



Educrat IAS
ACADEMY

No Need of going to Delhi Now!
Prepare for UPSC from Kolkata

EDUCRAT PIB COMPILATION



DAILY
CURRENT AFFAIRS



EXAM
FOCUSED



ACCURATE
& RELIABLE



STAY AHEAD.
SCORE HIGH.

SEPTEMBER 2026



AIR 135
SAIMA KHAN
UPSC 2025



AIR 443
DEBJYOTI HALDER
UPSC 2025



AIR 649
JUHI DAS
UPSC 2025



AIR 153
SAHARS KUMAR
UPSC 2024



AIR 477
PARAMITA MALAKAR
UPSC 2024



RESERVE LIST
PRIYA PUROHIT
UPSC 2023

PARK STREET: 9163228921, 9163218921



Educrat IAS Daily PIB Gist

Topic	Page No.
1 . NPCI International–Uzbekistan Partnership: UPI via UZQR	1
2. Mission Zero: Depalpur Achieves Zero Legacy Waste	1
3. Agatti Island, Lakshadweep	2
4. Green Forge Complex at BRIC-NABI, Mohali	2
5. Index of Services Production (ISP)	2
6 . Bishkek Declaration, 2026	3
7. Prime Minister Dhan-Dhaanya Krishi Yojana (PM-DDKY)	3
8. Reimagining Governance: Discourse for Excellence (RGDE)	3
9. Semipalatinsk Treaty	4
10. India’s SECURE Vision for SCO	4
11 . International Workshop on Tiger Landscape	5
12. India’s Sovereign Credit Rating Upgraded	5
13. Quantum Biotechnology	6
14. Legal Metrology (Indian Standard Time) Rules, 2026	6
15. EPF Scheme 2026 Amnesty Provision	6
16. RAKSHA: India’s Defence Diplomacy Roadmap	7
17. BIO-NIVESH: Biotechnology–Investment Platform	7
18. Green Shipping Corridors & Green Fuel Bunkering	7
19. Agentic AI Skilling Initiative	8
20. Reclaimed Asphalt Pavement (RAP)	8
21. Gaurang Vyas & Gujarati Musical Tradition	8
22. Peptide-Based Piezoelectric Biomaterials for Self-Powered Healthcare	9
23. Thermo-Responsive Microgels	9
24. Record Seebeck Response in ScN: New Generation of Thermoelectric Sensors	10
25. Vulture Conservation in India: From Crisis to Recovery	10
26. Corporate Mitra	11
27. Recirculatory Aquaculture System (RAS)	11
28. Biofloc Technology (BFT)	11
29. Jute: India’s Golden Fibre	12
30. India–Sweden Cooperation on AI & Digitalisation under SITAC	12
31. Swachh Vayu Sarvekshan Awards 2026 & National Clean Air Programme (NCAP)	13
32. AI-based Mithun Behaviour Monitoring	13
33. Exercise Veer Guardian 2026	13
34. India–Japan Cooperation on Forests	14
35. 7th Global Fintech Fest (GFF) 2026	14
36. Dr. Bhupen Hazarika: 100th Birth Anniversary	15
37 . INNOPROM India 2026	15



38. Skill Manthan	16
39. Metal-Free Organic Photocatalyst for Green Hydrogen	16
40. ORV Sagar Manthan: India's Advanced Ocean Research Vessel	16
41. International Deep-sea Macrofauna Taxonomy School	17
42 . Bakhira Lake Sediments & Indian Summer Monsoon Reconstruction	17
43. International Space Summit 2026	17
44. Exercise Samudra Laksamana 2026	18
45. Small Hydro Power (SHP)	18
46. District-Level Estimates of Unincorporated Non-Agricultural Sector — ASUSE 2025	19
47 . CAZRI Moth Bean Varieties: Climate-Resilient Agriculture	19
48 . Dryland Congress 2026 and Delhi Declaration on Drylands	19
49. OPU-IVF Calf in Badri Cattle	20
50. Pradhan Mantri Kisan Maandhan Yojana (PM-KMY)	20
51. Steel Slag Road Technology	21
52 . India-MERCOSUR Preferential Trade Agreement	21
53 . Great Indian Bustard Conservation and Sayara Van Kavach	22
54 . Operation Deep Manifest	22
55 . Vayu UTtaM	23
56. TICu_5Se_3 : Unusual Heat Transport and Thermoelectric Potential	23
57 . World Circular Economy Forum (WCEF) 2026	24
58. SARAL AI for Science Communication	24
59. UPI MDR Framework	24
60. Yudh Abhyas 2026	25
61. Periodic Labour Force Survey (PLFS)	25
62 . India Electric Mobility Index (IEMI)	26
63. World Ozone Day 2026	26
64. India's Net Zero Portal & NAPCC Dashboard	27
65. Babu Jagjivan Ram	27
66. Special Campaign 6.0: e-Waste Management	27
67 . Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY)	28
68. India's First Soil Carbon Payments to Farmers	28
69. Life Cycle Assessment (LCA) Framework for Solid Waste Management	29
70. Skills4Future: EV & Green Skills Lab	29
71. Electronics Components Manufacturing Scheme (ECMS)	29
72 . PM Vishwakarma Scheme	30
73. SEMICON India 2026: India's Transition to Semicon 2.0	30
74. 17th Kathakali Festival	31
75. Ultra High Performance Fibre Reinforced Concrete (UHPFRC) Technology	31
76. SLINEX-26: India-Sri Lanka Maritime Exercise	32
77 . Pharmacovigilance, Biovigilance & National Formulary of India 2026	32



78. Building India's Critical Minerals Recycling Ecosystem	32
79. India–New Zealand Free Trade Agreement (FTA)	33
80. PM-SETU	33
81. Exercise NOMADIC ELEPHANT 2026	34
82. Project Rhino & Greater One-Horned Rhinoceros	34
83. India Cine Hub (ICH)	35
84. Dadasaheb Phalke Award	35
85. Exercise Veer Guardian 2026	35
86. Sustainable Urban River Management (SURM) Framework & AI/ML-based Reservoir Sediment Management	36
87 . Tokay Gecko Trafficking	36
88. National Rainfed Area Authority (NRAA) & REWARD Programme	36
89 . Ayushman Bharat & Universal Health Coverage	37
90. WTO Agreement on Fisheries Subsidies (AFS)	37
91. Sodium Benzoate & Phenoxyethanol: Mechanism of Antibacterial Action	38
92 . 20 mK Dilution Refrigerator for Quantum Applications	38
93. Nidhi Companies – MCA Advisory	39
94. India–Netherlands Strategic Partnership on Water- Kalpasar Project	39
95. Exercise VARUNA 2026 – India–France Maritime Cooperation	40
96. Bio-based Biodegradable Plastic under BioE3	40
97 . DDU-GKY 2.0: Skill Training for Rural Youth	40
98. Exercise TARANG SHAKTI 2026	41
99. India's First LNG-Diesel Dual-Fuel Train	41
100. India's First Port-based e-Methanol Production Facility – Kandla	42
101. Arogya Manthan 2026 – AB PM-JAY & ABDM	42
102. PM-MKSSY (Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana)	43
103. Pradhan Mantri Anusuchit Jaati Abhyuday Yojana (PM-AJAY)	43
104. Agnibaan Reusable Launch Vehicle	44
105. FCV (Flue-Cured Virginia) Tobacco	44
106. Bharat Maritime Insurance Pool (BMIP)	45
107 . Nanomedicine – Precision Medicine & Personalised Healthcare	45
108. Viksit Panchayat – NITI Aayog's State Support Mission	46
109. Forest & Landscape Restoration – India at COFO 28	46
110. Exercise KAZIND-2026	47
111. India–France Space Cooperation	47



Educrat IAS Daily PIB Gist

1. NPCI International–Uzbekistan Partnership: UPI via UZQR

Syllabus Mapping: GS II: India–Central Asia Relations • Digital Diplomacy + GS III: Digital Economy • Digital Public Infrastructure

- **UPI (Unified Payments Interface)** is an instant **real-time payment system** developed by NPCI, enabling multiple bank accounts to be linked through a single mobile application.
- UPI facilitates **Person-to-Person (P2P)** as well as **Person-to-Merchant (P2M)** transactions.
- It enables payments using identifiers such as **UPI ID/VPA, mobile number and QR code**, reducing dependence on cash and cards.
- **NPCI (National Payments Corporation of India)** operates India's retail payment and settlement systems and developed UPI.
- **NPCI International Payments Ltd. (NIPL)** is the international arm of NPCI responsible for taking **UPI and RuPay** to international markets.
- Under the latest partnership, NIPL partnered with **National Interbank Processing Centre JSC (NIPC)**, operator of Uzbekistan's national payment system **HUMO**.
- Indian users can make **merchant payments in Uzbekistan by scanning UZQR**, the country's **national interoperable QR code**, through UPI-enabled applications.
- **HUMO** has been designated as NIPL's authorised partner for **cross-border merchant acceptance**.
- **UZQR** is part of the **Unified National QR infrastructure** mandated by the **Central Bank of Uzbekistan (CBU)**.
- The arrangement enables **P2M payments directly from Indian bank accounts** while travelling in Uzbekistan.
- **RBI** regulates payment systems, while **NPCI operates UPI**.
- **UPI Lite** facilitates **small-value payments** with simplified authentication.
- **UPI 123PAY** enables UPI transactions through **feature phones**, promoting financial inclusion.
- **UPI AutoPay** enables **recurring payments** through UPI mandates.
- **NIPL (NPCI International Payments Ltd.)** is the international arm of NPCI responsible for expanding **UPI and RuPay** globally
- **UPI international acceptance** includes **Singapore, UAE, France, Mauritius, Nepal, Bhutan, Qatar, Sri Lanka, Cambodia, Greece and Uzbekistan**.

2. Mission Zero: Depalpur Achieves Zero Legacy Waste

Syllabus Mapping: GS III: Solid Waste Management • Urbanisation • Environmental Governance

- **Swachh Shehar Jodi** — launched during **Swachhata Hi Seva 2025** under **SBM-U 2.0**; follows an **"Each One Teach One"** model of mentor–mentee city collaboration.
- **Depalpur (Madhya Pradesh)** became the **first city under Swachh Shehar Jodi** to achieve **"Zero Legacy Waste"**, with **1,250 MT** of legacy waste scientifically remediated.
- **Indore = Mentor city; Depalpur = Mentee city** — cooperation focused on **door-to-door collection, 4-bin segregation and scientific waste processing**.
- **Legacy waste** is the waste accumulated over years at old dumpsites; its remediation involves **segregation, recovery, recycling and scientific processing/disposal** rather than simply shifting the waste elsewhere.
- **RDF (Refuse Derived Fuel)** recovered from waste can be used as a fuel substitute; in Depalpur, RDF was sent for **co-processing in cement factories**.
- **Swachh Bharat Mission-Urban 2.0 (SBM-U 2.0)** focuses on sustaining ODF outcomes and achieving **garbage-free cities through scientific solid-waste management**, including segregation, processing and remediation of legacy dumpsites.
- **4-bin segregation** enables source/stream-wise separation of waste for appropriate recycling, recovery and processing.
- In a **4-bin waste segregation system**, the four streams are generally:
 - ❑ **Wet/biodegradable waste** — food waste, vegetable/fruit peels, garden waste → **composting/biological processing**
 - ❑ **Dry/recyclable waste** — paper, cardboard, plastic, metal, glass → **recycling/material recovery**
 - ❑ **Domestic hazardous waste** — batteries, paint containers, chemicals, expired medicines, etc. → **specialised safe treatment/disposal**
 - ❑ **Sanitary waste** — diapers, sanitary napkins, used masks, bandages, etc. → **separate collection and appropriate treatment/disposal**.
- **Co-processing** means using waste-derived materials such as RDF as a resource/fuel in an industrial process, reducing dependence on conventional fuel and landfill disposal.



