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Weekly Current Affairs Compilation for UPSC TNPSC KPSC

Guiding Dreams, Empowering Future

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EXCLUSIVE CURRENT AFFAIRS BULLETIN

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57th GST COUNCIL MEETING



Why in News?

The 57th Goods and Services Tax (GST) Council meeting, chaired by the Union Finance Minister, approved procedural and structural reforms concerning registration, refunds, input tax credit, exports, enforcement and litigation. Most measures are proposed to take effect from 1 April 2027. The emphasis was on certainty, ease of compliance and fewer disputes rather than further rate changes. Note: proposed measures require the applicable legal notifications or amendments before implementation.

Key Outcomes of the 57th GST Council Meeting

1. GST Rate Rationalisation

- No GST rate changes were announced at the meeting.
- Rate decisions are proposed to be considered once each year and implemented from the start of the following financial year.
- A predictable annual calendar would help businesses plan pricing, contracts, inventories and compliance.

2. Simplified Registration

- Greater clarity and standardisation of documents required for GST registration is proposed, reducing arbitrary objections and rejections.
- Approximately 61% of taxpayers reportedly receive automatic registration within three working days.
- The objective is to make the remaining registrations faster, more transparent and predictable.

3. Faster Refunds

- Refund applications are proposed to be acknowledged within 10 days, against the earlier 15-day period.
- Prompt processing would particularly assist exporters and businesses with working-capital constraints.
- Faster acknowledgement is distinct from final sanction and payment of a refund.

4. Inverted Duty Structure

- Refund eligibility is proposed to extend to input services under the inverted duty structure from 1 November 2026.
- An inverted duty structure arises when input tax rates exceed those on outward supplies, leading to accumulated unutilised input tax credit.
- Refunds can reduce blocked working capital and correct distortions in the tax chain.

5. Reduced Litigation

- The proposal states that notices for tax demands below ₹10,000 would not be issued and pending notices below the threshold would be withdrawn.
- This could reduce compliance costs for small taxpayers and allow administrators to focus on material disputes.
- The scope, exclusions and enforceability would depend on subsequent legal instruments.

6. Inter-State Movement of Goods

Inspection, detention and seizure are proposed to be restricted to officers of the supplier State or destination State.

- Interception would require specific intelligence and authorisation by a Joint Commissioner-level officer.
- The reform seeks to prevent arbitrary checks, improve logistics efficiency and reduce transit delays.

7. Decriminalisation

- The Council reportedly recommended removal of GST arrest powers and raising the prosecution threshold from ₹1 crore to ₹5 crore.
- The intent is to distinguish serious tax offences from technical or lower-value non-compliance.
- Criminal-law changes require legislative effect; recommendations alone do not amend existing law.

8. Faceless Assessment

- A faceless Central GST assessment model, drawing on income-tax experience, is proposed.
- A draft framework is expected for consultation before Budget 2027, with proposed implementation in 2027–28.
- Reduced face-to-face interaction could promote consistency, transparency, audit trails and lower discretion.

9. Service Exports

- Services provided to foreign clients through overseas branches of Indian firms may qualify for export-related benefits under the proposed clarification.
- Testing, repair, certification and research performed in India for foreign clients may qualify even if the goods remain in India, subject to legal conditions.
- The measures could benefit service exporters and strengthen India's position as a testing, R&D and certification hub.

GST Council: Constitutional Framework

Status and Composition

- The GST Council is a constitutional body established under Article 279A by the Constitution (101st Amendment) Act, 2016.
- Chairperson: Union Finance Minister; members include the Union Minister of State in charge of Revenue or Finance and State Ministers responsible for finance or taxation.
- The Council recommends rates, exemptions, thresholds, model GST laws, place-of-supply rules and IGST apportionment principles.

Petroleum Products

- Under Article 279A(5), the Council recommends the date on which GST may be levied on petroleum crude, high-speed diesel, motor spirit (petrol), natural gas and aviation turbine fuel.
- These five petroleum products are presently outside GST levy; other petroleum-related products may be subject to GST.

Quorum and Voting

- Quorum: one-half of the total membership.
- Decisions require at least a three-fourths weighted majority of members present and voting.
- The Union Government has one-third of the total weighted votes; States together have two-thirds.
- The Council exemplifies cooperative fiscal federalism and intergovernmental consultation.

About Goods & Services Tax (GST) Nature and Introduction

- GST is a destination-based, value-added indirect tax on the supply of goods and services.







- The constitutional foundation was laid by the 101st Amendment Act, 2016; GST was rolled out on 1 July 2017.
- It aims to reduce cascading taxation, streamline indirect taxes and create a unified national market.

Taxes Subsumed

- Several Central and State levies were subsumed, including service tax, central excise on most goods, State VAT on most goods, central sales tax and luxury tax.
- Certain taxes and goods remain outside GST or are subject to special constitutional and statutory treatment.

Dual GST Model

- Intra-State supply: Central GST (CGST) plus State GST (SGST), or Union Territory GST where applicable.
- Inter-State supply and imports: Integrated GST (IGST), along with applicable customs duties on imports.
- Input tax credit is central to avoiding tax-on-tax effects throughout supply chains.

Goods and Services Tax Network (GSTN)

- GSTN provides the digital infrastructure for taxpayer registration, return filing, e-invoicing and compliance processes.

Next-Generation GST Reforms (GST 2.0)

- The 56th GST Council meeting in 2025 endorsed a simplified structure centred on 5% and 18% slabs.
- A 40% rate was introduced for specified luxury and sin goods, including identified tobacco products, high-end vehicles, yachts and private aircraft, subject to applicable notifications.
- Rate relief and exemptions were envisaged for selected essentials, medicines and insurance products.
- Lower rates on selected inputs and products aim to support MSMEs, startups, manufacturers, artisans, cement and handicraft-related activities.

Technology-Driven Tax Administration

- GSTN, e-invoicing, pre-filled returns and real-time validation reduce filing errors and improve traceability.
- AI, machine learning and data analytics can identify anomalies, improve risk-based scrutiny and help detect evasion.
- Digital safeguards should be balanced with transparency, appeal rights and protection against erroneous automated action.

Conclusion

The 57th GST Council meeting signals a move from frequent rate changes towards predictable, taxpayer-oriented administration. Proposals on registration, refunds, enforcement, prosecution, faceless assessment and service exports seek to ease compliance, release working capital and reduce disputes, particularly for MSMEs and exporters. Their success will depend on timely statutory implementation, transparent safeguards and coordinated Centre–State action, reinforcing GST's objective of a unified market through cooperative federalism.

Previous Year Question (Prelims 2017)

Q. What is/are the most likely advantages of implementing "Goods and Services Tax (GST)"?

1. It will replace multiple taxes collected by multiple authorities and will thus create a single market in India.
2. It will drastically reduce the "Current Account Deficit" of India and will enable it to increase its foreign exchange reserves.
3. It will enormously increase the growth and size of the economy of India and will enable it to overtake China in the near future.
Select the correct answer using the code given below:
(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (a) 1 only.

World Development Report 2026:

The Promise of Artificial Intelligence



Why in News?

The Union Ministry of Electronics and Information Technology launched the World Bank Group's World Development Report (WDR) 2026: The Promise of Artificial Intelligence at an event organised under the IndiaAI Mission with the World Bank Group. The report was first released globally in August 2026. It examines how developing countries, including India, can harness AI for productivity, growth and improved public services while managing inequality, labour disruption and governance risks.

I. Key Highlights of WDR 2026

1. Rapid Diffusion and the Adoption Gap

- AI is diffusing faster than earlier general-purpose technologies (GPTs): steam engines took about 80 years, electricity 40 years and the internet 20 years to reach lower-income economies.
- ChatGPT reportedly derived 50% of its traffic from middle-income nations within six months.
- By April 2025, reported ChatGPT adoption among internet users was 25% in high-income economies, 5.8% in upper-middle-income, 4.7% in lower-middle-income and 0.7% in low-income economies.
- The persistent adoption gap shows that access and complementary capabilities matter more than invention alone. Countries that build infrastructure and deploy technologies at scale can capture substantial gains.

