imaging.

Figure: OptoSAR concept - Mission Drishti fuses optical + SAR on one platform

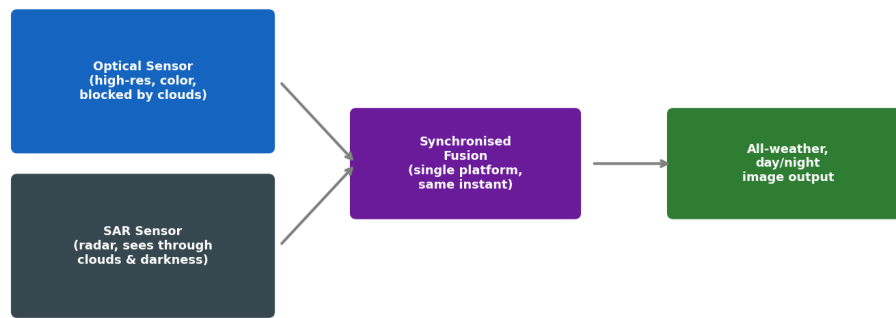


Figure: OptoSAR concept - Mission Drishti fuses optical and SAR sensing on a single platform.

Conclusion: Mission Drishti's architectural innovation - fusing optical clarity with radar's all-weather capability on one synchronised platform - solves a long-standing limitation of Earth observation and marks a significant milestone for India's private space ecosystem, even as the satellite's subsequent loss of communication during a solar storm underscores the operational risks facing small satellites in low Earth orbit.

Q16. What is agentic Artificial Intelligence (AI)? Explain its working. Describe its applications with suitable examples. Discuss the advantages, risks and challenges associated with agentic AI systems.

[15 marks | Answer in 250 words]

Approach: Four-part: (a) define, (b) explain working, (c) describe applications with examples, (d) discuss advantages/risks/challenges.

Introduction: Agentic AI refers to a class of artificial intelligence systems that can autonomously plan, decide and execute multi-step tasks toward a given goal with minimal human intervention, marking a shift from AI as a passive tool to AI as an active, goal-directed agent.

Body:

1. Definition: unlike traditional generative AI that responds to single prompts, agentic AI systems break a high-level goal into sub-tasks, use external tools and APIs, and iteratively adjust their plan based on feedback.
2. Working - Perceive: the agent gathers information from its environment - data, user instructions, and outputs from tools it has already used.
3. Working - Plan/Reason: using a large language model as a reasoning engine, the agent decomposes the goal into an ordered sequence of actions.
4. Working - Act: the agent executes actions - calling APIs, browsing the web, writing and running code, or invoking other software tools.
5. Working - Observe and iterate: the agent evaluates outcomes against the goal, updates its memory/internal state, and repeats the cycle until the goal is achieved or a stopping condition is met.
6. Application - customer service: agents handling multi-step queries (booking changes, refund processing) end-to-end without human handoff.
7. Application - software development: coding agents that can write, test and debug code autonomously across multiple files.
8. Application - enterprise automation: agents managing supply-chain reordering, financial reconciliation or research synthesis without step-by-step human direction.
9. Advantage: significant productivity gains and the ability to handle complex, multi-step workflows without constant supervision, enabling faster decision cycles.

10. Risk - autonomy/misalignment: agents may take unintended or harmful actions if goals are mis-specified, a phenomenon sometimes called 'reward hacking'.
11. Risk - accountability gap: unclear liability when autonomous agent actions cause errors or harm, especially in high-stakes domains like finance or healthcare.
12. Risk - security: tool/API access creates new attack surfaces, such as prompt injection or unauthorised data access, alongside broader concerns about job displacement.