3. Agatti Island, Lakshadweep

Syllabus Mapping: GS-I — Indian Geography; GS-III — Blue Economy, Fisheries, Environment & Biodiversity

- **Agatti Island** is part of **Lakshadweep**, a Union Territory of India in the **Arabian Sea**.
- **Agatti** is one of the islands of Lakshadweep and is known for its **coral reefs, lagoon ecosystem and marine biodiversity**.
- Lakshadweep is an **archipelago of coral islands**; its islands are predominantly **atolls**, with lagoons enclosed by coral reefs.
- **Agatti's significance:** It is an important location for **fisheries, tourism and marine-resource-based livelihoods**.
- **Fisheries:** Agatti has an **ornamental fish hatchery**; Lakshadweep has **300+ ornamental fish species**.
- **Blue Economy:** Agatti was the venue for the **Fisheries Outreach Programme (2026)** and the launch of **Mission Rangan Machhli 2031** for development of ornamental fisheries.
- **Lakshadweep's marine space:** It has a lagoon area of about **4,200 sq km** and an EEZ of nearly **4 lakh sq km**.
- Lakshadweep accounts for nearly **17% of India's EEZ**, despite its very small land area.
- **Important fisheries:** **Yellowfin Tuna and Skipjack Tuna** are major high-value resources of Lakshadweep.
- **Ecological significance:** Coral reefs around Lakshadweep support **marine biodiversity, fisheries and island livelihoods**, making conservation important alongside economic utilisation.

4. Green Forge Complex at BRIC-NABI, Mohali

Syllabus Mapping: GS-III — Biotechnology; GM Crops; Agriculture; Bioeconomy; Environment

- **Green Forge** is a controlled simulation facility at **BRIC-NABI, Mohali**, designed for **cultivation and experimentation of genetically modified (GM) crops** under controlled environmental conditions.
- It can vary **light (quality and quantity), temperature and humidity** to simulate different environmental conditions and study crop performance before field cultivation.
- **Genetically Modified (GM) crops** are produced by introducing/altering specific genetic material using **modern biotechnology**, to obtain desired traits such as pest resistance, improved nutrition or stress tolerance.
- **Bt cotton** is India's major commercial GM crop; it contains genes from *Bacillus thuringiensis* that provide resistance against certain insect pests.
- **BioE3: Biotechnology for Economy, Environment and Employment (BioE3)** focuses on promoting **high-performance biomanufacturing**, linking biotechnology research with industry, sustainability and employment.
- **BRIC (Biotechnology Research and Innovation Council)** is an autonomous institution under the **Department of Biotechnology (DBT), Ministry of Science & Technology**, created by integrating multiple DBT autonomous institutions.
- **NABI: National Agri-Food and Biomanufacturing Institute (NABI)** focuses on research in **agri-food biotechnology and biomanufacturing**, including conversion of agricultural resources/residues into **high-value products**.
- **Bioeconomy:** Biotechnology-based conversion of **agricultural waste into nutraceuticals and biomaterials** can support a **circular and low-carbon economy** by creating value from biomass that would otherwise be treated as waste.
- **Carbon Capture and Utilisation (CCU)** involves capturing CO₂ emissions and **using the captured carbon as a resource/feedstock**, rather than only storing it.

5. Index of Services Production (ISP)

Syllabus Mapping: GS Paper III – Indian Economy → Services Sector → Growth & Employment → Economic Statistics

- **Index of Services Production (ISP)** is India's **first high-frequency indicator dedicated to measuring services-sector output**; it tracks short-term changes in the **volume of output of the formal services sector**. **Base year: 2024–25** — aligned with the newer CPI series. **Released by MoSPI**.
- **First trial ISP:** Released for **April 2026**, covering **19 service sub-sectors** and around **60% of the services sector**.
- **Key distinction:** **IIP measures industrial production**, whereas **ISP is intended to capture short-term changes in services-sector output**.
- **Why deflator is needed:** Services data are generally available in **nominal/value terms**; a **price deflator removes the effect of price changes** to obtain real/volume growth.
- **Important deflators:** **WPI** is used for wholesale trade; relevant **CPI** is used for most other services. **CPI-General** is used for repair & maintenance, banking and insurance.
- **Key data sources:** **Administrative data + GST data + ASISSE (Annual Survey of Incorporated Services Sector Enterprises)**.
- ISP marks the **first use of GST data in statistical applications** for its compilation.
- **Institutional framework:** **MoSPI constituted a Technical Advisory Committee (TAC) in May 2025** to develop the conceptual and methodological framework of ISP.



- **International reference:** OECD Compilation Manual for Index of Services Production (2007) is a major reference; Eurostat is another important guide.
- **Services excluded from current ISP coverage** include **public administration & defence, certain financial activities, government health & education, gambling & betting**, and several predominantly non-market/informal activities.

6. Bishkek Declaration, 2026

Syllabus Mapping: GS2: International Relations | Regional Groupings | SCO | Terrorism & Security | Connectivity | Multilateralism

- **Shanghai Cooperation Organisation (SCO)** is a **Eurasian political, economic and security organisation**; it focuses particularly on **regional security, counter-terrorism, economic cooperation and connectivity**.
- **2026 marks 25 years of SCO**. It was established in **2001 at Shanghai** by **China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan and Uzbekistan**.
- **India became a full member in 2017**, along with Pakistan. **Iran became a full member in 2023 and Belarus in 2024**.
- **Current full members: 10** → China, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Tajikistan, Uzbekistan and Belarus.
- **SCO is not a military alliance like NATO**; it is primarily a regional cooperation organisation with a strong **security/counter-terrorism dimension**.
- **Permanent bodies:** Secretariat – Beijing, China + **Regional Anti-Terrorist Structure (RATS)** – Tashkent, Uzbekistan
- **RATS** is an important SCO mechanism for cooperation against **terrorism, separatism and extremism**.
- **SCO's official languages: Chinese and Russian**. The 2026 summit saw India support inclusion of **English as an official language** in the SCO Charter.
- **Afghanistan:** India views **peace and stability in Afghanistan as closely connected with Eurasian regional security** and has emphasised development and humanitarian assistance.
- **2026 Bishkek Summit:** Held in **Bishkek, Kyrgyz Republic**, with the **Bishkek Declaration** and multiple decisions/MoUs covering areas including **climate, nuclear safety, energy conservation and combating drug addiction**.

7. Prime Minister Dhan-Dhaanya Krishi Yojana (PM-DDKY)

Syllabus Mapping: GS3: Agriculture | Agricultural Productivity | Sustainable Agriculture | Government Schemes

- **PM-DDKY targets 100 districts** selected on the basis of **low agricultural productivity, low cropping intensity and low agricultural credit disbursement** — i.e. districts with significant untapped agricultural potential.
- The scheme has **6 focus areas:** **agricultural productivity; crop diversification & sustainable agriculture; post-harvest storage; irrigation; agricultural credit; governance & service delivery**.
- **Convergence is the key feature:** PM-DDKY brings together **36 Central schemes of 11 Ministries/Departments**, along with State schemes and private-sector interventions, instead of creating isolated interventions.
- **Outcome-based monitoring:** **121 indicators** are being used — **74 output indicators + 47 outcome indicators**. Output performance is ranked monthly through the dashboard, while outcome indicators assess improvement against the **baseline**.
- **Latest progress:** The average score of the 100 districts rose from **22.54 (April 2026) to 38.85 (July 2026)**, an improvement of **16.31 points**.
- **District-level planning:** All 100 districts have uploaded their **District Action Plans (DAPs)**. This makes implementation more responsive to district-specific agricultural constraints.
- **Important new monitoring feature:** The **Financial Progress Module** became operational on **31 August 2026**. A **Beneficiary Progress Module** is planned to track whether interventions actually translate into benefits for individual farmers.
- **Capacity building:** **Krishi Vigyan Kendras (KVKs)** are being used as technical partners for farmer and extension-worker training and field-level interventions. From January–July 2026, **6.90 lakh farmers and 88,961 extension workers** were trained.

8. Reimagining Governance: Discourse for Excellence (RGDE)

Syllabus Mapping: GS4: Ethics in Governance | Public Service Values | Integrity | Probity | Accountability

- **RGDE (Reimagining Governance: Discourse for Excellence)** is an initiative of **EPFO**, organised under the aegis of **Pandit Deendayal Upadhyaya National Academy of Social Security (PDUNASS)**.
- RGDE provides a platform for **reflection, dialogue and learning on excellence in public administration**, bringing together **civilisational wisdom, institutional experience and contemporary administrative practice**.



- The session held on **31 August 2026** was part of the **second edition of Season Two of RGDE**, involving officers from EPFO and PDUNASS, including field-office officials participating virtually.
- **Core theme of the session: Rajdharm as an enduring ethic of public responsibility** — connecting the ethical use of public power with **integrity, empathy, fairness and non-discrimination**.
- RGDE specifically seeks to translate ethical and civilisational ideas into **everyday administrative practice**, particularly situations involving **discretion, competing considerations and citizen grievances**.
- A key message was that **rules, systems and technology are instruments**, but cannot replace **sincerity, honesty, self-restraint, cultural awareness and empathy** in determining citizens' experience of government institutions.
- The discussion was linked to EPFO's role in delivering **social security to workers, pensioners and their families**, highlighting the need to combine **legal compliance with empathy and citizen-centric service delivery**.
- Rajdharm is presented as a continuing ethic for **technology-enabled governance** — digitisation can improve systems and efficiency, but **human judgement, empathy and ethical conduct remain indispensable**.

9. Semipalatinsk Treaty

Syllabus Mapping: GS2: International Relations | Central Asia | Nuclear Disarmament | Non-Proliferation | Regional Security

- **Semipalatinsk Treaty = Treaty on a Nuclear-Weapon-Free Zone in Central Asia (CANWFZ).**
- It was **signed at Semipalatinsk, Kazakhstan, on 8 September 2006** by the five Central Asian republics: **Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan**.
- It entered into force on **21 March 2009**.
- It established **Central Asia as a Nuclear-Weapon-Free Zone (NWFZ)** — the **first NWFZ in the Northern Hemisphere located entirely** and directly bordering two nuclear-weapon States
- The Treaty prohibits its parties from **developing, manufacturing, acquiring, possessing or testing nuclear weapons**, and also prohibits **stationing** of nuclear weapons on their territories.
- **Kazakhstan is particularly significant:** the Soviet Union conducted **hundreds of nuclear tests at the Semipalatinsk nuclear test site**. Kazakhstan closed the site on **29 August 1991**, making nuclear disarmament a major part of its national identity.
- The Treaty is also important for **environmental and public-health consequences of nuclear testing**, especially the legacy of radioactive contamination around the former Semipalatinsk test site.
- **Negative security assurances:** China, France, Russia and the UK have ratified the Protocol providing legally binding assurances against the use or threat of use of nuclear weapons against CANWFZ parties; **the United States has signed but not ratified the Protocol**.
- India is **not a party to the Semipalatinsk Treaty**, since the treaty is a regional NWFZ arrangement for the five Central Asian states.

10. India's SECURE Vision for SCO

Syllabus Mapping: GS2: International Relations | SCO | Regional Groupings | Regional Security | Connectivity | Economic Cooperation | Sovereignty & Territorial Integrity | Environmental Cooperation

- PM Narendra Modi introduced the concept of a **"SECURE" SCO** at the **SCO Summit in Qingdao, China, in 2018**. Each letter represents a dimension of India's approach towards regional cooperation.
- **S – Security of citizens:** Focus on combating **terrorism, extremism, organised crime, drug trafficking and other transnational security threats**. India emphasises that terrorism must be confronted collectively.
- **E – Economic development for all:** Regional security should be accompanied by **inclusive economic growth, trade, investment and development**, so that the benefits of regional cooperation reach all member states.
- **C – Connecting the region:** India supports greater **physical, economic and digital connectivity** to facilitate trade, investment and people-to-people exchanges. Connectivity, however, must respect **sovereignty and territorial integrity**.
- **U – Uniting the people:** Strengthening **cultural, civilisational, educational and people-to-people linkages** among SCO countries. India's SCO presidency also introduced cooperation areas such as **Youth Empowerment and Shared Buddhist Heritage**.
- **R – Respect for sovereignty and territorial integrity:** Regional cooperation must be based on **sovereign equality, territorial integrity, mutual respect and non-interference in internal affairs**. This is particularly important in India's approach to regional connectivity projects.
- **E – Environmental protection:** Economic development and connectivity should be pursued alongside **environmental sustainability and ecological protection**, making environmental security an integral part of regional cooperation.
- **India's SCO Presidency connection:** During its **2022–23 SCO presidency**, India used SECURE as an organising framework and hosted **130+ institutional meetings/events**, including 14 ministerial-level meetings.