2. Three Cs: Capabilities, Concentration and Complements

- Capabilities: AI can automate non-routine cognitive functions including disease diagnosis, weather forecasting and farm advisory, helping compensate for shortages of doctors, scientists and other specialists.
- Concentration: Advanced compute, semiconductor design and frontier models remain concentrated in the United States and China. Leading US technology firms are projected to spend more than USD 750 billion on AI infrastructure in 2026.
- Concentration creates dependence for developing economies, but pre-trained models may also be cheaper to adopt than building new models from scratch.
- Complements: Reliable electricity, affordable connectivity, literacy, institutions and good data are essential. In Sub-Saharan Africa, 32% of rural schools reportedly lack electricity, 68% lack internet and 89% of 10-year-olds struggle with foundational reading (2024 data).

3. Small AI in Low-Resource Settings

- Compact, low-compute, task-specific models can deliver cost-effective solutions in resource-constrained settings.
- India: Wadhwani AI's Cough Against TB reportedly achieved 90% screening accuracy; such tools support screening rather than replace confirmatory clinical diagnosis.
- Ghana: The Rori learning platform reportedly delivered a full year of educational gains at roughly USD 5 per student.
- Lesson: Targeted, locally adapted AI can be more useful than expensive frontier systems.

4. Economic and Labour-Market Impact

- The report estimates that 4.5% of jobs in developing countries face generative-AI automation exposure, compared with 14.2% in high-income economies. Exposure is not identical to actual displacement.
- Productivity gains are currently skewed towards advanced economies with stronger complementary infrastructure and skills.
- Outsourced business-process outsourcing (BPO) gigs reportedly declined 39% in 2025, signalling disruption in some digitally traded services.
- Data centres impose rising electricity and water demands on local grids and utilities, requiring careful infrastructure and environmental planning.



5. Governance and Public-Service Delivery

- Kenya: AI-supported court-case allocation reportedly handled over 10,000 disputes.
- India: AI-supported agricultural forecasting can improve farm decision-making; weather forecasts in Telangana reportedly saved up to USD 560 per small farmer.
- Bangladesh: AI-supported diabetic eye screening reportedly increased daily screenings by 40%.
- Poorly designed automated cash-transfer systems illustrate the risks of weak data quality, exclusion, error and inadequate grievance redress.

6. Geopolitics, Labour & Information Integrity

- Full domestic AI sovereignty is financially unrealistic for many developing countries; open-source models, regional compute sharing and international cooperation offer practical alternatives.
- Kenyan data-annotation workers reportedly earn USD 1.32–2.00 per hour, underscoring unequal distribution of gains between capital owners and digital labour.
- Africa reportedly has only 66 fact-checking organisations serving a population of 1.5 billion, raising concerns over AI-enabled disinformation.

7. Global Preparedness Gap

- More than 80 countries had issued national AI strategies by mid-2026.
- Among 25 low-income countries referenced, Rwanda was reportedly the only one with an official AI policy framework.
- Policy gaps, weak infrastructure and limited institutional capacity leave poorer economies less prepared to benefit from AI.

II. Recommendations: Adopt, Adapt and Advance

1. Adopt Existing AI Tools

- Use open-source and commercial AI applications for translation, administrative triage and immediate service-delivery bottlenecks.
- Adoption is a necessary first step, but alone does not guarantee lasting development dividends.

2. Adapt AI to Local Conditions

- Prioritise local-language datasets, agro-climatic conditions and domestic clinical protocols to reduce errors from models trained on unsuitable foreign datasets.
- Develop multimodal and voice-first solutions for basic phones and low-bandwidth connectivity to widen inclusion.

3. Advance Selectively

- Avoid uncritical pursuit of frontier models requiring billions in computing investment and large energy grids.
- Invest instead in affordable, high-impact Small AI applications and targeted domestic capability.

4. Government as Enabler

- Strengthen electricity, broadband, digital literacy and foundational education.
- Expand affordable compute access through Compute-as-a-Service and trusted public-data repositories.
- Align labour and tax policy with the need to manage premature displacement.

5. Government as User

- Move from fragmented pilots to rigorously evaluated and scalable public applications.
- Use procurement to support proven tools in agriculture, healthcare, education and social protection.
- Develop clean, standardised, AI-ready government datasets interoperable with Digital Public Infrastructure (DPI).

6. Government as Regulator

- Adopt agile, risk-based regulation with voluntary standards, algorithmic impact assessments and independent audits.
- Apply existing consumer, competition, privacy/data-protection and cyber laws to fraud, deepfakes and discrimination.
- Coordinate internationally to improve interoperability and avoid fragmented regulatory regimes.

III. Implications for India

- Leverage IndiaAI Mission and DPI for inclusive public services, while evaluating AI deployments for accuracy, fairness and accessibility.
- Build local-language and sector-specific datasets, affordable compute capacity, digital skills and energy-efficient infrastructure.
- Plan for employment transitions in BPO and other exposed occupations, and protect privacy, accountability and grievance redress.

Conclusion

WDR 2026 argues that AI's development dividend depends less on inventing frontier systems than on building reliable infrastructure, skilled people, quality data and accountable institutions. For India, the priority is to adopt proven tools, adapt them to local needs and advance selectively, while protecting jobs, public trust and scarce resources. Inclusive deployment—not technological hype—will determine whether AI improves productivity and public services at scale.

Prelims Question (2020)

With the present state of development, Artificial Intelligence can effectively do which of the following?

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

(a) 1, 2, 3 and 5 only (b) 1, 3 and 4 only (c) 2, 4 and 5 only (d) 1, 2, 3, 4 and 5

Answer: B



RBI MPC RAISES Repo Rate to 5.50%

Why in News?

The Reserve Bank of India (RBI) Monetary Policy Committee (MPC) raised the policy repo rate by 25 basis points to 5.50%, marking its first increase since February 2023. It shifted its stance to "calibrated tightening" in response to persistent inflation. The decision reverses the rate-cutting cycle of 2025 and signals greater priority for inflation control while growth remains resilient.

1. Key Policy Decisions

Policy repo rate	**5.50% (increased by 25 basis points)**
Standing Deposit Facility (SDF)	5.25%
Marginal Standing Facility (MSF)	5.75%
Bank Rate	5.75%
Policy stance	Calibrated tightening

- The 63rd MPC meeting was held from 5–7 October 2026 under RBI Governor Sanjay Malhotra.
- The MPC unanimously voted to increase the policy repo rate under the Liquidity Adjustment Facility (LAF).

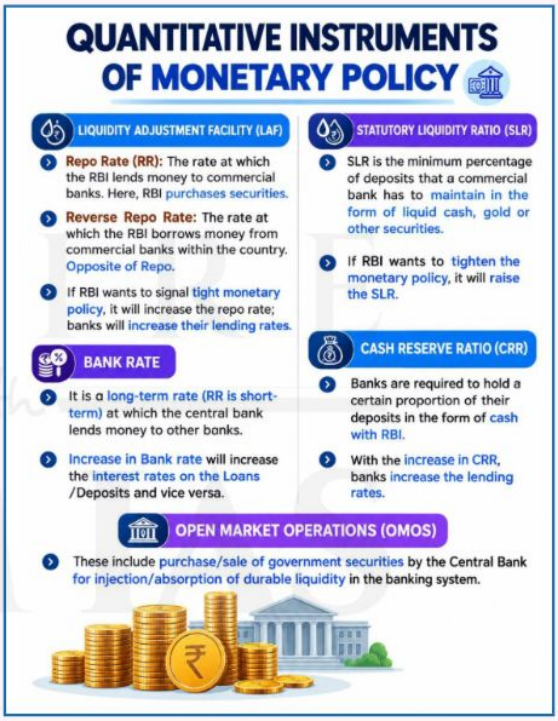
2. Inflation Outlook

- RBI revised the FY 2026–27 headline inflation forecast upward by 20 basis points to 5.2%.
- Headline CPI inflation reached 4.8% in August 2026, primarily driven by food and fuel prices.
- Core inflation was projected at 4.4% for FY27; the share of CPI items showing inflation above 4% increased to about 37% in August 2026.
- Food inflation became more broad-based, including sharp price rises in sugar and onions.

3. Growth Outlook

- RBI increased its real GDP growth forecast for FY 2026–27 from 6.7% to 7.1%, reflecting resilient domestic demand.
- Q1 FY27 real GDP growth was 7.8%, exceeding expectations; July–August high-frequency indicators pointed to sustained momentum.
- S&P Global revised its FY27 India GDP growth estimate to 7% from 6.6%, citing industrial activity, consumption, exports and public investment.
- CMIE also projected 7% growth, supported by investment and exports.