Figure: The agentic AI loop - autonomous, iterative goal pursuit

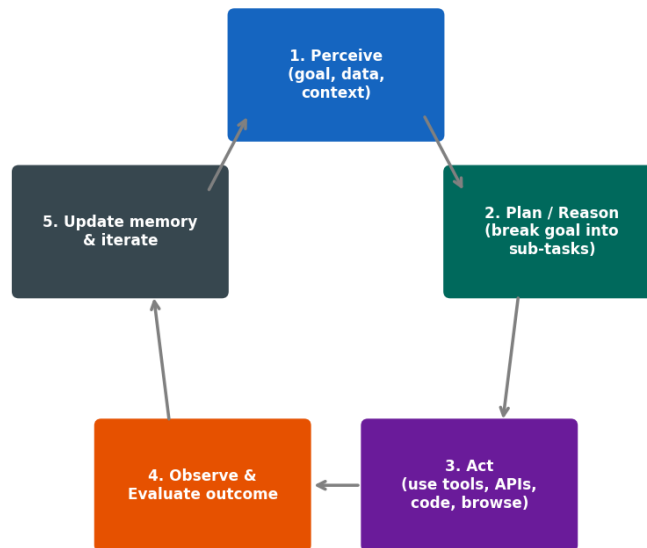


Figure: The agentic AI loop - autonomous, iterative goal pursuit.

Conclusion: Agentic AI represents a significant evolution in AI capability with transformative productivity potential, but its autonomous, tool-using nature demands robust governance frameworks, human-in-the-loop oversight mechanisms and clear accountability structures to safely harness its benefits.

Q17. What are the challenges to solid waste management in India? Discuss the governmental policy framework on solid waste management. Discuss the success/failure causes of Delhi and Indore cities highlighting the salient feature of their solid waste management initiatives.

[15 marks | Answer in 250 words]

Approach: Three-part: (a) discuss challenges, (b) discuss policy framework, (c) compare Delhi and Indore's experience.

Introduction: Solid waste management remains one of urban India's most persistent governance challenges, with rapid urbanisation generating waste faster than municipal capacity to process it, though cities like Indore demonstrate that effective models are achievable while Delhi's experience highlights the difficulties of managing waste at scale.

Body:

1. Challenge - generation outpacing infrastructure: India generates a very large volume of municipal solid waste daily, with collection and processing infrastructure lagging in larger metros.
2. Challenge - poor segregation at source: mixed waste complicates downstream composting and recycling, undermining the entire waste-management chain.

3. Challenge - legacy waste/landfill crisis: mountains of untreated legacy waste at major-city landfills pose fire, health and environmental hazards.
4. Challenge - institutional/financial constraints: municipal bodies often lack financing, trained personnel and technical capacity for scientific waste processing.
5. Challenge - informal-sector integration: a large informal waste-picker economy operates outside formal systems, complicating traceability though it plays a crucial recycling role.
6. Policy framework - Solid Waste Management Rules, 2016 (under the Environment Protection Act): mandate source segregation into wet/dry/hazardous waste and assign responsibilities across generators, municipalities and processing agencies.
7. Policy framework - Swachh Bharat Mission-Urban 2.0: focuses explicitly on source segregation, scientific processing and legacy-waste remediation, using 'garbage-free city' star ratings.
8. Policy framework - Extended Producer Responsibility under the Plastic Waste Management Rules: mandates producers and importers to manage the plastic waste they generate.
9. Indore's success: consistently India's top-ranked clean city, attributed to near-universal door-to-door collection and source segregation (enforced through strict monitoring and sustained citizen engagement), decentralised processing, and effective legacy-waste remediation at its landfill.
10. Indore's success factors: sustained political will, continuous municipal-commissioner-level ownership, and long-running public-awareness campaigns building citizen compliance.
11. Delhi's struggles: massive scale, historically fragmented municipal jurisdictions, and legacy landfill mountains reflect governance fragmentation and slower segregation compliance, compounded by high population density and limited land for processing facilities near the city.

Conclusion: Indore's experience shows that sustained political commitment, institutional consistency and citizen engagement can overcome solid-waste challenges even at significant scale, offering a replicable model that larger, more fragmented cities like Delhi must adapt to their own governance context.

Q18. 'Community participation is the cornerstone of effective disaster management'. Analyse this statement with suitable examples from India. Also discuss the challenges to community participation and measures to strengthen it.