- **Five new cooperation areas under India's SCO presidency: Startups & Innovation, Traditional Medicine, Science & Technology, Youth Empowerment and Shared Buddhist Heritage** — showing that India's vision extends beyond conventional security cooperation.

11. International Workshop on Tiger Landscape

Syllabus Mapping: GS3: Environment | Biodiversity Conservation | Tiger Conservation | Ecosystem Services | Ecotourism

- An international workshop on Tiger Landscapes: Conservation, Bioeconomy and Ecotourism as Pillars for Livelihood and Income Generation was held in New Delhi on **2–3 September 2026**, jointly organised by **International Big Cat Alliance (IBCA), Asian Development Bank (ADB) and National Tiger Conservation Authority (NTCA), MoEFCC**.
- The workshop emphasised moving from **species-centric conservation to integrated landscape management**, recognising that tiger conservation depends on the health of forests, grasslands, rivers, prey species, wildlife corridors and local communities.
- **Bioeconomy and community-based ecotourism** were highlighted as means of generating sustainable local incomes while creating economic incentives for communities to participate in conservation.
- The approach reflects the **landscape-level and ecosystem-based conservation paradigm**, under which protected areas cannot be treated as isolated ecological islands and conservation must also address surrounding habitats, corridors and human settlements.
- The workshop stressed **nature-based solutions and innovative/nature-positive financing**, seeking to mobilise financial resources for conservation while simultaneously delivering climate, biodiversity and livelihood benefits.
- India in **April 2023**, is an inter-governmental international organisation headquartered in India that promotes cooperation for conservation of **seven big cats** — **Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar and Puma**; India hosts **five of the seven species**—tiger, lion, leopard, snow leopard and cheetah.
- IBCA currently encompasses **95 big-cat range countries**, i.e. countries containing natural habitats with wild populations of big cats, giving it a broader geographical scope than tiger conservation alone.
- Tigers occur in **13 Tiger Range Countries (TRCs)** — **Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam** — making tiger conservation inherently a transboundary and regional cooperation issue.

12. India's Sovereign Credit Rating Upgraded

Syllabus Mapping: GS3: Indian Economy | Macroeconomic Stability | Financial Sector | External Sector | Economic Reforms

- **Japan Credit Rating Agency (JCR)** upgraded India's long-term **foreign currency and local currency issuer ratings from 'BBB+' to 'A-'**, with a **Stable Outlook**; India's **country ceiling** was also raised to 'A'.
- The upgrade reflects **strong and resilient economic growth, improving fiscal quality, strengthened financial system and a robust external position**.
- India recorded **7.8% real GDP growth in FY26**, with **Q1 FY27 growth also at 7.8%**, supported by private consumption and public investment despite global headwinds.
- JCR highlighted **GST and Digital Public Infrastructure (DPI)** as reforms strengthening the foundations of economic growth and productivity.
- **Fiscal quality improved** as the Central Government's fiscal deficit declined from **4.7% of GDP in FY25 to 4.4% in FY26**, alongside sustained emphasis on **capital expenditure and infrastructure investment**.
- Banking-sector soundness improved through **better asset quality, IBC, government capital infusion and stronger RBI supervision**, while **capital adequacy and profitability** remained sound; the **NBFC sector** also showed improvement.
- India's **current account deficit remains contained**, supported by a surplus in the services balance, while **foreign-exchange reserves exceeding short-term external debt** provide resilience against external shocks.
- The upgrade follows recent sovereign-rating upgrades by **Morningstar DBRS (May 2025), S&P Global Ratings (August 2025) and Japan's R&I (September 2025)**, indicating broader recognition of India's improving economic fundamentals.
- The higher sovereign rating can **improve investor confidence, reduce India's perceived sovereign risk and potentially lower borrowing costs**, benefiting the **Government, Indian corporates and financial institutions** through easier and potentially cheaper access to international capital; it can also strengthen India's attractiveness as an investment destination.
- For the **Government**, a stronger rating can reduce the risk premium on sovereign borrowing; for **Indian companies and banks**, it can improve access to overseas financing and potentially lower the cost of capital, while **foreign investors** may view India as a relatively safer long-term investment destination.



13. Quantum Biotechnology

Syllabus Mapping: GS3: Science & Technology | Quantum Technology | Biotechnology | National Quantum Mission

- The **National Conference on Quantum Biotechnology** was organised at **IIT Bombay** to advance the translation of quantum science into **diagnostics, biomedical imaging, drug discovery and precision medicine**, in alignment with the **National Quantum Mission (NQM)**.
- **Quantum biotechnology** lies at the intersection of **quantum sensing, quantum imaging and quantum computing with life sciences**, enabling measurements and detection at a precision beyond conventional instruments.
- The conference focused on converting **laboratory demonstrations into deployable healthcare technologies**, particularly through quantum biosensors and other quantum-enabled diagnostic tools.
- **QMet Tech Foundation**, the thematic hub (**T-Hub**) for **Quantum Sensing & Metrology** under NQM, is hosted at **IIT Bombay with DST support**, providing a platform for developing quantum sensing capabilities and their biomedical applications.
- Major application areas include **quantum biosensing, precision diagnostics, biomedical imaging, drug discovery and precision medicine**, potentially enabling earlier and more accurate detection of biological processes.
- The initiative reflects NQM's broader objective of building a **collaborative, application-driven quantum ecosystem** by bringing together physicists, biologists, clinicians, industry, startups and researchers.
- The conference also emphasised the need for **manufacturing, testing, talent development and startup support**, so that quantum technologies can move from research laboratories towards clinical and commercial applications.
- India's **National Quantum Mission (NQM)** was approved in **2023** for developing a quantum ecosystem covering **quantum computing, communication, sensing & metrology and quantum materials & devices**, with DST as the nodal department.

14. Legal Metrology (Indian Standard Time) Rules, 2026

Syllabus Mapping: GS3: Science & Technology | Digital Infrastructure | Cybersecurity | Legal Metrology | Space Technology

- The **Legal Metrology (Indian Standard Time) Rules, 2026** were notified by the **Department of Consumer Affairs, Ministry of Consumer Affairs, Food & Public Distribution** on **27 August 2026** and gazetted on **29 August 2026**, making IST the common legally recognised and traceable time reference under the **"One Nation, One Time"** initiative.
- The Rules will come into force **180 days after Gazette publication** and provide a framework for the **generation, maintenance, dissemination and use of IST**.
- **CSIR–National Physical Laboratory (NPL)** is India's **National Metrology Institute (NMI)** and the national custodian of IST; it generates IST using an **ensemble of atomic clocks** and maintains its traceability to **UTC**, the international reference time maintained by the **BIPM**.
- IST is maintained with traceability to UTC **within a few nanoseconds**, making it suitable for high-precision applications requiring accurate time and frequency synchronisation.
- For wider geographical dissemination, **secondary timescales** have been established at five **Regional Reference Standard Laboratories (RRSLs)** at **Ahmedabad, Bengaluru, Bhubaneswar, Faridabad and Guwahati**, all traceable to NPL's IST.
- **ISRO's NavIC** is linked to IST through NPL, enabling **satellite-based dissemination of Indian Standard Time** and strengthening the resilience of India's timing infrastructure.
- IST can be disseminated through **NTP (Network Time Protocol), PTP (Precision Time Protocol), NavIC and optical-fibre-based White Rabbit technology**, with different methods suited to different precision requirements.
- A common and traceable time reference is important for **telecommunications, digital payments, financial transactions, power grids, transportation, data centres and government ICT systems**, where precise timestamps are essential.
- The initiative has a **cybersecurity significance** because synchronised timestamps help correlate events across multiple systems during cyber incidents; **CERT-In's 2023 guidelines** recommend synchronisation with standard time sources such as **NPL and NIC**.

15. EPF Scheme 2026 Amnesty Provision

Syllabus Mapping: GS2: | Social Security | Labour Welfare | Governance | GS3: Inclusive Growth | Financial Inclusion

- **EPFO**, under the **Ministry of Labour & Employment**, introduced **VISHWAS 2026 and AMNESTY 2026** as one-time measures under the **EPF Scheme, 2026**, notified on **29 June 2026**.
- **VISHWAS 2026** provides **one-time settlement of legacy damages/penalty disputes** under **Section 14B of EPF&MP Act, 1952** and **Section 128 of CoSS, 2020**, covering defaults **prior to 14 June 2024**.
- Under VISHWAS, eligible damages are recalculated at a reduced **0.25%–1% per month**, compared with the normal rate of up to **25% per annum**, thereby reducing litigation and facilitating settlement.



- **AMNESTY 2026** provides **retrospective regularisation of PF Trust exemption status** where the Trust is recognised under the **Income Tax Act, 1961** but lacks a formal EPF exemption order under **Section 17 of EPF&MP Act / Section 143 of CoSS, 2020**.
- Amnesty is available for **six months, up to 28 December 2026**, with relaxation of certain CoSS requirements such as **minimum employee headcount, corpus size and 3-year compliance rule**.
- **VISHWAS** → **settlement of legacy damages/penalty disputes** | **AMNESTY** → **retrospective PF Trust exemption regularization**.

16. RAKSHA: India's Defence Diplomacy Roadmap

Syllabus Mapping: GS2: India & Foreign Relations | Defence Diplomacy | Strategic Partnerships | Indian Ocean Region |

- **RAKSHA** was released by **Raksha Mantri Rajnath Singh on 3 September 2026** in New Delhi as India's **10-year strategic roadmap for defence diplomacy**, providing a long-term framework for global defence partnerships.
- The document represents a shift from largely transactional defence engagement towards **proactive, long-term and partnership-oriented defence diplomacy**, linking India's national security objectives with international cooperation.
- **Strategic Partnerships** constitute a key pillar, with emphasis on deepening **bilateral and multilateral security cooperation**, thereby strengthening strategic trust and interoperability with friendly countries.
- **Capacity Building** involves **joint military exercises, training programmes and sharing of best practices**, enabling India to contribute to the institutional and operational capabilities of partner countries.
- **Indigenous Defence Exports** seek to leverage **Make in India/Aatmanirbhar Bharat** to establish India as a reliable defence-manufacturing and technology partner, thereby linking defence diplomacy with **defence industrialisation and strategic autonomy**.
- **Maritime Security** is a major focus, with India seeking to strengthen its role as a **Net Security Provider and First Responder in the Indian Ocean Region (IOR)** through cooperation with regional partners.
- The **Net Security Provider** concept reflects India's willingness and capacity to contribute to regional security through **HADR, maritime surveillance, capacity building, training and defence cooperation**, particularly in the IOR.
- **RAKSHA** places defence diplomacy within India's broader foreign-policy objective of promoting **peace, stability and a rules-based international order**, while responding to an increasingly complex global security environment.

17. BIO-NIVESH: Biotechnology-Investment Platform

Syllabus Mapping: GS3: Biotechnology | Bioeconomy | Innovation & Start-ups | Government-Private Sector Partnership

- **BIO-NIVESH** was launched by **Dr. Jitendra Singh on 3 September 2026** to strengthen the interface between **biotechnology innovators, investors, industry and Government**, with a focus on mobilising private capital and scaling innovations.
- It aims to bridge the **innovation-to-investment and laboratory-to-market gap**, enabling promising biotechnology technologies to move towards **commercialisation, scale-up and global markets**.
- The platform brings together **start-ups and investors** beyond conventional pitching by enabling investors to assess the **technology, IP, development pathway, market potential and regulatory readiness** of biotechnology innovations.
- **BIO-NIVESH** recognises the distinctive financing challenges of biotechnology, including **long development cycles, high capital requirements and complex regulatory pathways**, making **patient private capital** important for technology translation and scale-up.
- The initiative follows a **"whole of Government + whole of nation"** approach, requiring coordination among **DBT, BIRAC, industry, investors, research institutions and start-ups**.
- The **RDI Fund (₹1 lakh crore)** provides a major financing framework for technology development, with **BIRAC designated as a Second-Level Fund Manager for biotechnology and allied sectors**, particularly supporting technology translation, scale-up and innovation-led manufacturing.
- A proposed **"Big Five in Five Years"** approach seeks to nurture a few large **anchor biotechnology companies**, creating an ecosystem in which other start-ups can scale alongside them.