Q2 FY27	**7.2%**
Q3 FY27	6.9%
Q4 FY27	6.8%



4. Meaning of "Calibrated Tightening"

- A measured, stepwise tightening of monetary conditions through interest-rate increases or liquidity withdrawal, rather than aggressive hikes.
- It signals that a rate cut is not the near-term baseline; future choices are a pause or further tightening depending on conditions.



- The RBI previously used this stance in October and December 2018 under Governor Urjit Patel, without a subsequent hike; it returned to neutral and cut rates in February 2019.
- Governor Sanjay Malhotra explained that "calibrated" conveys a measured approach: tightening indicates that a cut is off the table, while a hike or pause remains possible.
- The stance is forward guidance, not a binding commitment to a particular decision at the next MPC meeting.

5. Reasons Behind the Rate Hike

A. Broadening inflation pressures

- The proportion of CPI components with inflation exceeding 4% rose to about 37% in August 2026.
- Core inflation reached 4.2% in August; excluding precious metals, core inflation was 2.9%.
- The MPC judged the inflation outlook less benign than in the preceding year.

B. Weather and agricultural supply disruptions

- Deficient south-west monsoon conditions, El Niño and reservoir levels roughly 20% below the preceding year threatened farm output and rural demand.
- Drought-like conditions in several States contributed to higher prices for sugar, onions and other staples.
- The near-term inflation outlook was pressured by agricultural supply constraints and higher energy and commodity prices.

C. Global geopolitics and energy

- West Asia tensions disrupted supply chains and contributed to volatility in crude oil prices.
- Crude oil exceeding USD 100 per barrel raises the risk of imported inflation.
- Renewed conflict escalation since the August MPC meeting increased uncertainty for the global economy.

D. Narrowing international interest-rate differential

- High interest rates in advanced economies narrowed the India–US rate differential; the US Federal Reserve raised rates by 25 basis points in September 2026.
- A domestic rate increase can help moderate foreign portfolio outflows and pressure on the rupee, although capital flows depend on several other factors.

E. Strong domestic growth

- Broad-based economic activity gave the RBI policy space to counter inflation without expecting severe immediate growth damage.

6. Expert and Market Assessments

- Dipti Deshpande (CRISIL): cited roughly 40% higher oil prices, monsoon risks, stronger-than-expected growth, ample liquidity and global tightening; saw room for another 25-basis-point hike in December.
- Aditi Nayar (ICRA): anticipated firmer inflation due to poor monsoon conditions, commodity prices and adverse base effects; another December hike was possible.
- Rajani Sinha (CareEdge): noted the 2018 tightening stance did not lead to additional hikes; anticipated a shallow cycle with possible further 25–50 basis points.
- Vikram Chhabra (360 ONE Asset): viewed the 25-basis-point increase as the least disruptive option amid global tightening; expected another 50 basis points during the cycle.
- Some market analysts projected an additional 75–100 basis points, potentially taking the repo rate to around 6–6.25% the following year; these are forecasts, not RBI commitments.

7. Other Observations from the Monetary Policy Statement

- Banking and NBFCs: scheduled commercial banks retained healthy capital adequacy, liquidity, asset quality and profitability; NBFC financial health was also assessed as sound.
- External sector: the current account deficit remained modest in Q1; the July–August merchandise trade deficit rose to USD 58.7 billion from USD 55.1 billion a year earlier, mainly due to electronics and crude oil imports.
- Liquidity: average daily net LAF absorption rose from ₹1.2 lakh crore in July to ₹5.8 lakh crore in August and ₹7.8 lakh crore in September 2026, indicating substantial surplus liquidity.
- Financial markets: RBI proposed a technical consultative committee for structured dialogue with market participants on operational and policy matters.

Conclusion

The October 2026 MPC decision to raise the repo rate to 5.50% and adopt calibrated tightening reflects a measured response to widening inflation pressures amid resilient growth. Weather-related food risks, expensive energy and global monetary conditions strengthened the case for restraint, while the RBI's 7.1% FY27 growth projection suggested room to act. The policy highlights the need to anchor inflation expectations without unduly constraining investment and employment, with future decisions dependent on incoming price, growth and liquidity data.

Prelims Practice Question

With reference to the Indian economy, consider the following statements:

1. **The repo rate is the rate at which the RBI lends short-term funds to commercial banks against government securities.**
2. **The Marginal Standing Facility (MSF) rate is always lower than the repo rate.**
3. **The Standing Deposit Facility (SDF) allows the RBI to absorb liquidity without providing collateral to banks.**

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

Answer: (b) 1 and 3 only.

India–EU Green Shipping Corridor

Why in News?

India and the European Union formally launched an industry coalition for the India–EU Green Shipping Corridor at the third Sagarmanthan: The Great Oceans Dialogue (2026), organised by the Ministry of Ports, Shipping and Waterways (MoPSW) with the Observer Research Foundation (ORF). The initiative seeks to accelerate low-emission maritime fuels, mobilise investment and establish commercially viable green shipping routes. It connects climate commitments, maritime infrastructure, energy transition and India–EU strategic cooperation.

1. Key Highlights & Implementation Roadmap

Green fuel trade and coalition

- Connect India's green fuel production potential with European demand, particularly for green ammonia and green methanol.
- Facilitate fuel trade and maritime decarbonisation across shipping routes.
- Pre-feasibility study initiated in 2025; industry coalition established in 2026.
- Coalition priorities: mobilise private investment; deepen government–industry partnerships; develop a commercially viable, scalable green corridor.

Green ports and renewable energy

- Harit Sagar Green Port Guidelines (2023): target renewable energy share of more than 60% in major ports by 2030 and more than 90% by 2047.
- Gradually replace diesel harbour tugs with green-powered vessels.
- Three identified green hydrogen hubs: Deendayal Port (Gujarat), Paradip Port (Odisha), V.O. Chidambaranar Port (Tamil Nadu).
- Hubs support production, storage and bunkering of cleaner maritime fuels.
- Other interventions: shore-to-ship electricity, electrification of port equipment and vehicles, and emissions reduction in port operations.

Resilience, capacity and inland waterways

- Build supply-chain resilience against geopolitical disruption and climate-related risks, alongside a just and inclusive transition.
- Maritime Amrit Kaal Vision 2047: annual port-handling capacity target of 10 billion tonnes by 2047.
- Major-port cargo handling: over 915 million tonnes in FY 2025–26, compared with 581 million tonnes in FY 2014–15 (figures as supplied).
- National-waterway cargo: 18 million tonnes in FY 2013–14 to 218 million tonnes in FY 2025–26 (figures as supplied); demonstrates growing multimodal transport role.

2. Why Green Shipping Matters

- International shipping accounts for approximately 3% of global greenhouse gas emissions; without intervention emissions could rise with world trade.
- The International Maritime Organization (IMO) has adopted a goal of net-zero GHG emissions from international shipping by or around 2050.
- Shipping is a hard-to-abate sector because of energy-intensive long-distance transport and limited mature zero-emission alternatives.
- Green shipping corridors are designated routes where public–private cooperation demonstrates the practical feasibility of zero- or near-zero-emission vessels, fuels and port infrastructure.

3. Why India–EU Cooperation Is Complementary

- India: large coastline and port network; expanding maritime sector; renewable-energy ambitions; significant potential for green hydrogen, green ammonia and green methanol production.
- European Union: large trade volumes, demanding decarbonisation targets and a need for reliable low-emission fuel supply chains.
- India can supply green fuels; the EU can contribute capital, technology and market access.
- Joint corridors can aggregate demand, reduce investment uncertainty and test commercial viability.

4. Indian Maritime and Green Port Initiatives

Harit Sagar Green Port Guidelines, 2023

- Issued by MoPSW to promote environmental sustainability of major ports.
- Priorities: renewable energy, carbon-emission reduction, shore power, electrification, and green hydrogen



production, storage and bunkering.

Maritime Amrit Kaal Vision 2047

- Long-term maritime development framework targeting 10 billion tonnes of port capacity annually by 2047.
- Emphasises sustainable infrastructure, technology modernisation and logistics capacity expansion.



5. Green Fuels:

- Green hydrogen: hydrogen produced through water electrolysis using renewable electricity; its production can have very low lifecycle emissions, depending on the electricity and supply chain. Used directly or converted into derivatives.
- Green ammonia: synthesised from green hydrogen and nitrogen; potential marine fuel and hydrogen carrier, though toxicity, NOx and safety management remain important.
- Green methanol: produced using green hydrogen and a suitable carbon source such as captured CO_2; lower lifecycle emissions depend on carbon sourcing and production energy.
- Bunkering: supplying fuel to ships; shore-to-ship power: providing electricity from shore while a vessel is berthed.