[15 marks | Answer in 250 words]

Approach: Three-part: (a) analyse the statement with examples, (b) discuss challenges, (c) suggest measures.

Introduction: Community participation is widely regarded as the cornerstone of effective disaster management because local communities possess first-hand knowledge of hazards, act as first responders in any crisis, and their active involvement determines the success of preparedness, mitigation and response efforts.

Body:

1. Rationale: communities are always the 'first responders' before formal disaster-relief machinery arrives, making their preparedness level directly determinative of initial casualty and damage outcomes.
2. Example - Odisha cyclone management: community-based early-warning dissemination and evacuation drills, refined after the 1999 super cyclone, have dramatically reduced casualties in subsequent cyclones such as Phailin (2013) and Fani (2019).
3. Example - Assam's community-based flood forecasting and the Aapda Mitra volunteer scheme have strengthened local response capacity.
4. Example - traditional/indigenous knowledge use in Himalayan and coastal communities for hazard prediction complements formal early-warning systems.
5. Institutional recognition: the Sendai Framework for Disaster Risk Reduction (2015-2030) explicitly prioritises community and stakeholder engagement in 'building back better', and India's National Disaster Management Plan mandates community-based disaster management committees.

6. Challenge - awareness and capacity gaps: many communities, especially in remote or marginalised areas, lack disaster-preparedness training and resources.
7. Challenge - sustainability of participation: community structures often become inactive between disaster events due to lack of continuous engagement and funding.
8. Challenge - social fragmentation: caste, class and gender inequities within communities can skew participation and benefit-sharing in disaster response.
9. Challenge - coordination gap: weak linkage between community-level structures and formal district/state disaster-management authorities.
10. Measure - institutionalising regular disaster drills and refresher training, not only post-disaster response training.
11. Measure - strengthening Panchayati Raj Institutions' role in disaster-management planning, given their grassroots legitimacy and reach, and ensuring inclusive representation of women, marginalised groups and persons with disabilities in community disaster committees.
12. Measure - leveraging technology (mobile-based early-warning apps, community radio) to sustain engagement between disaster events.

Conclusion: While community participation has demonstrably saved lives - as Odisha's cyclone management shows - sustaining this engagement requires continuous institutional support, inclusive representation and stronger linkages with formal disaster-management machinery, transforming episodic mobilisation into a resilient, ongoing culture of preparedness.

Q19. Separatist movements have been one of the major factors contributing to militancy and instability in Jammu & Kashmir (J&K). Bring out actions taken by the Government to bring J&K to national mainstream. Discuss pre and post abrogation status of Articles 370 and 35A. Also bring out positive impacts of abrogation of both these Articles in mainstreaming the state.

[15 marks | Answer in 250 words]

Approach: Three-part: (a) bring out government actions, (b) discuss pre/post-abrogation status of Articles 370 and 35A, (c) bring out positive impacts.

Introduction: Separatist movements, fuelled by cross-border terrorism and a sense of political alienation, were long a major driver of militancy and instability in Jammu & Kashmir, prompting a series of government actions culminating in the landmark 2019 abrogation of Articles 370 and 35A aimed at full national mainstreaming.

Body:

1. Government action - security measures: sustained counter-terrorism operations, surrender-and-rehabilitation policies for militants, and strengthened border management along the Line of Control to curb cross-border infiltration.
2. Government action - development-focused engagement: infrastructure investment (roads, the Udhampur-Srinagar-Baramulla rail link, power projects), tourism promotion and skill-development schemes aimed at addressing economic alienation.
3. Government action - political outreach: periodic dialogue initiatives with local stakeholders and phased restoration of the electoral and panchayat process.
4. Pre-abrogation status - Article 370: granted J&K special autonomous status, limiting Parliament's legislative competence over the state (barring defence, foreign affairs, communications) without state concurrence, and permitting the state its own constitution and flag.
5. Pre-abrogation status - Article 35A (inserted via a 1954 Presidential Order): empowered the J&K state legislature to define 'permanent residents' and reserve for them exclusive rights to property ownership, state government jobs and scholarships, excluding others including women who married non-state-subjects from certain rights.