18. Green Shipping Corridors & Green Fuel Bunkering

Syllabus Mapping: GS3: Environment | Maritime Transport | Decarbonisation | Green Hydrogen & Alternative Fuels |

- **MoPSW** is accelerating **green shipping corridors and alternative-fuel-ready ports** to align India's maritime sector with the transition towards **low- and zero-emission shipping**.
- **Green shipping corridors** are maritime routes designed to facilitate the use of **low- and zero-emission fuels and technologies**, requiring compatible infrastructure at ports and across the shipping ecosystem.



- **Bunkering** refers to the **refuelling of ships**; therefore, **Green Fuel Bunkering Hubs** are port facilities designed to enable the **storage, handling and supply of alternative/green marine fuels** to vessels.
- **Deendayal, Paradip and V.O. Chidambaranar Port Authorities** are developing **Green Fuel Bunkering Hubs**, strengthening India's preparedness for future green marine fuels.
- **Kamarajar Port** has equipped its **coal terminals with shore power**, allowing berthed vessels to use **land-based electricity instead of onboard engines**, thereby reducing emissions while at berth.
- The **National Centre of Excellence for Green Ports and Shipping (NCoEGPS)** is supporting MoPSW in maritime decarbonisation, including **green ports, alternative fuels and cleaner shipping technologies**.

19. Agentic AI Skilling Initiative

Syllabus Mapping: GS3: Science & Technology | Artificial Intelligence | Digital Economy | Skilling & Future of Work |

- **NIELIT**, under **MeitY**, in collaboration with **Intel India**, launched the **NIELIT–Intel India Agentic AI Skilling Initiative** on **3 September 2026** to expand industry-aligned AI learning and build a **future-ready workforce**.
- **Agentic AI** represents an evolution beyond conventional predictive and generative AI, comprising systems capable of **reasoning, planning and executing complex tasks**, while operating under **human oversight**.
- The initiative aims to prepare **students, educators and professionals** for changing workforce requirements through **practical learning, industry-relevant curricula, continuous upskilling and human–AI collaboration**.
- **Agentic AI for Everyone** introduces **AI agents, workflow automation and multi-agent systems**, with hands-on learning in designing and governing AI-powered workflows using **no-code platforms**.
- **Engineering Agentic AI Systems** focuses on building and deploying scalable agentic systems, covering **agent architecture, tool integration, orchestration, memory and deployment**, using no-code/low-code as well as code-based frameworks.
- The initiative complements the **IndiaAI Mission's** focus on developing a strong **AI talent pipeline**, including AI-focused education, industry-led training, **AI Data Labs** and Government–academia–industry partnerships.
- The collaboration combines **NIELIT's nationwide skilling reach** with **Intel's technology and industry expertise**, aiming to democratise access to practical Agentic AI skills across Indian institutions and learners.

20. Reclaimed Asphalt Pavement (RAP)

Syllabus Mapping: GS3: Infrastructure | Sustainable Development | Circular Economy | Waste Management | Green Technology

- **CSIR-CRRI**, in collaboration with **Oriental Structural Engineers Pvt. Ltd. (OSEPL)** and **Ooms India**, demonstrated **60% Reclaimed Asphalt Pavement (RAP)** utilisation in the **Dense Bituminous Macadam (DBM)** layer on **NH-716 (Chennai–Tirupati Package-I)**.
- **RAP** is the milled/recovered material from existing asphalt pavements containing valuable **aggregates and aged bitumen**, which can be processed and reused in new asphalt mixtures instead of being treated as waste.
- **60% RAP utilisation** means a substantial share of the new asphalt mix is sourced from existing pavement, reducing the requirement for **virgin aggregates and bitumen**, construction waste and the environmental footprint of road construction.
- The technology follows a **circular-economy approach**, treating existing highways as a **“resource bank”** from which aggregates and bitumen can be recovered, rejuvenated and reused.
- **REJUBIT**, an indigenous **RAP rejuvenator jointly developed by CSIR-CRRI and Ooms India**, restores key properties of aged bitumen, enabling higher proportions of RAP to be incorporated into new asphalt mixes.
- The field demonstration covered the complete recycling chain—**RAP recovery → processing & characterisation → aged-binder evaluation → rejuvenation → mix design → hot-mix plant production → laying → field compaction**—under actual highway conditions.
- The demonstration **marks the transition of REJUBIT and high-RAP technology from laboratory development to field-scale implementation**, providing technical experience for wider adoption of recycled pavement materials.
- Wider use of RAP can promote **resource efficiency, circular infrastructure and reduced dependence on non-renewable/virgin road-building materials**, particularly aggregates and bitumen.

21. Gaurang Vyas & Gujarati Musical Tradition

Syllabus Mapping: GS1: Indian Culture | Indian Music | Folk & Regional Traditions | Performing Arts | Intangible Cultural Heritage

- **Gaurang Vyas** was a renowned Gujarati music composer whose contribution is significant in the context of **Gujarati regional music**; he continued the musical legacy of his father **Avinash Vyas**, an important figure in Gujarati music.
- **Gujarati musical traditions** comprise both **folk and devotional forms**, reflecting the region's religious traditions, community life and literary culture; important forms include **Garba, Dandiya Raas, Bhajans and Dayro**.



- **Garba** is a major Gujarati **folk-dance tradition**, traditionally associated with the worship of **Shakti/Amba** during **Navratri**; the circular movement around a lamp or garbo symbolises the continuity of life and the divine feminine. UNESCO inscription: **Garba of Gujarat** was inscribed on the **Representative List of the Intangible Cultural Heritage of Humanity in 2023**.
- **Dandiya Raas** is traditionally performed with **decorated sticks (dandiya)** and is associated with the **Raas tradition of Gujarat**, while Garba is primarily characterised by rhythmic circular movement and devotional singing.
- **Bhakti traditions** have deeply shaped Gujarati musical culture; **Narsinh Mehta**, the 15th-century Gujarati saint-poet, is particularly important for his devotional compositions and the **Vaishnava bhakti tradition**.
- **Narsinh Mehta's 'Vaishnava Jana To'** is among the best-known Gujarati devotional compositions and was closely associated with **Mahatma Gandhi's Sabarmati Ashram tradition**; this illustrates the link between regional devotional music and India's modern socio-political history.
- **Dayro** represents another important Gujarati performance tradition involving **storytelling, folk songs, poetry and musical narration**, demonstrating the close relationship between Gujarati literature, oral traditions and performing arts.

22. Peptide-Based Piezoelectric Biomaterials for Self-Powered Healthcare

Syllabus Mapping: GS3: Science & Technology | Nanotechnology | Biomaterials | Biotechnology | Healthcare Technology |

- Researchers from **CeNS, Bengaluru**, with **IISER Kolkata and JNCASR Bengaluru**, developed peptide-based nanomaterials whose **piezoelectricity can be switched on by controlling molecular self-assembly**, without chemically modifying the peptide.
- **Piezoelectricity** is the property of certain materials to generate an **electric charge when mechanical stress is applied**; the reverse effect—mechanical deformation under an applied electric field—is called the **inverse piezoelectric effect**.
- Common piezoelectric materials include **quartz, certain ceramics and polymers**; conventional high-performance ceramic materials can be **brittle and unsuitable for direct biomedical applications**, motivating the development of softer, biodegradable and biocompatible materials.
- **Peptides**, short chains of amino acids linked by **peptide bonds**, are attractive biomaterial building blocks because they can be **biocompatible, biodegradable and capable of self-assembly** into structures such as nanofibres.
- The researchers found that peptides formed nanofibres in water without showing piezoelectricity, but addition of only **1% suitable co-solvent** reorganised them into an ordered **supramolecular structure**, activating a strong piezoelectric response without changing their chemical composition.
- The underlying principle is **chiral self-assembly**: molecular organisation aligns **electric dipoles** in a **non-centrosymmetric structure**; breaking inversion symmetry is essential for piezoelectric behaviour.
- The technology enables **mechanical energy harvesting**, where otherwise wasted mechanical energy from **heartbeat, breathing, walking or body movement** can potentially be converted into electricity for low-power biomedical and wearable devices.
- Potential applications include **self-powered implantable medical sensors, biosensors, wearable electronics, electronic skin and health-monitoring devices**, reducing dependence on conventional batteries in certain low-power applications.

23. Thermo-Responsive Microgels

Syllabus Mapping: GS3: Science & Technology | Materials Science | Nanotechnology | Drug Delivery | Biomedical Technology | Smart Materials

- Researchers at **Raman Research Institute (RRI)**, an autonomous institute under **DST**, demonstrated that **temperature shocks can temporarily fluidise jammed systems and erase their structural memory**, providing a way to control their structural recovery.
- **Microgels are microscopic, three-dimensional cross-linked polymer networks** that can absorb and retain very large quantities of liquid; the microgels used in the study could absorb around **300–500 times their weight in water**.
- Because of their polymer-network structure, microgels can **swell by absorbing water and contract when external conditions change**, giving them stimuli-responsive behaviour; depending on their composition, they can respond to **temperature, pH, ionic strength or other stimuli**.
- **Thermo-responsive microgels** undergo a temperature-dependent change in their swelling state; this makes them useful as **smart materials** in which temperature can act as an external trigger to control their physical properties.
- In **drug delivery**, thermo-responsive microgels can act as carriers that **load drugs in the swollen state and release them when temperature triggers contraction/collapse**, allowing controlled and potentially site-specific drug release.
- The study used densely packed microgels as a model **jammed system** and found that a sudden **thermal shock** could rearrange the particles and temporarily make the system behave like a liquid, while erasing its previous structural memory.



- Microgels have applications beyond drug delivery because their **high water-absorption capacity, softness and stimuli-responsive behaviour** make them useful in **diapers and sanitary products, biomedical coatings and flexible/biomimetic materials**.
- Their **soft and water-rich nature** makes microgels particularly relevant to biomedical applications where conventional rigid materials may be unsuitable; they can be engineered to mimic some properties of **biological tissues**.
- **Applications of microgels** include **controlled drug delivery and thermo-responsive biomedical coatings, absorbent products such as diapers and sanitary napkins**, and the development of **soft, flexible and biomimetic materials** that can mimic properties of biological tissues; their stimuli-responsive nature also makes them promising for broader **smart-material and biomedical applications**.

24. Record Seebeck Response in ScN: New Generation of Thermoelectric Sensors

Syllabus Mapping: GS3: Science & Technology | Semiconductor Technology | Thermoelectricity | Energy Efficiency

- Researchers from **JNCASR, IISc and the University of Sydney** demonstrated an exceptionally high thermoelectric response in **scandium nitride (ScN)**, challenging the long-assumed upper limit of thermoelectric voltage generation in crystalline solids.
- The **Seebeck effect** is the generation of an **electric voltage from a temperature difference** across a material; it enables conversion of otherwise wasted thermal energy into electricity and forms the basis of **thermoelectric generators and temperature sensors**.
- The **Seebeck coefficient** measures the voltage generated per unit temperature difference and is expressed in **V/K**; conventional metals generally show values of only tens of $\mu\text{V/K}$, while good semiconductors generally reach hundreds of $\mu\text{V/K}$.
- The researchers used **ScN**, a refractory transition-metal nitride, as an **epitaxial single-crystalline thin film**, and introduced magnesium to compensate naturally occurring free electrons, producing a **heavily doped, highly compensated (HDHC) semiconductor**.
- The HDHC ScN exhibited a Seebeck coefficient exceeding **-124.6 mV/K near room temperature**, far above the earlier solid-state ceiling and even reaching a range traditionally associated with **ionic electrolytes and hydrogels**.
- The significance is not merely the record value: **engineered disorder and charge compensation** were used to modify electronic transport while retaining a crystalline structure, showing that controlled disorder can become a tool for designing **extreme thermoelectric and sensing materials**.
- Thermoelectric materials are important for **waste-heat recovery** because they can directly convert a temperature gradient into electricity **without moving parts**; potential sources include **industrial plants, automobile exhaust, power plants and other heat-generating systems**.
- The present ScN breakthrough is particularly promising for **ultrasensitive temperature sensors, heat-flux detection, low-noise thermal imaging, bolometers and IoT sensors**, where even very small temperature differences need to be detected.