6. Green Shipping Corridors and Global Frameworks

- Corridors involve governments, ports, shipping companies, cargo owners and fuel producers to create demand and enable refuelling infrastructure.
- The Clydebank Declaration, announced at COP26, promoted development of zero-emission maritime routes.
- Related bilateral initiatives demonstrate how policy coordination and private investment can support first-mover deployment.

India–EU relations

India and the EU maintain a strategic partnership involving trade, climate, technology and connectivity.

The corridor adds cooperation in sustainable maritime logistics and clean-fuel value chains.

Maritime infrastructure and Sagarmala

- India has a network of major and non-major ports; the supplied background figure is 12 major ports and over 200 non-major ports, which should be checked against the latest official classification.
- Sagarmala supports port-led development and seeks to leverage India's coastline for economic growth.

National Green Hydrogen Mission

- Launched in 2023 to make India a global hub for green hydrogen production, use and export.
- Target: at least 5 million metric tonnes (MMT) of annual green hydrogen production capacity by 2030.
- Projected abatement: nearly 50 MMT of annual greenhouse-gas emissions by 2030.

Conclusion

The India–EU Green Shipping Corridor links India's emerging green-fuel capabilities with European demand while advancing maritime decarbonisation, port modernisation and resilient supply chains. The 2026 industry coalition, supported by Harit Sagar Guidelines, green hydrogen hubs and Maritime Amrit Kaal Vision 2047, can turn policy ambition into commercially workable routes if investment, infrastructure, fuel safety and lifecycle emissions are addressed together. For UPSC, it illustrates how international cooperation, clean-energy transition and port-led development intersect in India's sustainable-growth strategy.

Prelims Question (2025; as supplied)

Which of the following statements with regard to Green Hydrogen is/are correct?

1. **It is decarbonized hydrogen o btained from natural gas reforming combined with carbon capture and storage (CCS).**
2. **It is produced using electrolysis of water with electricity generated by renewable energy.**
3. **National Green Hydrogen Mission of India aims for an abatement of nearly 50 MMT of annual greenhouse gas emissions by 2030.**

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

Answer: (b) 2 and 3 only.



TRISHNA Satellite Mission

Why in News?

The Indo-French TRISHNA (Thermal Infra-Red Imaging Satellite for High-resolution Natural Resource Assessment) Earth-observation mission is in an advanced stage of development. According to the supplied October 2026 update, ISRO anticipates launch within approximately 12–16 months (around late 2027). The mission links thermal remote sensing to water security, agricultural productivity, climate resilience and India–France strategic cooperation. Launch timing and technical figures are planning estimates and should be checked against the latest ISRO/CNES mission releases.

Mission at a Glance

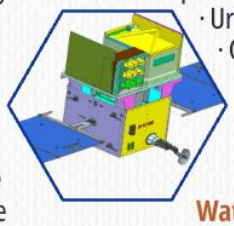
- Full name: Thermal Infra-Red Imaging Satellite for High-resolution Natural Resource Assessment (TRISHNA).
- Partner agencies: Indian Space Research Organisation (ISRO) and Centre National d'Études Spatiales (CNES), France.
- Mission type: Joint Earth-observation satellite for high-resolution land-surface temperature, water resources and ecosystem monitoring.
- Proposed launch vehicle: Polar Satellite Launch Vehicle (PSLV); launch site: Satish Dhawan Space Centre, Sriharikota.
- Indicative launch timeline in the supplied October 2026 account: within 12–16 months, approximately late 2027.

Objectives

Primary scientific objectives

- Measure surface temperature, emissivity,

biophysical variables and radiation at high spatial and temporal resolution.
- Assess surface energy budgets from regional to global scales.
- Improve water and food security through observation of evapotranspiration, terrestrial water stress and water use.
- Monitor anthropogenic climate-change impacts and the energy and water budgets of the continental biosphere.
- Observe water quality and dynamics of inland and coastal waters at high resolution.



4. Payloads and Technical Specifications

Thermal Infra-Red (TIR) payload — CNES

- Four-channel long-wave infrared imaging sensor designed for land-surface temperature and emissivity mapping.
- Four spectral bands: 8.65 µm, 9.0 µm, 10.6 µm and 11.6 µm.
- Multi-band thermal observations support temperature–emissivity separation and split-window retrieval applications.
- Visible–Near Infra-Red and Short-Wave Infra-Red (VNIR–SWIR) payload — ISRO
- Seven spectral bands: blue, green, red, near infrared (NIR), water vapour, cirrus and short-wave infrared (SWIR).
- Measures surface reflectance to derive biophysical variables and radiation-budget inputs.

5. Applications & Societal Benefits

Agriculture and water security

- Estimate irrigation water use and crop evapotranspiration; support water-saving advisories.
- Improve crop water productivity and sustainable irrigation scheduling.
- Strengthen micro-watershed planning, drought assessment and early action against crop failure.

Climate and ecosystem monitoring

- Track drought indicators, permafrost change and evapotranspiration trends.
- Improve surface energy-flux studies, hydrological modelling and climate adaptation planning.

Urban planning and public health

- Generate detailed urban heat-island maps and inputs for heat alerts.
- Support heat-resilient land-use design and urban adaptation strategies.

Water bodies, cryosphere and disasters

- Observe inland/coastal water quality, thermal pollution and potential submarine groundwater discharge.
- Assess snow cover and snowmelt patterns; support reservoir operation planning in summer.
- Detect volcanic/geothermal anomalies and subsurface coal fires, aiding disaster-risk reduction.

Global initiatives and datasets

- Contribute observations relevant to GEOGLAM (Group on Earth Observations Global Agricultural Monitoring).
- Support monitoring of UN Sustainable Development Goals, Global Water Watch, Essential Agricultural Variables (EAVs) and Essential Climate Variables (ECVs).

6. India–France Space Cooperation

Three major joint satellite missions

- Megha-Tropiques (2011): tropical atmosphere, precipitation and water-cycle studies.
- SARAL (2013): oceanographic observation using ARGOS and AltiKa.
- TRISHNA (upcoming): thermal infrared Earth observation for water, ecosystems and climate.

Division of responsibilities

- ISRO: satellite bus, VNIR–SWIR instrument and Indian launch infrastructure.
- CNES: TIR payload; India and France collaborate on science and data processing.

Strategic context

- Space cooperation is a longstanding component of the India–France strategic partnership.
- 2026 is described in the supplied notes as the Indo-French Year of Innovation, supporting cooperation in advanced technologies.
- Other cited areas of cooperation include NavIC ground-station development in France, support linked to Gaganyaan and ocean-data collaboration under the "Space for Ocean Alliance".
- India's expanding private space ecosystem, described as nearly 400 startups in the supplied material, creates opportunities for industrial partnerships; this figure is time-sensitive.



Conclusion

TRISHNA illustrates how India–France space cooperation can translate advanced Earth-observation science into practical public benefits: its complementary thermal and optical payloads are designed to provide frequent, detailed measurements of surface temperature, evapotranspiration and water stress, improving agricultural water management, climate adaptation, urban heat planning, cryosphere studies and disaster-risk reduction. Building on Megha-Tropiques and SARAL, the mission also strengthens bilateral technological collaboration and contributes to global environmental monitoring; for UPSC, it connects remote-sensing fundamentals with sustainable development, strategic partnerships and evidence-based governance.

UPSC Prelims Practice Question

Note: The following question was supplied as a "previous year question"; its official UPSC PYQ status has not been established, so it is labelled as a practice question.

Consider the following statements regarding the TRISHNA mission:
1. TRISHNA is a joint Earth-observation mission of ISRO and the French space agency CNES.
2. TRISHNA will operate in a sun-synchronous orbit and is designed for a five-year operational life.
Which of the statements given above is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Answer: (c) Both 1 and 2.



NATIONAL SC-ST HUB
Safalta ki pehchaan

NATIONAL SC–ST Hub (NSSH)

Why in News?

The National Scheduled Caste and Scheduled Tribe Hub (NSSH) is strengthening inclusive entrepreneurship by assisting SC/ST-owned Micro and Small Enterprises (MSEs) in overcoming barriers related to finance, technology, skills, mentoring and market access. It links social justice with economic empowerment, public procurement and inclusive growth.