6. Post-abrogation status: on 5 August 2019, Presidential Orders read down Article 370 and abrogated Article 35A; the state was reorganised into two Union Territories - Jammu & Kashmir (with legislature) and Ladakh (without legislature) - under the Jammu and Kashmir Reorganisation Act, 2019.
7. Post-abrogation status: all Central laws now automatically apply to J&K; the separate state constitution and flag ceased to exist; the permanent-resident category and associated property/job restrictions were removed.
8. Positive impact - extension of central welfare legislation (RTI Act, RTE Act, reservation policies for OBCs and economically weaker sections) previously inapplicable in J&K.
9. Positive impact - opening of property ownership and investment opportunities to all Indian citizens, attracting new investment proposals in tourism, infrastructure and industry.
10. Positive impact - restoration of the panchayat/local-body electoral process and, more recently, the J&K Assembly elections, restoring representative government at multiple tiers.
11. Positive impact - a decline in organised separatist political mobilisation in subsequent years, alongside a rise in tourist footfall, though sporadic terror incidents persist.

Conclusion: While cross-border terrorism-linked militancy remains a live security challenge, the combination of sustained security operations, development investment and the structural reintegration following the abrogation of Articles 370 and 35A mark a significant, if still evolving, step toward Jammu & Kashmir's full political and economic mainstreaming.

Q20. Discuss counterfeit currency and money laundering as major sources of terror funding in India. State the actions being taken at International level to check these menaces. Highlight the role of Financial Action Task Force (FATF) and methods of compliance by its member states in preventing terror funding.

[15 marks | Answer in 250 words]

Approach: Three-part: (a) discuss counterfeit currency and money laundering as terror-funding sources, (b) state international action, (c) highlight FATF's role and member compliance methods.

Introduction: Counterfeit currency circulation and money laundering constitute two of the most persistent channels of terror financing in India, prompting a coordinated national and international response anchored by the Financial Action Task Force (FATF).

Body:

1. Counterfeit currency: Fake Indian Currency Notes (FICN), often traced to actors across the western border, are pushed into circulation via hawala networks and used to fund terror infrastructure and destabilise the economy.
2. Money laundering: terror financing is frequently layered through seemingly legitimate businesses, shell companies, hawala transfers and cryptocurrency channels to obscure the origin and movement of funds destined for terror groups.
3. Nexus with organised crime: narcotics trafficking and smuggling revenues are frequently laundered and channelled into terror financing, particularly in border states.
4. Domestic response: the Unlawful Activities (Prevention) Act and the Prevention of Money Laundering Act empower agencies such as the NIA and Enforcement Directorate to investigate and prosecute terror-financing networks, while the Financial Intelligence Unit-India monitors suspicious-transaction reports from banks and financial institutions.
5. International action - United Nations: UN Security Council sanctions regimes, such as the 1267 Committee, designate terrorist individuals and entities for global asset freezes.
6. International action - treaty framework: the International Convention for the Suppression of the Financing of Terrorism (1999) criminalises terror financing across signatory states.
7. FATF's role: an inter-governmental body established in 1989 that sets global standards for combating money laundering and terror financing, and monitors member and reviewed countries' compliance through

Mutual Evaluations.

8. FATF grey list/black list mechanism: countries with strategic deficiencies in anti-money-laundering/counter-financing-of-terrorism frameworks are placed under increased monitoring (grey list) or identified as high-risk (black list), creating reputational and financial pressure for compliance.

9. Compliance methods: FATF's 40 Recommendations require member states to criminalise money laundering and terror financing, implement customer due-diligence (KYC) norms, enable cross-border information sharing, and empower financial intelligence units; India itself has undergone FATF Mutual Evaluation and remains an active member pushing for stricter global compliance.

Conclusion: Counterfeit currency and money laundering remain deeply entrenched, adaptable channels for terror financing, and countering them effectively requires sustained coordination between domestic law-enforcement/financial-intelligence agencies and the international, FATF-led compliance architecture that raises the cost of non-compliance for state and non-state actors alike.