25. Culture Conservation in India: From Crisis to Recovery

Syllabus Mapping: GS3: Environment | Biodiversity Conservation | Species Recovery | Wildlife Conservation

- **International Vulture Awareness Day 2026** was observed at **Panchkula, Haryana**, where MoEFCC organised the national workshop *"From Crisis to Recovery – Conserving India's Vultures"*, focusing on **Vulture Safe Zones, veterinary safety and conservation capacity**.
- India supports both **resident and migratory vultures**, including **White-rumped, Long-billed, Slender-billed, Red-headed, Egyptian, Himalayan Griffon, Eurasian Griffon, Cinereous and Bearded Vultures**, making India important for vulture conservation across South Asia.
- Vultures are **obligate/efficient scavengers** that rapidly consume animal carcasses, thereby preventing accumulation of carrion, reducing potential spread of pathogens and contributing to **nutrient recycling and ecosystem health**; hence, they function as an important **ecosystem service provider**.
- India witnessed a severe vulture population decline from the **1990s**, primarily associated with disruption of the food chain and consumption of livestock carcasses containing residues of **veterinary painkillers**, particularly **diclofenac**, which is highly toxic to vultures.
- The **Vulture Safe Zone (VSZ)** approach seeks to create landscapes where vultures have access to **safe food and veterinary care**, particularly by promoting vulture-safe alternatives to harmful veterinary drugs and ensuring safe carcass management.
- **Jatayu Conservation Breeding Centre (JCBC), Pinjore**, a collaboration between the **Haryana Forest Department and BNHS**, is an important conservation-breeding centre for **White-rumped, Long-billed and Slender-billed Vultures**, undertaking scientific husbandry, artificial incubation, veterinary care, breeding and genetic management.



- During 2025–26, JCBC housed 356 vultures and bred 35 chicks, while 87 vultures were released or contributed for reintroduction and 90 birds were transferred to other conservation-breeding institutions, illustrating the transition from captive breeding towards population recovery in the wild.

26. Corporate Mitra

Syllabus Mapping: GS3: MSMEs | Ease of Doing Business | Formalisation | Skill Development | Inclusive Growth

- **Corporate Mitra** is an initiative of the **Ministry of Corporate Affairs (MCA)**, implemented with **ICAI, ICSI and ICoAI**, to create a pool of **trained and certified paraprofessionals** providing affordable support to MSMEs in business and regulatory compliance.
- The initiative was announced in the **Union Budget 2026–27**, with the objective of reducing the compliance burden on MSMEs and improving their access to professional support, thereby promoting **ease of doing business and formalisation**.
- The **first batch has 2,879 registered learners** and the **Corporate Mitra Learning Management System (LMS)** has been launched for structured learning and capability development.
- The programme has a **12-month duration: 6 months of academic learning (~150 hours)** followed by **6 months of on-the-job training** in professional firms of ICAI, ICSI and ICoAI members.
- The academic and technological ecosystem is supported by **IIT Madras, IIT Madras Pravartak and SWAYAM Plus**, while ICAI, ICSI and ICoAI provide professional/domain expertise.
- The programme is designed to create a **skilled compliance-support cadre for MSMEs**, helping improve **transparency, accountability, regulatory compliance and orderly business growth**.

27. Recirculatory Aquaculture System (RAS)

Syllabus Mapping: GS3: Fisheries & Aquaculture | Blue Economy | Sustainable Agriculture | Water-use Efficiency | Agri-tech

- **RAS is an intensive, controlled aquaculture system** in which water from fish-rearing tanks is continuously **collected, treated and recirculated**, substantially reducing dependence on fresh water.
- The system uses a combination of **mechanical and biological filtration** to remove solid wastes and harmful dissolved substances and maintain suitable conditions for fish growth; treated water is then returned to the culture tanks.
- RAS can recycle **up to 90–95% of water**, making it particularly useful where freshwater availability is limited and enabling aquaculture in **urban, peri-urban and otherwise unsuitable locations**.
- Since the culture environment is controlled, RAS enables **year-round production**, better control over water quality and greater **biosecurity**, while reducing exposure to fluctuations in natural water bodies.
- RAS can support farming of diverse species, including **high-value trout in cold-water regions**, as well as fish and shrimp in suitable controlled systems; it can therefore help diversify India's aquaculture beyond traditional production areas.
- Its controlled environment can improve **quality consistency and traceability**, which are increasingly important for **export-oriented seafood production**.
- **Limitations:** RAS requires relatively high **capital investment, electricity, technical expertise and continuous monitoring**; therefore, power failure or inadequate system management can rapidly affect cultured fish.
- Under **PMMSY, 9,467 RAS units** have been approved, with the technology being promoted as part of India's shift towards **intensive, resource-efficient and commercially viable aquaculture**.

28. Biofloc Technology (BFT)

Syllabus Mapping: GS3: Fisheries & Aquaculture | Blue Economy | Sustainable Agriculture | Biotechnology | Resource-use Efficiency

- **Biofloc Technology (BFT)** is an intensive aquaculture system that uses **beneficial microorganisms** to convert nitrogenous wastes generated by fish/shrimp into **microbial biomass (bioflocs)** within the culture tank.
- Bioflocs consist of a mixture of **microorganisms, organic matter and trapped particles**; they can serve as an **additional food/nutritional source** for cultured organisms while simultaneously helping maintain water quality.
- BFT works by maintaining an appropriate **carbon-to-nitrogen (C:N) ratio**, which promotes the growth of heterotrophic bacteria that assimilate dissolved nitrogenous wastes into microbial biomass, reducing the accumulation of toxic compounds such as **ammonia**.
- Unlike conventional aquaculture, where substantial water exchange may be required to remove wastes, Biofloc enables **waste recycling within the culture system**, thereby reducing water consumption and nutrient discharge.
- BFT is particularly suited to **high-density/intensive farming** and can support fish and shrimp production in relatively small areas, creating opportunities for **small-scale and land-constrained farmers and entrepreneurs**.
- Biofloc can improve **feed utilisation** because the microbial biomass itself becomes an additional feed resource, potentially reducing dependence on conventional feed inputs.



- **Limitations:** the system requires careful control of **C:N ratio, dissolved oxygen, pH and microbial balance**, and continuous aeration is important; poor management can cause rapid deterioration of water quality.
- Under **PMMSY, 4,573 Biofloc units** have been approved, promoting technology-based aquaculture and helping expand production beyond traditional farming systems.

29. Jute: India's Golden Fibre

Syllabus Mapping: GS3: Agriculture | Fibre Crops | Agro-based Industries | MSMEs | Sustainable Development | Circular Economy |

- **Jute** is a **bast fibre** obtained mainly from the stems of *Corchorus* species and is called the “**Golden Fibre**” because of its natural golden colour and silky lustre; **mesta** is also classified as raw jute in trade/industrial usage due to similar end uses.
- India is the **world's largest producer of raw jute** and leading producer of jute goods, accounting for about **75% of estimated global jute-goods production**; **West Bengal** is the major production and industrial centre, followed by **Bihar, Assam, Odisha and Jharkhand**.
- Jute is a **warm and humid-season crop**, generally sown during **March–April** and harvested in about **100–110 days**; it requires roughly **700–1,500 mm rainfall** and is predominantly **rainfed**, with cultivation concentrated in eastern and northeastern India.
- Jute is an important **sustainable natural fibre** because it is **biodegradable, recyclable, strong, durable and versatile**, with applications in packaging, agriculture, construction and technical textiles; it also has **thermal/acoustic insulation and high moisture-absorption properties**.
- **Jute Geotextiles (JGT)** are technical textiles made from jute fibres and are used for **soil-erosion control, slope/river-bank protection, road and railway construction, drainage and soft-soil stabilisation**; being biodegradable, they can support soil restoration, seed germination and ecological restoration.
- The **National Jute Development Programme (NJDP)** is the umbrella programme for jute-sector development, implemented by the **National Jute Board (NJB)**, for **FY2021–22 to FY2025–26**; its major components include **JUTE-ICARE and Jute Diversification**.
- **JUTE-ICARE (Improved Cultivation and Advanced Retting Exercise)**, launched in **2015–16**, promotes **scientific cultivation, certified seeds, mechanisation and improved retting** to raise productivity and fibre quality, with implementation involving **CRIJAF and Jute Corporation of India (JCI)**.
- The **Jute Corporation of India (JCI)** is the **sole nodal agency for implementing MSP policy for raw jute** and undertakes procurement directly from farmers when market prices fall below MSP; the **MSP for raw jute for 2026–27 is ₹5,925/quintal**.
- The **Jute Packaging Materials (Compulsory Use in Packing Commodities) Act** creates a guaranteed domestic market by mandating jute packaging; currently, **100% of foodgrains and 20% of sugar** are required to be packed in jute bags, subject to government notifications/exemptions.
- **JUTE-SMART**, an e-governance portal developed by the **Office of the Jute Commissioner**, digitises procurement and supply of jute sacking bags; **ISRO's NRSC**, with JCI and NJB, has also developed the **Jute Crop Information System**, including **BHUVAN JUMP** for field monitoring and **PATSAN** for near-real-time crop surveillance and analytics.

30. India–Sweden Cooperation on AI & Digitalisation under SITAC

Syllabus Mapping: GS3: Science & Technology | Artificial Intelligence | Digitalisation | International Technology Cooperation

- **IndiaAI Mission**, under **MeitY**, held a bilateral dialogue with Sweden under the **Sweden–India Technology and AI Corridor (SITAC)** on cooperation in AI and digitalisation.
- India highlighted its AI strengths in **Digital Public Infrastructure (DPI), large-scale digital adoption, AI talent and testing environments**, while Sweden brings expertise in **industrial technology, advanced manufacturing and research**.
- IndiaAI Mission's priorities include **compute capacity, datasets & models, indigenous/domain-specific AI, AI applications, future skills, start-up financing and Safe & Trusted AI**.
- Discussions covered the policy ecosystem for enterprise AI, particularly **data governance, data localisation, responsible AI and market access**, highlighting that AI adoption requires both technological capacity and governance frameworks.
- Potential cooperation areas include **industrial AI, trusted data, compute infrastructure, AI skills and responsible AI**, with emphasis on practical outcomes rather than only policy dialogue.
- The engagement may lead to **pilots, testbeds, co-development, ecosystem partnerships and commercial collaborations** between Indian and Swedish technology/industrial companies.
- **SITAC** provides a focused framework for sustained India–Sweden cooperation in AI and digitalisation, connecting **Swedish industrial capabilities with India's AI ecosystem and market scale**.



31. Swachh Vayu Sarvekshan Awards 2026 & National Clean Air Programme (NCAP)

Syllabus Mapping: GS3: Environment | Air Pollution | Environmental Governance | Sustainable Development | Citizen Participation

- **Swachh Vayu Diwas 2026** was observed by **MoEFCC** on the **International Day of Clean Air for Blue Skies**, with the **5th Swachh Vayu Sarvekshan Awards** recognising best-performing cities and wards under NCAP.
- **Swachh Vayu Sarvekshan Framework**, introduced in **2022–23**, assesses cities on **road-dust control, solid-waste management, vehicular emissions, industrial pollution, C&D waste, other emissions (DG sets/commercial establishments) and IEC activities**.
- All **130 NCAP cities** are ranked in three population categories—**<3 lakh, 3–10 lakh and >10 lakh**—through **city self-assessment → State-level Monitoring Committee → CPCB evaluation → independent field verification → selection of 10 best-performing cities**.
- **NCAP**, launched as a flagship programme for improving air quality across **130 cities in 24 States/UTs**, uses a **city-specific strategy** rather than a uniform one-size-fits-all approach.
- **Top Performers:**
 - ❑ Category 1: Population >10 lakh → Lucknow – 1st, Indore – 2nd, Jabalpur – 3rd.
 - ❑ Category 2: Population 3–10 lakh → Rourkela – 1st, Firozabad & Guntur – joint 2nd, Amravati – 3rd.
 - ❑ Category 3: Population <3 lakh → Kalinganagar – 1st, Angul – 2nd, Talcher – 3rd.
- The released **Compendium of Best Management Practices under NCAP** documents replicable interventions by cities and SPCBs/ PCCs across **road dust, vehicular and industrial pollution, solid/C&D waste, open burning, greening, technology and public outreach**.