National SC–ST Hub: Essential Facts

- **Launched:** 18 October 2016.
- **Nodal ministry:** Ministry of Micro, Small and Medium Enterprises (MSME).
- **Implementing agency:** National Small Industries Corporation (NSIC).
- **Target beneficiaries:** Scheduled Caste (SC) and Scheduled Tribe (ST) entrepreneurs owning Micro and Small Enterprises (MSEs).
- **Objective:** Improve enterprise competitiveness and access to finance, technology, skills, mentoring and markets, particularly government procurement.

Major Schemes and Interventions

Special Credit Linked Capital Subsidy Scheme (SCLCSS)

- Assists new and existing SC/ST-owned MSEs in upgrading plant, machinery and equipment.
- Capital subsidy: 25% of eligible investment, capped at ₹25 lakh.
- Covers manufacturing and service enterprises without product or sector restrictions, as described in the supplied scheme brief.
- Reported cumulative progress (2016–March 2026): 3,160 MSEs supported with ₹356.10 crore across 233 districts in 27 States/UTs.

Single Point Registration Scheme (SPRS)

NSIC registration facilitates MSE participation in government procurement. Benefits include free tender sets and exemption from Earnest Money Deposit (EMD), subject to applicable procurement rules.

Public Procurement Support

- Central Ministries, Departments and Central Public Sector Enterprises (CPSEs) have an annual procurement target of 25% from MSEs.
- Within the overall MSE procurement target, 4% is earmarked for SC/ST-owned MSEs.
- Policy intent: Expand institutional market access and reduce entry barriers for underrepresented entrepreneurs.

Special Marketing Assistance Scheme (SMAS)

- Promotes market access through exhibitions, trade fairs, vendor-development programmes, e-tendering workshops and awareness campaigns.
- Eligible enterprises may participate in up to four domestic and two international events annually.
- International exhibition assistance caps supplied: ₹3 lakh for micro enterprises; ₹2.5 lakh for small enterprises; ₹1.5 lakh for medium enterprises. Verify category-wise current eligibility against operative scheme guidelines.
- Registration conditions include Udyam Registration Portal and MSME Data Bank enrolment.

Performance and Achievements

- Procurement from SC/ST-owned MSEs reportedly rose nearly 39-fold, from ₹99.37 crore in 2015–16 to ₹4,013.42 crore in 2025–26.
- Leading states highlighted: Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu and Assam.
- Women accounted for 55% of candidates trained, indicating a gender-inclusive capacity-building component.
- Training aligned with public procurement and Government e-Marketplace (GeM) opportunities.
- Skills covered: cafeteria management and food production; welding; CAD/CAM; laundry services; fashion designing and tailoring; bamboo-based work.

SMAS activity during 2025–26

- 141 SC/ST MSEs participated in four domestic exhibitions.
- 247 vendor-development programmes were organised.
- 197 e-tendering workshops were organised.
- 230 awareness workshops were organised.

Financial, Technical and Capacity-Building Assistance

Bank loan processing fee reimbursement

- Reimburses 80% of eligible processing fees or ₹1 lakh, whichever is lower, excluding taxes.
- Applies to eligible loans from Scheduled Commercial Banks, Non-Banking Financial Companies (NBFCs) and State Finance Corporations.

Performance bank guarantee reimbursement

- Reimburses 80% of eligible performance bank guarantee charges or ₹1 lakh, whichever is lower.
- Lowers tender participation and contract-execution costs for SC/ST MSEs.

Testing fee reimbursement

- Reimburses 80% of eligible testing fees or ₹1 lakh, whichever is lower.
- Supports product testing, licensing and BIS certification through NABL/BIS-ac-

credited, government or PSU laboratories.

Export Promotion Council (EPC) membership

- Reimburses 80% of eligible membership charges or ₹20,000, whichever is lower.
- Includes annual membership, subscription and entry fees.
- Applicants require a valid Import Export Code (IEC) and Registration-cum-Membership Certificate (RCMC).

Capacity building and mentoring

- Provides 90% reimbursement of course fees, up to ₹1 lakh annually.
- Supports 1–30-day programmes at the top 50 National Institutional Ranking Framework (NIRF) management institutes.
- Up to two courses can be supported annually.
- Business Accelerator Programme (BAP) provides mentoring on business strategy, pricing, operational efficiency and market positioning.

E-commerce market access

- Facilitates access to government-promoted platforms including GeM, e-Khadi, TRIFED, Tribes India and MSME Mart.
- Reimburses 80% of eligible membership fees or ₹25,000, whichever is lower.

Conclusion

The National SC–ST Hub advances inclusive growth by combining targeted financial assistance, public procurement access, technology upgradation, market linkages and capacity building for SC/ST-owned MSEs. The reported rise in procurement from ₹99.37 crore in 2015–16 to ₹4,013.42 crore in 2025–26, alongside 55% women's participation among trainees, illustrates its potential to address structural entrepreneurial barriers; sustained impact, however, depends on effective implementation, enterprise competitiveness and equitable access to opportunities.



Previous Year Question (Prelims 2020)

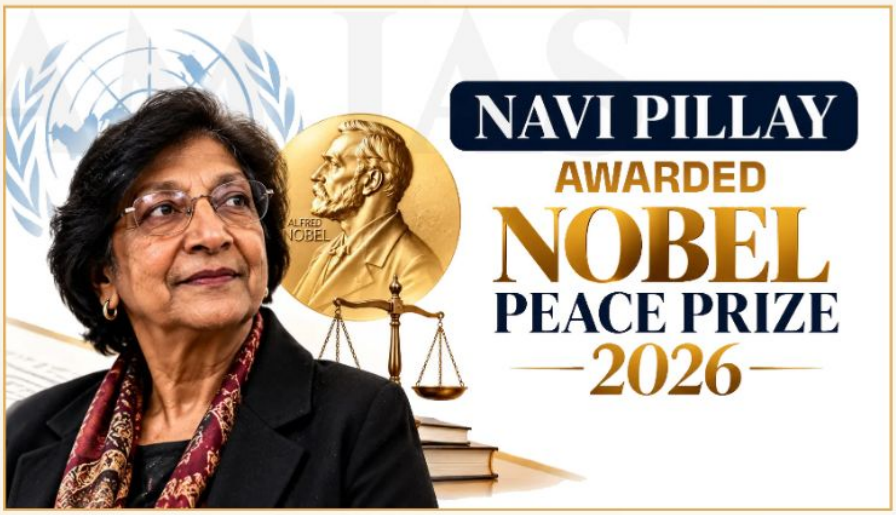
Q. Which one of the following categories of Fundamental Rights incorporates protection against untouchability as a form of discrimination?

(a) Right against Exploitation
(b) Right to Freedom
(c) Right to Constitutional Remedies
(d) Right to Equality

Answer: (d) Right to Equality.

Why in News?

South African jurist and human-rights advocate Navanethem "Navi" Pillay, of Indian Tamil ancestry, was awarded the 2026 Nobel Peace Prize for her efforts to promote peace and international law. Announced on 9 October 2026, the honour coincided with heightened tensions over US sanctions against the International Criminal Court (ICC), where Pillay previously served as a judge.



Navi Pillay: Background and Career

- Born in 1941 in Durban, South Africa, into a family of Indian Tamil origin with ancestral links to Tamil Nadu; aged 85 in 2026.
- A pioneering anti-apartheid lawyer who challenged racial discrimination and defended political activists.
- Became the first non-white woman appointed to South Africa's High Court.
- Judge and President of the International Criminal Tribunal for Rwanda (ICTR): helped advance jurisprudence on rape and sexual violence as acts of genocide, particularly the landmark 1998 Akayesu judgment.
- Judge of the International Criminal Court (ICC), serving from 2003 to 2008.
- UN High Commissioner for Human Rights, 2008–2014.
- Ad hoc judge at the International Court of Justice (ICJ) in The Gambia v. Myanmar proceedings concerning alleged genocide against the Rohingya.
- Chair, UN Independent International Commission of Inquiry on the Occupied Palestinian Territory, including East Jerusalem, and Israel, 2021–2025.

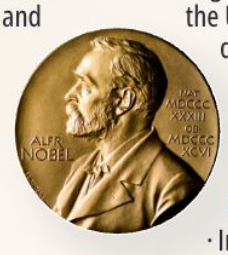
Nobel Peace Prize 2026: Citation and Significance

- Awarded by the Norwegian Nobel Committee for efforts to promote peace and international law.
- The Committee stressed that peaceful resolution of conflicts depends on international rule of law, particularly when wars increase and international judges and institutions face political pressure.
- The award recognises Pillay's contributions to accountability for genocide, crimes against humanity and war crimes, as well as strengthening international judicial institutions.
- Pillay emphasised defending independent courts, the rule of law and a principled international legal order.
- She is the first South African woman and the fifth South African Nobel Peace Prize laureate, joining figures such as Nelson Mandela and Desmond Tutu.
- The 2026 announcement was made on 9 October; the formal Nobel Peace Prize ceremony is scheduled for 10 December in Oslo.

United States Sanctions & the ICC Controversy

- The US administration imposed or expanded economic sanctions against

the ICC and associated officials or service providers amid disputes over the Court's assertion of jurisdiction involving nationals of non-party States.
- Reported sanctions affecting officials and technology/service vendors raise operational questions about access to financial, telecommunications and software services.
- The controversy illustrates the tension between national sovereignty and international accountability, and between judicial independence and political pressure.
- The precise scope and timing of each US sanction measure should be distinguished from the Nobel announcement; their coincidence does not itself establish a causal connection.



About the International Criminal Court
- Established by the Rome Statute adopted in 1998; the treaty entered into force on 1 July 2002.
- Headquarters: The Hague, Netherlands.
- A permanent, independent criminal court with jurisdiction over genocide, crimes against humanity, war crimes and the crime of aggression, subject to the Rome Statute's jurisdictional rules.
- Complementarity: the ICC is a court of last resort; national authorities have primary responsibility, and ICC intervention generally requires that a State is unwilling or unable genuinely to investigate or prosecute.
- The supplied source material reports 125 States Parties; membership totals can change and should be checked against the UN treaty depositary for the exam date.
- India, the United States, China and Russia are not parties to the Rome Statute.

India's position on the Rome Statute
- India has not acceded to the Rome Statute.
- Concerns include sovereignty and jurisdiction over nationals of non-party States, the role of the UN Security Council, and the treaty's treatment of certain weapons and conduct.
- For UPSC, distinguish non-membership of the ICC from India's wider support for international law and accountability through other multilateral mechanisms.

India and the diaspora
- Her Tamil ancestry highlights the global contribution of the Indian diaspora to law and public institutions.
- India's position on the ICC is an important example of balancing sovereignty concerns with international legal cooperation.

Conclusion
Navi Pillay's 2026 Nobel Peace Prize recognises decades of work advancing human rights and international criminal accountability, from anti-apartheid advocacy to the ICTR, ICC and UN. The contemporaneous US–ICC sanctions dispute exposes the tension between State sovereignty and international justice, while her Indian Tamil heritage illustrates the global contribution of the diaspora. For UPSC, the key lesson is to distinguish the mandates of the ICC, ICJ and UN human-rights mechanisms and assess how independent legal institutions support a rules-based international order.

Prelims Practice Question
Q. With reference to the International Criminal Court (ICC), consider the following statements:
1. The ICC was established by the Rome Statute of 1998.
2. India is a member of the ICC.
3. The ICC operates on the principle of complementarity, meaning it steps in only when domestic legal systems are unable or unwilling genuinely to prosecute.
(a) 1 and 2 only (b) 1 and 3 only (c) 2 and 3 only (d) 1, 2 and 3

Answer: (b) 1 and 3 only.

Prime Minister Dhan-Dhaanya Krishi Yojana (PMDDKY)

Why in News?
Prime Minister Dhan-Dhaanya Krishi Yojana (PMDDKY), formally launched on 11 October 2025 as a six-year initiative, has completed its first year. It aims to transform agriculture in relatively disadvantaged agricultural districts through convergence of existing schemes, district-specific action plans and outcome-based monitoring.

Key Facts About PMDDKY
- Aim: Transform agriculture and allied activities in 100 Aspirational Agricultural Districts through focused local interventions.
- Policy inspiration: NITI Aayog's Aspirational Districts Programme, adapted to agriculture and allied sectors.
- Cabinet approval: 16 July 2025; formal launch: 11 October 2025.
- Duration: Six years, beginning FY 2025–26.

Need for the Scheme
- Low agricultural productivity.
- Inadequate irrigation facilities.
- Limited access to agricultural credit.
- Insufficient post-harvest infrastructure.

Objectives
- Raise agricultural productivity, promote crop diversification and encourage sustainable agricultural practices.
- Expand post-harvest storage facilities at panchayat and block levels.
- Improve irrigation coverage and infrastructure.
- Facilitate short-term and long-term agricultural credit.

Selection of 100 Districts
- Selection based on low agricultural productivity, low cropping intensity and low agricultural credit disbursement.
- Allocation among States and Union Territories considered shares of net cropped area and operational holdings.
- At least one district was selected from each State.

Convergence and Nodal Institutions
- Integrates 36 Central schemes across 11 Ministries/Departments, alongside State schemes and private-sector partnerships.
- Department of Agriculture and Farmers Welfare (DA&FW) leads implementation with other Ministries/Departments, NITI Aayog,

NABARD and States/UTs.
- Emphasis is on coordinating existing interventions instead of implementing isolated, overlapping programmes.

Three-Tier Administrative Structure

District level	**District Dhan Dhaanya Krishi Yojana Samiti, chaired by District Collector/District Magistrate; prepares and implements the District Action Plan (DAP).**
State level	State Dhan Dhaanya Krishi Yojana Samiti, chaired by Chief Secretary; reviews and monitors DAPs.
National oversight	National Executive Committee, chaired by Union Minister for Agriculture and Farmers Welfare; oversees implementation.
National monitoring	National Monitoring Committee, chaired by Secretary, DA&FW; monitors progress.

District Action Plans (DAPs)
- Need-based planning: Baseline and diagnostic assessments identify local agricultural gaps and suitable interventions.
- Convergence: DAPs integrate relevant Central and State schemes and set outcome targets, annual milestones and scheme-linked activities.
- Approval and fund flow: DAPs go to concerned State departments for inclusion in annual action plans, approvals and release of funds.
- Monitoring: 121 indicators across 36 schemes—74 output indicators and 47 outcome indicators.
- Dashboard ranking: Districts are ranked monthly using output indicators on the PM-DDKY dashboard.

First-Year Progress (2025–26 to August 2026)
- Dashboard operationalised in the last week of October 2025; monthly output-based rankings began in November 2025.
- All 100 districts prepared DAPs and began implementation.
- National, State and district committees were established for review and monitoring.
- All 100 districts submitted output-indicator data through August 2026 and outcome-indicator data for FY 2025–26.
- Central Nodal Officers periodically review implementation and guide districts.
- Department of Public Enterprises included adoption of PMDDKY districts by Central Public Sector Enterprises for CSR activities during FY 2026–27 and FY 2027–28.

Top-Performing Districts
- 1st: Gaya, Bihar.
- 2nd: Nagaur, Rajasthan.
- 3rd: Umaria, Madhya Pradesh.

PM-DDKY Farmer Producer Organisation (FPO) Sangam
- Held in December 2025 as a platform for farmers and FPOs to exchange experiences and identify opportunities for productivity, market access and income enhancement.
- Participation: More than 72 FPOs from 15 States and 33 PMDDKY districts.
- Key themes: Natural farming, oilseeds, beekeeping, protected cultivation, micro-irrigation, institutional finance and digital agriculture.

Best Practices from PMDDKY Districts

Gadchiroli, Maharashtra
- An FPO with 800 farmer members established a rice-processing unit and a 900-metric-tonne warehouse.
- Local processing and storage support value addition and better price realisation for farmers.

Jaisalmer, Rajasthan
- An FPO with 1,236 farmer members adopted Integrated Pest Management (IPM)-based cumin cultivation across 2,000 acres.
- Solar-powered sprinkler irrigation was adopted on 500 acres, promoting water efficiency and productivity.

Conclusion
PMDDKY applies district-specific planning, inter-ministerial convergence and measurable performance monitoring to address persistent agricultural gaps in 100 relatively disadvantaged districts. Its first-year improvement in average district scores from 18.85 to 46.89, together with action-plan preparation, FPO participation and examples of local value addition and efficient irrigation, suggests promising implementation momentum. Sustained success, however, will depend on translating reported outputs into durable gains in productivity, farm incomes, credit access and environmental sustainability.