32. AI-based Mithun Behaviour Monitoring

Syllabus Mapping: GS3: Science & Technology | Artificial Intelligence | Livestock & Animal Husbandry | Tribal Livelihoods | Biotechnology

- **ICAR–National Research Centre on Mithun (NRC Mithun), Medziphema, Nagaland** has developed an **AI-based, real-time and non-contact system** to detect and track Mithun behaviour for improved livestock management.
- **Mithun** (*Bos frontalis*), also called **Gayal** or the “**Cattle of the Hills**”, is a rare bovine of the **Northeastern Hill Region**, mainly reared in **Arunachal Pradesh, Nagaland, Manipur and Mizoram** under traditional free-range/forest-grazing systems.
- Mithun has strong **socio-cultural and economic significance** among tribal communities; it is traditionally associated with **wealth, prestige and social status**, while also supporting livelihoods and food security.
- **Nagaland**: Mithun is the **State Animal**, and ‘**Nagami**’ was registered by ICAR-NBAGR in 2025 as the **first officially recognised Mithun breed**; it is adapted to forest-based hill ecosystems and community-managed rearing.
- Mithun is also recognised as a **food animal by FSSAI (2023)** and was included in **FAO’s Domestic Animal Diversity Information System (2023)**, increasing its potential for scientific livestock development and value addition.
- The AI system uses **YOLOv8n for behaviour detection** and **DeepSORT for individual-animal tracking**, enabling automated identification of behaviours such as **feeding, standing, lying and mounting**.
- Such behavioural monitoring can provide early indications of **health, nutrition and animal welfare**, while **mounting behaviour** can assist in **oestrus and reproductive management**, reducing dependence on continuous manual observation.

33. Exercise Veer Guardian 2026

Syllabus Mapping: GS2: India–Japan Relations | Defence Cooperation | Strategic Partnerships | Indo-Pacific Security | GS3: Defence Technology

- **Exercise Veer Guardian-2026** is a bilateral air exercise between the **Indian Air Force (IAF)** and **Japan Air Self-Defense Force (JASDF)**, being conducted at **Air Force Station Jodhpur** from **9–22 September 2026**.
- The IAF is participating with **LCA Tejas, Su-30MKI and Rafale**, while JASDF is participating with its **F-2A fighter aircraft**, providing exposure to different combat-aircraft platforms and operational doctrines.
- The 14-day exercise focuses on **advanced operational missions, mission planning, professional exchanges, engineering practices and aerospace safety**, thereby improving interoperability and operational understanding.
- The exercise strengthens **tactical proficiency and aerospace operational synergy** between the two air forces and forms part of the broader **India–Japan Special Strategic and Global Partnership**.
- **JASDF** is the air arm of Japan’s Self-Defense Forces; the **F-2** is a Japanese fighter aircraft developed by **Mitsubishi Heavy Industries with Lockheed Martin**, based on the F-16 design but extensively modified for Japanese requirements.
- Other exercises:



- ❑ **Dharma Guardian** is the bilateral **Army exercise** between the **Indian Army** and **Japan Ground Self-Defense Force (JGSDF)**, aimed at strengthening interoperability and cooperation in joint tactical operations.
- ❑ **JIMEX (Japan–India Maritime Exercise)** is the bilateral **Naval exercise** between the **Indian Navy** and **Japan Maritime Self-Defense Force (JMSDF)**, focusing on maritime security and naval interoperability.
- ❑ **Malabar** is a **multilateral naval exercise** involving **India, USA, Japan and Australia**; Japan became a permanent participant in **2015**.
- ❑ **MILAN**, hosted by India, is a **multilateral naval exercise** in which Japan also participates, but it is **not a bilateral India–Japan exercise**.

34. India–Japan Cooperation on Forests

Syllabus Mapping: GS2: India–Japan Relations | GS3: Forest Conservation | Biodiversity | Sustainable Forestry | Geospatial Technology

- India and Japan's **forest cooperation**, institutionalised through the **2015 Memorandum of Cooperation (MoC)**, was reviewed at the **7th Joint Working Group (JWG)** meeting in 2026, with a new **2027–31 Roadmap** endorsed.
- Cooperation is centred on **three emerging forestry areas: Tree Outside Forests (TOF), Forest Genetics and Forest Stack**—linking conventional forest conservation with **genetic resources and technology-based forest monitoring**.
- **Tree Outside Forests (TOF)** refers to trees growing outside formally designated forests, making them important for **urban/peri-urban greening, agroforestry, carbon sequestration and landscape restoration**.
- **Forest Genetics** focuses on conserving **genetic resources and germplasm**, tree breeding and improved planting material, helping develop **productive and climate-resilient tree populations**.
- **Forest Stack** involves using **forest inventories, geospatial technologies and digital monitoring** for better assessment and management of forest resources.
- The cooperation also has a practical **sandalwood** dimension, with India and Japan exchanging experience on **sandalwood agroforestry, cultivation and processing**, alongside wildlife-conservation practices at **Nagarhole Tiger Reserve**.

35. 7th Global Fintech Fest (GFF) 2026

Syllabus Mapping: GS3: Indian Economy | FinTech | Digital Public Infrastructure | Financial Inclusion | Digital Payments | AI & Emerging Technologies | Financial Regulation

- **7th Global Fintech Fest (GFF) 2026** is being held in **Mumbai, 8–11 September 2026**, organised principally by **Payments Council of India (PCI), NPCI and Fintech Convergence Council (FCC)**.
- **Theme: “Potential to Impact: Agentic AI | Tokenisation | Quantum: Trusted, Connected, Global Systems for Inclusive Finance”**, highlighting the emerging technologies shaping the next generation of financial services.
- India's fintech ecosystem is built on **Digital Public Infrastructure (DPI)**—combining **digital identity (Aadhaar), interoperable payments (UPI), digital documents (DigiLocker) and open digital networks**, allowing financial innovation to scale rapidly.
- **JAM Trinity (Jan Dhan–Aadhaar–Mobile)** provides the foundational architecture for financial inclusion by combining **bank-account access + digital identity + mobile connectivity**; as of Aug 2026, **59.15 crore Jan Dhan accounts** had been opened.
- **UPI** provides interoperable real-time digital payments and has expanded internationally; in **August 2026 it recorded 24,509 million transactions** and operates across **11 countries**, illustrating the global scalability of India's DPI model.
- **Agentic AI** can enable financial systems to **reason, decide and execute workflows** under human oversight, with applications in fraud detection, regulatory compliance and personalised financial services.
- **Tokenisation** converts assets into **programmable digital units**, enabling possibilities such as fractional ownership, improved liquidity and faster settlement across financial markets and payments.
- **Quantum technologies** can strengthen future financial infrastructure through **quantum-safe cryptography and advanced risk optimisation**, addressing both security and computational challenges.
- **FinTech** contributes to **financial inclusion** by reducing information asymmetry and transaction costs; India's **Financial Inclusion Index rose from 43.4 (March 2017) to 70.0 (March 2026)**.
- The growth of fintech is supported by a regulatory ecosystem including **RBI's Regulatory Sandbox (2019)** for controlled testing of innovative financial products, **SRO-FT framework (2024)** for self-regulation, and the **Digital Personal Data Protection Act, 2023** for personal-data protection.
- **Aadhaar e-KYC, DigiLocker and DBT** strengthen digital financial delivery by simplifying identity/document verification and enabling direct transfer of government benefits, thereby reducing intermediaries and transaction costs.



36. Dr. Bhupen Hazarika: 100th Birth Anniversary

Syllabus Mapping: GS1: Indian Culture | Indian Music | Regional Cultural Traditions | Cultural Integration | Northeast India

- **Dr. Bhupen Hazarika (1926–2011)** was an iconic **Assamese musician, singer, lyricist, composer and filmmaker** whose work carried the cultural identity and social concerns of **Assam and Northeast India** to the national stage.
- His music drew substantially from **Assamese folk traditions**, while addressing themes of **humanism, social justice, equality, communal harmony and cultural unity**, making music a vehicle of both cultural expression and social commentary.
- **Bihu** is Assam's best-known folk tradition, associated with the **agricultural cycle**; **Rongali/Bohag Bihu** marks the Assamese New Year and spring and is celebrated through **Bihu songs and dance**.
- **Borgeet**, associated with **Srimanta Sankardeva and Madhavdeva**, is a tradition of devotional music linked to Assam's **Neo-Vaishnavite/Ekasarana tradition**, while **Ojapali** combines music, narration and expressive gestures through an **Oja and Palis**.
- **Goalpariya folk music**, associated with western Assam, reflects themes such as **love, separation, rural life and everyday experiences**, representing the diversity within Assamese folk culture.
- Hazarika's contribution went beyond regional music: by bringing **Northeast Indian cultural traditions and social experiences** to wider audiences, he acted as a cultural bridge between **regional identity and national integration**.
- He received the **Dadasaheb Phalke Award (1992)**, **Padma Vibhushan (2012, posthumous)** and **Bharat Ratna (2019, posthumous)**.

37 . INNOPROM India 2026

Syllabus Mapping: GS2: Economic Diplomacy GS3: Industrialisation | Industrial Corridors | Logistics Infrastructure | Investment

- **INNOPROM India 2026**, held in New Delhi (9–11 September), is the **first Indian edition** of Russia's major industrial forum, providing a platform for cooperation in **manufacturing, industrial technology, localisation and investment**.
- India and Russia have set a **US\$100 billion bilateral trade target by 2030**, with growing emphasis on **manufacturing, technology cooperation, investment, logistics, localisation and industrial clusters**.
- **National Industrial Corridor Development Programme (NICDP)** covers **11 Industrial Corridors, 20 Greenfield Industrial Smart Cities across 13 States**, with projects spanning **~19,878 ha**, an estimated investment potential of **₹5.35 lakh crore** and employment potential of nearly **14 lakh**.
- These **Industrial Smart Cities** are planned as **investment-ready, plug-and-play manufacturing ecosystems**, providing **serviced industrial land, reliable power, water and wastewater systems, ICT infrastructure and multimodal connectivity** with highways, railways, ports and airports.
- The four already-developed Industrial Smart Cities are **Dholera Special Investment Region (Gujarat)**, **Shendra-Bidkin Industrial Area/AURIC (Maharashtra)**, **Integrated Industrial Township Greater Noida (Uttar Pradesh)** and **Integrated Industrial Township Vikram Udyogpuri (Madhya Pradesh)**.
- The industrial corridors are aligned with **PM GatiShakti**, integrating industrial nodes with transport and logistics networks; Russian investment can also be facilitated through potential **Russian industrial clusters** within NICDC cities, promoting localisation, technology partnerships and resilient supply chains.
- **BHAVYA (Bharat Audyogik Vikas Yojna)** aims to develop **100 investment-ready plug-and-play industrial parks** during FY2026–27 to FY2031–32, with an outlay of about **₹33,660 crore**, complementing the industrial-corridor ecosystem.
- **Industrial Corridor Land Platform (ICLP)** is a **GIS-enabled platform** providing information on **4,000+ industrial parks**, including land availability, infrastructure and connectivity, enabling investors to make informed site-selection decisions.
- NICDC is also Project Management Agency for **7 PM MITRA Parks**, while **NLDSL's ULIP and Logistics Data Bank (LDB)** strengthen the digital logistics ecosystem and provide end-to-end visibility of EXIM container movement.

38. Skill Manthan

Syllabus Mapping: GS2: Women Empowerment | Skill Development | District-level Governance | Entrepreneurship | MSMEs

- **Skill Manthan**, organised by **Ministry of Skill Development & Entrepreneurship (MSDE)**, is a **knowledge-sharing platform for district-led innovations** in skill development and livelihood creation; its inaugural session focused on **"Building Sustainable Livelihoods for Women."**
- The approach is based on **hyperlocal, demand-driven skilling**, where **District Skill Development Plans (DSDPs)** align training with local economic opportunities and **industry/MSME requirements**, rather than following a uniform national model.