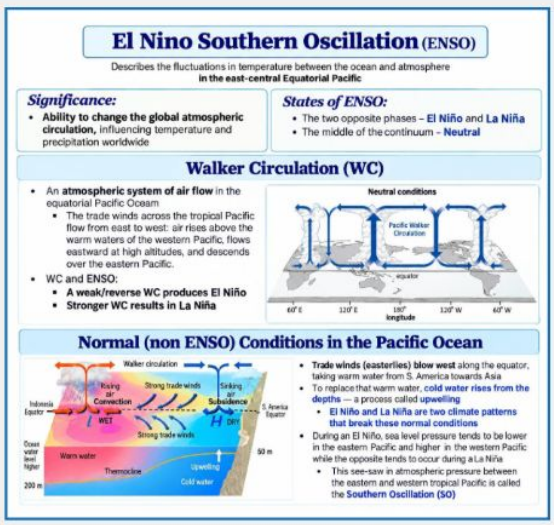
Previous Year Question (Prelims, 2020)

Under the Kisan Credit Card scheme, short-term credit support is given to farmers for which of the following purposes?

1. Working capital for maintenance of farm assets
2. Purchase of combine harvesters, tractors and mini trucks
3. Consumption requirements of farm households
4. Post-harvest expenses
5. Construction of family house and setting up of village cold storage facility

(a) 1, 2 and 5 only (b) 1, 3 and 4 only
(c) 2, 3, 4 and 5 only (d) 1, 2, 3 and 4

Answer: (b) 1, 3 and 4 only.



Super El Niño 2026–27 & The Tamil Nadu Anomaly

Why in News?

The supplied briefing reports a WMO warning that the ongoing 2026–27 El Niño could intensify into a "Super El Niño," with a Niño 3.4 sea-surface temperature (SST) anomaly potentially reaching about +3.7°C in October–December 2026. Although El Niño commonly weakens India's Southwest Monsoon, Tamil Nadu can receive enhanced Northeast Monsoon rainfall, increasing the possibility of heavy rain and flooding. These specific 2026–27 projections should be checked against the latest official WMO and IMD bulletins before publication.

Understanding El Niño and Super El Niño

El Niño: Definition and mechanism

- El Niño is the warm phase of the El Niño–Southern Oscillation (ENSO), a coupled ocean–atmosphere phenomenon in the central and eastern tropical Pacific.
- It typically recurs every 2–7 years.
- The conventional Oceanic Niño Index (ONI) criterion identifies an El Niño episode when the Niño 3.4 SST anomaly reaches at least +0.5°C for five consecutive overlapping three-month seasons.
- Weakening or reversal of easterly trade winds shifts warm surface water eastwards towards Peru and Ecuador, suppressing cold-water upwelling associated with the Humboldt (Peruvian) Current.

Meaning and intensity categories

- "Super El Niño" is an informal expression for an exceptionally intense El Niño; it is not a distinct official ENSO phase.
- A common informal threshold is Niño 3.4 SST anomalies of +2.0°C or higher; some eastern Pacific areas may exceed +3.0°C.
- Weak: +0.5°C to +0.9°C; Moderate: +1.0°C to +1.4°C; Strong: +1.5°C to +1.9°C; Very strong: +2.0°C or higher.

Reported 2026–27 outlook

- The source notes cite Niño 3.4 SST anomalies of approximately +3.05°C to +3.08°C, with possible peaks approaching +4.0°C.
- An October–December estimate of around +3.7°C is also quoted, suggesting a potentially record-setting event.
- These are scenario/projection claims, not observed values; forecasts of this magnitude are highly uncertain and require official verification.

Historical Context in India

- 1876–78: severe El Niño-related drought contributed to the Great Madras Famine and widespread deprivation across the Deccan, with millions of deaths.
- 1997–98: India experienced near-normal Southwest Monsoon rainfall despite a very strong El Niño; a positive Indian Ocean Dipole (IOD) is often discussed as a mitigating factor.
- 2015–16: weak Southwest Monsoon seasons coincided with a strong El Niño; Chennai experienced devastating flooding in December 2015 during the Northeast Monsoon. Individual flood events cannot be attributed to ENSO alone.

Factors Modulating El Niño's Impact on India

A. Walker Circulation

- El Niño shifts the ascending, convection-rich branch of the east–west Walker Circulation towards the central/eastern Pacific.
- Enhanced subsidence over parts of the Indian Ocean region can suppress convection and Southwest Monsoon rainfall.

B. Indian Ocean Dipole (IOD)

- IOD describes the SST contrast between the western equatorial Indian Ocean (near East Africa/Arabian Sea) and eastern equatorial Indian Ocean (near Indonesia).
- Positive IOD: relatively warmer western basin; it can support Indian monsoon rainfall and sometimes offset El Niño-associated suppression.
- Negative IOD: relatively warmer eastern basin; it can worsen weak-monsoon conditions.
- The supplied briefing quotes a projected positive IOD anomaly near +0.5°C for October–December 2026; verify against current official forecasts.
- The IOD is sometimes informally called the "Indian Niño."

C. Location of Pacific warming

- Canonical/eastern-Pacific El Niño: warming concentrated towards the coast of Peru; often linked with suppression of India's Southwest Monsoon.
- El Niño Modoki/central-Pacific El Niño: warming focused in the central tropical Pacific with relatively cooler water on either side.
- Different SST patterns can alter atmospheric circulation and regional cyclone patterns, but cyclone responses are not deterministic.

D. Madden–Julian Oscillation (MJO)

- MJO is an eastward-propagating disturbance of tropical cloudiness, convection and winds, typically cycling every 30–60 days.
- Its active convective phase over the Indian Ocean can bring episodic heavy rainfall and temporarily strengthen monsoon activity even during El Niño.

Why Tamil Nadu Can Respond Differently

A. Northeast Monsoon dependence

- Tamil Nadu lies partly in the rain shadow of the Western Ghats and is less dependent than much of India on June–September Southwest Monsoon rainfall.
- Approximately 48–50% of its annual rainfall is received during the October–December Northeast (retreating) Monsoon.
- Thus a weak Southwest Monsoon does not necessarily imply a weak Northeast Monsoon for Tamil Nadu.

B. Regional pressure and wind patterns

- The supplied notes describe a possible "wind tunnel" effect, with Bay of Bengal–Arabian Sea pressure gradients channelling moisture-bearing winds towards coastal Tamil Nadu.
- Such local circulation mechanisms must be evaluated using seasonal observations rather than assumed for every El Niño.

C. Warmer Bay of Bengal

- Weaker winds and strong solar heating may warm parts of the southern Bay of Bengal by about 1°C in the cited scenario.
- A shallow mixed layer and salinity stratification can retain heat near the sea surface.
- Warmer waters increase evaporation and atmospheric moisture availability for rain-bearing systems.

D. Cyclones and low-pressure systems

- Northeasterly flow and Bay of Bengal depressions can draw heat and moisture from warm waters during November–December.
- When atmospheric conditions are favourable, this can intensify local rainfall and cyclone-related hazards along the Tamil Nadu coast.
- Warmer SST alone does not guarantee more or stronger cyclones; wind shear, atmospheric circulation and storm tracks also matter.

E. East India Coastal Current (EICC)

- The EICC along India's east coast exhibits seasonal reversals linked to monsoon winds and remote oceanic forcing.
- The source notes describe a reversal from northward to southward flow between February and November, affecting coastal SST and potentially rain-bearing systems.
- They also claim a westward reversal of equatorial currents in 2026, transporting warmer water towards India; this specific event requires observational confirmation.

Implications for Tamil Nadu

Temperature

- The source briefing suggests summer 2027 could be hotter than normal.
- Some areas are projected in the supplied notes to reach 42–42.5°C; these figures are not verified here and should not be treated as a deterministic forecast.

Rainfall and flood risk

- The Northeast Monsoon may deliver

above-normal rainfall in some El Niño years, with a risk of extreme precipitation and urban/coastal flooding.
- December 2015 Chennai floods provide a historical example of extreme Northeast Monsoon rainfall during a strong El Niño year.
- Local topography, drainage, reservoirs, urbanisation and storm tracks strongly influence the actual impacts.

Scientific caution and climate change

- Not all anomalous ocean warming is caused by ENSO; long-term greenhouse-gas-driven warming also raises background temperatures.
- 2024 was the warmest year in the global observational record at the time referenced by the source notes.
- A warmer baseline can intensify heat and moisture extremes, but attribution of individual events needs rigorous analysis.