- The initiative demonstrates that sustainable women's livelihoods require **convergence of skilling + entrepreneurship + finance + technology + market access**, rather than skill training alone.
- **Meerut (Uttar Pradesh)** demonstrated a women-centric **manufacturing model** providing hands-on training and employment in **badminton racket and shuttlecock production**, linking skilling directly with local manufacturing opportunities.
- **Bijnor (Uttar Pradesh)** showcased **Vidur Prerna Swadeshi**, a district-wide platform supporting rural women entrepreneurs through **branding, market access and enterprise support**.
- **NTR District (Andhra Pradesh)** presented **RISE**, a one-stop ecosystem combining **skilling, credit facilitation, mentoring, employment linkages and entrepreneurial support**, illustrating institutional convergence for women-led enterprises.
- The model highlights the role of **district administrations as engines of local economic transformation**, with decentralised planning enabling skills to be matched with **local demand, enterprises and employment opportunities**.

39. Metal-Free Organic Photocatalyst for Green Hydrogen

Syllabus Mapping: GS3: Science & Technology | Green Hydrogen | Nanotechnology | Renewable Energy | Supramolecular Chemistry

- Researchers at **CeNS, Bengaluru (under DST)** developed a **metal-free organic photocatalyst** by combining the naturally occurring amino acid **aspartic acid** with **perylene diimide (PDI)**, a light-absorbing organic molecule.
- The molecules undergo **supramolecular self-assembly** in water to form highly ordered **2D nanosheets**, without changing their chemical composition.
- **Supramolecular self-assembly** means spontaneous organisation of molecules through **non-covalent interactions**; here, aspartic acid promotes **hydrogen bonding**, while PDI enables **π - π stacking and light absorption**.
- This molecular organisation improves **light absorption, charge separation, charge transport and accessible catalytic surface area**, thereby reducing energy losses during solar-driven water splitting.
- The self-assembled material produced nearly **18% higher photocurrent** than its bulk counterpart, indicating improved efficiency in converting solar energy for water-splitting reactions.
- **Green hydrogen** can be produced by **solar-driven water splitting**, where light energy drives the separation of water into **hydrogen and oxygen**; photocatalysts facilitate this process.
- The key significance is the development of a **metal-free, potentially more sustainable photocatalyst**, reducing dependence on **scarce/expensive metals** used in conventional catalytic systems.
- The molecular-design approach has potential applications in **green hydrogen, artificial photosynthesis, solar fuels and next-generation renewable-energy devices**.

40. ORV Sagar Manthan: India's Advanced Ocean Research Vessel

Syllabus Mapping: GS3: Science & Technology | Oceanography | Deep Ocean Mission | Marine Resources |

- **ORV Sagar Manthan (Yard 3041)** is India's first advanced Ocean Research Vessel built by **GRSE** for **NCPOR** under the **Ministry of Earth Sciences**, marking a shift from importing research platforms to **indigenous oceanographic capability**.
- The vessel is being developed under **Vertical-4 (Deep Ocean Survey & Exploration)** of the **Deep Ocean Mission (DOM)** at an approximate cost of **₹840 crore**, with a **30-year service life** and capability to operate in extreme environments including the **Southern Ocean**.
- It is a **multidisciplinary, all-weather research platform** equipped for **multibeam bathymetry, seismic/geophysical surveys, sub-bottom profiling, atmospheric observations and CTD water-column sampling**, enabling integrated study of the ocean, seabed and atmosphere.
- The vessel will support exploration of **Indian Ocean mid-oceanic ridges** for **polymetallic/multi-metal hydrothermal sulphide mineralisation**, while also establishing environmental baselines—linking ocean research with India's interest in **deep-sea mineral resources**.
- Its **ROV (Remotely Operated Vehicle)** and **AUV (Autonomous Underwater Vehicle)** deployment capability enables investigation and data collection in deep and difficult-to-access ocean environments.
- Oceanographic data generated by the vessel can strengthen understanding of **climate dynamics, polar-glacier changes, ocean processes and tsunami hazards**, thereby supporting **disaster preparedness and climate research**.
- The vessel will gradually replace the 43-year-old ORV Sagar Kanya, while symbolising India's transition from acquiring research platforms abroad to indigenous design and construction.
- The project demonstrates **Atmanirbharta in complex maritime technology**, with GRSE undertaking domestic design, engineering and construction; the vessel has **dual-class certification by Indian Register of Shipping (IRS) and American Bureau of Shipping (ABS)**.



41. International Deep-sea Macrofauna Taxonomy School

Syllabus Mapping: GS3: Marine Biodiversity | Deep-sea Ecosystems | Ocean Governance | International Environmental Cooperation

- **CMLRE (MoES), Kochi** is hosting the five-day **Deep-sea Macrofauna Taxonomy School (7–11 September 2026)** under the **Sustainable Seabed Knowledge Initiative (SSKI)** of the **International Seabed Authority (ISA)**.
- The programme aims to **standardise methodologies for deep-sea benthic biodiversity assessment** and build **taxonomic capacity** among early-career researchers from Indian Ocean countries, strengthening scientific foundations for sustainable seabed management.
- Training covers **traditional taxonomy, DNA barcoding, Scanning Electron Microscopy (SEM), biodiversity-data analysis, sample curation and open-access biodiversity-data publishing**, combining conventional identification with modern molecular and imaging tools.
- **Macrofauna** refers to relatively large benthic organisms that can generally be retained by standard macrofaunal sampling sieves; studying them helps assess **species composition, distribution and ecological health of deep-sea habitats**.
- The initiative brings together **ISA + MoES/CMLRE + IORA + Korea's MABIK**, demonstrating the importance of **international scientific cooperation and standardised datasets** for understanding biodiversity in areas beyond national jurisdiction.
- The programme is particularly relevant to **deep-seabed environmental governance**, where reliable taxonomic and biodiversity information is essential for assessing environmental impacts of seabed exploration and supporting **sustainable ocean-resource management**.

42 . Bakhira Lake Sediments & Indian Summer Monsoon Reconstruction

Syllabus Mapping: GS1: Indian Geography | Geomorphology | Wetlands | GS3: Climate Change | Water Resources | Disaster Management |

- Researchers from **Birbal Sahni Institute of Palaeosciences (BSIP), DST** used **environmental magnetic properties preserved in Bakhira Lake sediments** to reconstruct **Indian Summer Monsoon (ISM) variability over ~25,000 years**, extending the climatic record back to the **Last Glacial Maximum**.
- **Bakhira Lake**, in the **Ghaghara–Rapti alluvial system of the Central Ganga Plain**, is a **perennial oxbow/floodplain wetland** associated with the **Rapti River** and forms part of **Bakhira Wildlife Sanctuary**, one of eastern Uttar Pradesh's largest natural floodplain wetlands; the wetland was designated a **Ramsar Site in 2022**.
- **Bakhira Wildlife Sanctuary** is an important **freshwater wetland and bird habitat**, supporting **migratory birds of the Central Asian Flyway**, including species such as **red-crested pochard, northern pintail and northern shoveller**, while also being a known congregation site for the **vulnerable Sarus Crane**.
- **Palaeoclimate reconstruction** uses natural **proxies** preserved in sediments to infer past climate; here, **magnetic minerals, grain size, geochemistry and clay minerals** reveal changes in **rainfall, weathering, erosion, sediment transport and hydrology**.
- The ~25,000-year record shows that the **Indian Summer Monsoon has not remained constant**: colder/drier climatic phases generally corresponded with **weaker monsoon activity**, while warmer/wetter phases saw **stronger monsoon conditions**, demonstrating long-term natural variability.
- **Environmental magnetism** is particularly useful because magnetic minerals can respond to **weathering, erosion, sediment source and hydrological conditions**, allowing past environmental changes to be reconstructed even in the absence of instrumental observations.
- Such records provide a **baseline for distinguishing natural climate variability from recent anthropogenic changes** and can improve **monsoon modelling, water-resource planning, agricultural planning and flood–drought management**.

43. International Space Summit 2026

Syllabus Mapping: GS3: Space Technology | Space Security | Emerging Technologies | Disaster Management | Science & Technology

- **The first International Space Summit was held in Paris, France, in September 2026**, where Prime Minister Narendra Modi addressed the gathering virtually and presented India's vision for a **safe, secure, peaceful and sustainable outer-space domain**.
- The Summit comes amid **growing orbital congestion, proliferation of space actors and rapid technological advancement**, making **space sustainability, responsible behaviour and international cooperation** increasingly important dimensions of global space governance.
- India advocated **international law, dialogue and multilateral cooperation** in outer space, favouring **cooperation over confrontation, sustainability over short-term gains and inclusion over exclusion**.
- India's approach draws upon **"Vasudhaiva Kutumbakam" (One Earth, One Family, One Future)**, seeking to ensure that the benefits of space science and technology contribute to **global welfare rather than becoming concentrated among a few technologically advanced powers**.



- India's growing role in the global space ecosystem is reflected in **ISRO's cost-effective missions and international launch services**, with **430+ payloads from 34 countries** launched aboard Indian rockets.
- India's space programme is simultaneously moving towards **higher-end capabilities**, from **Aditya-L1's solar observations** and **Chandrayaan-3's lunar south-polar-region landing** to human spaceflight, indicating a transition from conventional satellite applications towards **planetary exploration and human spaceflight**.
- India's future roadmap envisages an **indigenous space station by 2035** and a **crewed lunar mission by 2040**, signalling its ambition to become a **full-spectrum spacefaring nation** while maintaining the principle that space exploration should ultimately benefit humanity.
- The expansion of India's **private space ecosystem**, alongside ISRO, is enabling greater **commercialisation, innovation and technology development**, with start-ups complementing institutional space capabilities.
- **India–France space cooperation** has historical depth, dating back to the **Thumba phase of India's space programme in the 1960s**, and has evolved towards cooperation in **Earth observation and advanced space technologies**, combining scientific capability with developmental applications.

44. Exercise Samudra Laksamana 2026

Syllabus Mapping: GS2: India–Malaysia Relations | ASEAN | Act East Policy | GS3: Maritime Security | Indian Ocean | Defence Cooperation

- **INS Mysore** arrived at **Lumut, Malaysia**, on 9 September 2026 for the **4th edition of Exercise Samudra Laksamana**, a **bilateral maritime exercise between the Indian Navy and Royal Malaysian Navy (RMN)**.
- The exercise includes **harbour and sea-based professional engagements**, including **cross-deck visits, operational interactions and sporting engagements**, aimed at enhancing **interoperability, professional exchange and mutual understanding**.
- The exercise builds upon expanding India–Malaysia defence engagement, including the **12th India–Malaysia Sub Committee Meeting held on 1 July 2026**, strengthening institutional mechanisms for bilateral maritime cooperation.
- The deployment reflects India's broader **maritime partnership with ASEAN**, particularly in the context of the **ASEAN–India Year of Maritime Cooperation 2026**.
- The engagement is aligned with India's **MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions)** vision, which emphasises cooperative maritime security, growth and development across the wider region.

45. Small Hydro Power (SHP)

Syllabus Mapping: GS3: Renewable Energy | Hydropower | Energy Security | Decentralised Energy | Sustainable Development | Infrastructure

- India's assessed **Small Hydro Power (SHP) potential is ~21 GW across 7,100+ identified sites**, but only around **5.2 GW has been harnessed**, indicating substantial untapped renewable-energy potential.
- SHP can strengthen **energy security and decentralised generation**, particularly by supplying relatively dependable renewable electricity closer to consumption centres in **remote and geographically challenging regions**.
- **Run-of-river SHP projects**, wherever technically and environmentally feasible, can require relatively less land and avoid the **large-scale submergence and displacement** associated with major reservoir-based hydropower projects, although ecological impacts still require assessment.
- SHP can generate wider **rural socio-economic benefits** through local employment, enterprises and income opportunities, making it relevant to both clean-energy transition and development of remote areas.
- The proposed **Small Hydro Power Development Scheme (2026–27 to 2030–31)** has an outlay of **₹2,584.60 crore**, targets about **1,500 MW additional capacity**, and proposes incentives for States to prepare DPRs for around **200 projects**.
- A major constraint is the **long project lead time**, particularly due to delays in **forest, environmental and right-of-way clearances**, highlighting the need for better Centre–State coordination and mechanisms to flag and escalate undue delays.
- SHP projects face **bankability challenges because of their distinctive cash-flow profile**, creating a need for **long-term "patient capital"**; IREDA has been urged to work with banks and multilateral institutions such as **ADB and World Bank** to improve financing availability.
- India's SHP expansion complements its broader clean-energy transition, with the country having crossed **300 GW of installed non-fossil-fuel capacity** and seeking a **diverse, balanced and geographically appropriate energy portfolio**.