Disaster Management and Expert Advice

- The Tamil Nadu expert advice described in the supplied briefing favours multi-hazard preparedness instead of planning solely for drought or flooding.
- Strengthen early-warning dissemination, urban drainage, reservoir operation protocols, cyclone shelters and emergency response.
- Where water storage is inadequate, authorities may consider limiting non-essential water use such as car washing and park irrigation.
- Industrial water use may need regulation during shortages, balanced against public health and economic needs.
- Prepare simultaneously for extreme heat, agricultural water stress, intense rainfall and cyclone impacts.



Conclusion

The potential 2026–27 strong El Niño highlights how global climate drivers produce contrasting regional impacts: weaker Southwest Monsoon conditions across parts of India may coexist with heavy Northeast Monsoon rainfall in Tamil Nadu. Walker Circulation, the IOD, MJO, Bay of Bengal temperatures and local ocean currents shape this outcome, while long-term warming amplifies uncertainty. The policy priority is therefore evidence-based, multi-hazard preparedness—integrating flood protection, heat and drought planning, water management and timely official forecasts rather than relying on a single ENSO prediction.

Previous Year Question (Prelims, 2017)

With reference to "Indian Ocean Dipole (IOD)" sometimes mentioned in the news while forecasting Indian monsoon, which of the following statements is/are correct?

1. IOD phenomenon is characterised by a difference in sea surface temperature between tropical Western Indian Ocean and tropical Eastern Pacific Ocean.
2. An IOD phenomenon can influence an El Niño's impact on the monsoon.
(a) 1 only (b) 2 only (c) Both 1 and 2 (d) Neither 1 nor 2

Answer: (b) 2 only.

GPS Tracking of Elephants in ASSAM



Why in News?

During the 72nd Wildlife Week, the Assam Forest Department and World Wide Fund for Nature–India (WWF-India) released "Tracking the Giants: Movement and Habitat-Use Patterns of GPS-Collared Elephants in Assam." The study documents the movement of Asian elephants across fragmented landscapes and identifies conservation priorities amid increasing human–elephant conflict.

Key Findings of the GPS-Collaring Study

Study design and geographic coverage

- Study period: April 2021–June 2026, covering four female-led elephant herds and one solitary male elephant.
- Study districts: Udalguri, Sonitpur and Biswanath, all on the northern bank of the Brahmaputra in Assam.
- More than 38,000 GPS locations recorded, enabling high-resolution analysis of seasonal movement and habitat use across human-dominated landscapes.

Important habitats and land-use patterns

- Sonai Rupai, Behali and Bornadi Wildlife Sanctuaries were identified as important habitats for the tracked elephants.
- Protected areas and reserve forests remained essential throughout much of the year, but elephants also regularly used areas outside formal protected boundaries.
- Tea plantations functioned as movement pathways and secondary habitats, increasing encounters with people and making plantation-level conservation coordination important.

Seasonal movements and agricultural interface

- Home ranges of female-led herds expanded during the paddy cultivation season, which coincided with increased human–elephant conflict.
- In Sonitpur, post-monsoon GPS fixes were distributed approximately 40% in farmland, 40% in forests and 20% in tea estates.
- The collared elephant Mynow used tea plantations for more than 40% of recorded locations in monsoon and post-monsoon periods.

Riverine and trans boundary movement

- River channels provide north–south passage between Himalayan foothill forests and Brahmaputra grasslands or chaporis.
- Dry-season cross-border movement was recorded between Udalguri (Assam) and Jomotsangkha Wildlife Sanctuary (Bhutan).
- These findings support coordinated India–Bhutan corridor protection and landscape-level planning beyond isolated protected areas.

Infrastructure risks

- Elephant routes intersect roads, railways and settlements, exposing elephants to collisions and communities to human–wildlife conflict.
- The study points to the need for wildlife crossings, early-warning systems, habitat connectivity and local conflict-response mechanisms.

Human–Elephant Conflict in Assam

- In July 2026, Assam's Forest Minister informed the State Assembly that human–elephant conflict had claimed 1,147 human lives and 246 elephants since 2016.
- Habitat fragmentation, forest degradation and land-use change increase shared use of farmlands, tea estates and settlements.
- Consequences include crop and property losses, injuries, human deaths and elephant mortality; mitigation requires community engagement as well as habitat management.

Asian Elephants: Essential Facts

Population & distribution

- India is home to more than 60% of the world's wild Asian elephants.
- More than half of India's elephants inhabit the Western Ghats; Karnataka has the largest State population, followed by Assam and Tamil Nadu according to the figures cited in the source material.
- The 2025 Synchronised All India Elephant Census estimated 4,149 elephants in Assam, an important stronghold in northeast India.

Scientific census methods

- The Synchronised All India Elephant Estimation (SAIEE) established a DNA-based scientific baseline, moving beyond purely visual population counts.
- Methods combine dung-derived genetic mark–recapture with camera-trap-based distance sampling to improve population estimates.

Legal and international protection

- Asian elephants receive Schedule I protection under the Wild Life (Protection) Act, 1972.
- The mainland Asian elephant was included in Appendix I of the Convention on Migratory Species (CMS) at COP13 in Gandhinagar, India.

Major conservation programmes

- Project Elephant (1992): conserves elephant populations, habitats and migration corridors while reducing human–elephant conflict.
- India has 33 notified Elephant Reserves across 14 States, including Singhbhum (the first), Terai and Agasthyamalai.
- Monitoring the Illegal Killing of Elephants (MIKE): a CITES-linked system to monitor illegal killings and trends; India has 10 MIKE sites.
- Gajraj Suraksha: AI-supported rail intrusion detection to reduce elephant–train collisions.

Ecological significance

- Elephants are keystone species and ecosystem engineers: they disperse seeds, modify vegetation, create access to water and open dense habitats.
- Their wide-ranging movement links ecosystems and helps maintain biodiversity and ecological processes.

Technology in Elephant Conservation: Gajraj Suraksha

- Developed by Indian Railways as an AI-enabled Intrusion Detection System (IDS) to reduce elephant–train collisions.
- Optical fibre cables beside railway tracks act as sensors, detecting vibrations associated with elephant movement.
- The system reportedly identifies activity within about 200 metres of tracks and sends audio-visual alerts to locomotive pilots and station masters.
- Reported detection accuracy is 99.5%; this is a stated system claim, not a guarantee in all field conditions.
- Proposed deployment covers approximately 700 km of elephant corridors across West Bengal, Odisha, Jharkhand, Assam, Kerala and parts of Chhattisgarh and Tamil Nadu.

Conservation Implications and Way Forward

- Protect landscape connectivity between forests, riverine grasslands, tea estates and agricultural land, rather than relying only on protected-area boundaries.
- Use GPS telemetry, remote sensing and ground surveys to identify seasonal corridors and target interventions during paddy cultivation.
- Coordinate with tea estates, village institutions and district administrations on early warnings, safe movement and rapid response.
- Improve road and rail safety with location-specific speed controls, crossing structures, alerts and operational protocols.
- Strengthen India–Bhutan cooperation for transboundary elephant movement and shared habitat management.

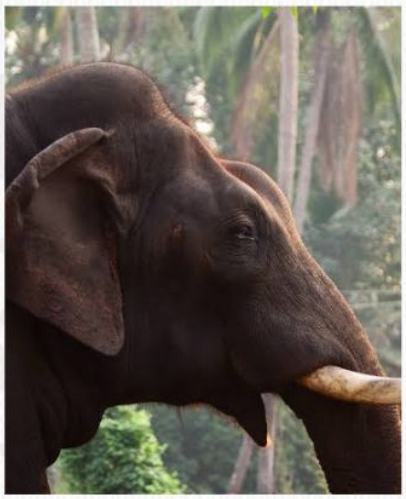
- Support local communities through transparent compensation, crop-protection practices and evidence-based conflict mitigation.

Conclusion

The Assam–WWF-India GPS study demonstrates that effective elephant conservation requires protection of connected landscapes, not only isolated sanctuaries. Seasonal use of farmland and tea estates, extensive home ranges and cross-border movement into Bhutan highlight the importance of corridor planning, community participation and international coordination. Combining GPS evidence with railway warning systems, habitat restoration and responsive conflict management can safeguard elephants while reducing risks to people and livelihoods.







Previous Year Question (Prelims, 2020)

With reference to Indian elephants, consider the following statements:

1. The leader of an elephant group is a female.
2. The maximum gestation period can be 22 months.
3. An elephant can normally go on calving till the age of 40 years only.
4. Among the States in India, the highest elephant population is in Kerala.
(a) 1 and 2 only (b) 2 and 4 only (c) 3 only (d) 1, 3 and 4 only

Answer: (a) 1 and 2 only.