46. District-Level Estimates of Unincorporated Non-Agricultural Sector — ASUSE 2025

Syllabus Mapping: GS3: Indian Economy | MSMEs | Informal Sector | Employment | Inclusive Growth | Statistical Systems

- **NSO, MoSPI** released **district-level estimates of India's unincorporated non-agricultural sector for the first time**, using **ASUSE 2025**, marking a shift towards more granular **sub-state-level evidence for targeted policymaking**.



- The estimates cover **Manufacturing, Trade and Other Services** among unincorporated establishments such as **proprietorships, partnerships (excluding LLPs), cooperatives, societies/trusts**, across rural and urban India.
- District-level estimates are available for **757 of 770 districts** in the ASUSE 2025 sampling frame; **Delhi's district-level estimates could not be generated**, while Lakshadweep and Chandigarh are already represented through their single-district UT-level estimates.
- The sector shows strong **geographical concentration**: the **top 10 districts account for about one-tenth**, while the **top 50 districts account for nearly one-third** of total unincorporated establishments, workforce and GVA, highlighting substantial spatial concentration of informal economic activity.
- There is considerable variation in enterprise density: roughly **one-third of districts have more than 1 lakh establishments**, while about **9% have fewer than 10,000**; only **16 districts** have more than **5 lakh establishments** each.
- District-level productivity varies significantly: **280 districts record GVA per worker above the all-India average of ₹1,56,539**, while around **331 districts fall in the ₹1–1.5 lakh range**, providing a granular picture of regional differences in economic productivity.
- **Women's economic participation shows strong regional variation**: women constitute at least **one-third of the workforce in 237 districts**, while they account for **more than 50% in 25 districts**; Telangana, Manipur, Meghalaya and Mizoram feature prominently among districts with high female participation.
- The data also reveals significant **female entrepreneurship**: in Mizoram, **women-owned proprietary establishments constitute at least 50% of establishments in every district**, while districts with high shares of female-led establishments are concentrated particularly in Telangana, Manipur and Meghalaya.
- The district-level approach can help address the **"one-size-fits-all" limitation of national/state averages** by identifying local concentrations of enterprises, productivity gaps, employment patterns and women's participation, enabling more targeted interventions for **MSMEs, skills, credit, infrastructure and livelihoods**.
- ASUSE follows a **multi-stage stratified sampling design**, covering rural and urban areas and using **CAPI (Computer Assisted Personal Interviewing)** through tablets; its estimates must be interpreted with **sampling variability and Relative Standard Errors (RSEs)** in mind.

47. CAZRI Moth Bean Varieties: Climate-Resilient Agriculture

Syllabus Mapping: GS-III: Agriculture | Climate-resilient agriculture | Food security | Genetic improvement | Sustainable farming

- Moth bean is an important kharif pulse crop of the hot arid regions of western Rajasthan and is well adapted to the Thar Desert, where rainfall is low, erratic and unevenly distributed.
- Its low productivity is linked to rainfed cultivation, prolonged dry spells, high evapotranspiration and poor soil-moisture availability, making drought tolerance and moisture-use efficiency important breeding objectives.
- The ICAR–Central Arid Zone Research Institute (CAZRI), Jodhpur has developed four varieties—CAZRI Moth-4, CAZRI Moth-5, CAZRI Moth-6 and CAZRI Moth-7—with emphasis on moisture-stress tolerance, higher yield potential and adaptation to arid conditions.
- During a prolonged dry spell in Kharif 2026, these varieties remained green, healthy and productive despite around 30 days without rainfall, demonstrating their moisture-stress adaptation.
- A key adaptive trait is developmental plasticity—the ability of plants to modify their growth, flowering and maturity according to the availability of soil moisture. Early flowering and rapid completion of the reproductive cycle can help crops escape terminal drought.

48. Dryland Congress 2026 and Delhi Declaration on Drylands

Syllabus Mapping: GS-III: Climate-resilient agriculture | Dryland farming | Land degradation | Food security GS-II: International cooperation | South–South cooperation

- The Dryland Congress 2026, jointly organised by ICAR and ICRISAT in New Delhi, concluded with the Delhi Declaration on Drylands (3D), focusing on scientific cooperation, innovation and scaling solutions for resilient dryland agriculture. The Congress also marked 50 years of ICAR–ICRISAT collaboration.
- Drylands cover approximately 45% of the world's land surface and support more than two billion people; their major challenges include water scarcity, rainfall variability, land degradation, climate change and unstable agricultural markets. Thus, dryland development is directly linked to global food security and rural livelihoods.
- The central focus on South–South cooperation is important because developing countries often face comparable problems of drought, soil degradation and smallholder vulnerability; cooperation enables the sharing and adaptation of locally relevant agricultural technologies among countries of Asia, Africa and Latin America.



- Triangular cooperation differs from South–South cooperation: it involves collaboration between developing countries with technical, financial or institutional support from a developed country or a multilateral organisation such as the United Nations or CGIAR.
- The Congress emphasised climate-resilient dryland agri-food systems, which require more than drought-resistant seeds and include soil-moisture conservation, rainwater harvesting, watershed management, crop diversification, improved seed systems, weather information and better market access.
- The focus on drylands can be linked to the United Nations Convention to Combat Desertification (UNCCD), 1994, the principal international legally binding framework dealing with desertification, land degradation and drought, particularly in arid, semi-arid and dry sub-humid regions.
- The Declaration is also relevant to the UNCCD objective of Land Degradation Neutrality (LDN), under which the rate of land degradation should be balanced by avoiding degradation, reducing ongoing degradation and restoring degraded land. LDN is reflected in SDG Target 15.3.

49. OPU–IVF Calf in Badri Cattle

Syllabus Mapping: GS-III: Indigenous livestock breeds | Animal husbandry | Biotechnology | Genetic improvement |

- A healthy Badri female calf was born through Ovum Pick-Up and In Vitro Fertilisation (OPU–IVF), highlighting the use of advanced reproductive biotechnology for the conservation and rapid multiplication of indigenous cattle germplasm. Badri cattle are an indigenous breed of Uttarakhand and the state animal of the state.
- Badri cattle, also known as Badri/Pahari cattle, are traditionally reared in the hilly regions of Uttarakhand and are adapted to the Himalayan environment. Their conservation is important because indigenous breeds possess locally evolved traits such as adaptation to difficult terrain, climatic variability and low-input production systems.
- In OPU–IVF, oocytes are collected from genetically superior donor cows, fertilised with selected semen in a laboratory and developed into embryos; these embryos are then transferred into hormonally synchronised recipient cows. In this case, a Badri embryo was transferred into a Sahiwal recipient cow, which carried and delivered the Badri calf.
- The technology can accelerate the multiplication of elite female germplasm because several embryos may be produced from a genetically valuable donor, unlike conventional reproduction, which generally produces one calf per pregnancy. It can therefore support breed improvement, conservation of valuable genetic traits and structured germplasm banks.
- The initiative also proposes exploring cloning of elite Badri cows; however, cloning and OPU–IVF serve different purposes: IVF combines selected maternal and paternal genetic material, whereas cloning aims to produce a genetically near-identical copy of a donor animal.
- Conservation of Badri cattle is significant under the broader objective of protecting indigenous animal genetic resources, since local breeds may possess valuable traits such as disease tolerance, climatic adaptation and suitability for low-resource farming systems, even when their commercial productivity is lower than that of specialised exotic or crossbred cattle.

50. Pradhan Mantri Kisan Maandhan Yojana (PM-KMY)

Syllabus Mapping: GS-II: Social security | Welfare schemes for vulnerable sections GS-III: Agriculture | Farmers' welfare | Inclusive growth

- Pradhan Mantri Kisan Maandhan Yojana (PM-KMY) is a Central Sector, voluntary and contributory old-age pension scheme launched on 12 September 2019 by the Ministry of Agriculture & Farmers Welfare for eligible Small and Marginal Farmers (SMFs).
- Eligible farmers aged 18–40 years with cultivable landholdings of up to 2 hectares, whose names appeared in the relevant land records as on 1 August 2019, can enrol; the scheme provides a minimum assured pension of ₹3,000 per month after attaining 60 years of age.
- The scheme follows an equal-contribution model: the farmer contributes ₹55–₹200 per month, depending on the age of entry, and the Central Government contributes an equal matching amount. Thus, it is different from a fully government-funded social pension.
- In the event of the subscriber's death after commencement of pension, the spouse is entitled to a family pension equal to 50% of the subscriber's pension, i.e. ₹1,500 per month, subject to the scheme's conditions. The scheme is therefore linked to old-age income security and family-level social protection.
- PM-KMY is implemented in partnership with the Life Insurance Corporation of India (LIC), while enrolment is facilitated through Common Service Centres (CSCs) using Aadhaar, bank details, mobile-based verification and an auto-debit mandate.
- PM-KMY should be distinguished from PM-KISAN: PM-KISAN provides income support to eligible farmer families, whereas PM-KMY creates a contributory pension safety net for old age. Eligible farmers may also use their PM-KISAN-linked bank account for contributions to PM-KMY.



- The scheme excludes beneficiaries of other specified pension or social-security schemes, income-tax payers, institutional landholders, certain constitutional office-holders, elected representatives, most serving or retired government and public-sector employees, and registered professionals; MTS, Class IV and Group D employees are exempted from the employee-related exclusion.

51. Steel Slag Road Technology

Syllabus Mapping: GS-III: Infrastructure | Science & Technology | Waste Management | Circular Economy | Sustainable Development

- Steel slag road technology uses processed steel slag, a by-product of steel production, as an alternative to naturally mined aggregates. It converts industrial waste into an infrastructure resource.
- Steel slag is mainly generated during steel refining through Basic Oxygen Furnace (BOF) and Electric Arc Furnace (EAF) processes. Its composition varies with the production method, making processing and quality control essential.
- The technology reduces dependence on mining and quarrying of natural aggregates, thereby supporting resource efficiency, reduced land degradation and the circular economy.
- Fresh steel slag may contain free lime and free magnesia, which can expand on absorbing moisture. Hence, ageing, crushing, screening and quality testing are required before its use in roads.
- Unlike fly ash, a by-product of coal combustion, steel slag is generated during steel refining and is valued for its hardness and durability, making it suitable for heavy-load roads.
- The technology is reported to reduce construction costs by around 40%, provide nearly four times the strength of conventional roads and increase the maintenance cycle to around 15 years in suitable applications.
- The 1.85-km road at Raigarh, Chhattisgarh, developed by CSIR-CRRI and Jindal Steel, received the Guinness World Record for the longest road built with processed steel slag aggregates. A 40-km project in Angul, Odisha, is planned for wider application.
- The technology has been used in Hazira, NH-66, Hazira Port and Arunachal Pradesh, particularly in areas requiring durable pavements for heavy freight traffic.
- It supports SDG 9—resilient infrastructure and innovation—and SDG 12—responsible consumption and production. It also reflects industrial symbiosis, where the by-product of one industry becomes an input for another.
- Large-scale adoption requires assessment of slag quality, expansion potential, leachability, drainage, pavement design and subgrade conditions. Thus, steel slag cannot be used universally without site-specific testing and environmental safeguards.

52 . India–MERCOSUR Preferential Trade Agreement

Syllabus Mapping: GS-II: International Relations | India's relations with Latin America GS-III: Indian Economy | External trade | Trade facilitation

- India and MERCOSUR have initiated negotiations to expand their existing Preferential Trade Agreement (PTA) to deepen economic relations and create greater market-access opportunities for businesses.
- MERCOSUR is a South American regional economic bloc comprising Argentina, Brazil, Paraguay and Uruguay as its core members. Venezuela's membership remains suspended, while Bolivia has been admitted as a new member.
- The India–MERCOSUR PTA was signed on 25 January 2004 and entered into force on 1 June 2009. It provides preferential tariff concessions on 450 tariff lines by India and 452 tariff lines by MERCOSUR.
- Unlike a comprehensive Free Trade Agreement (FTA), a PTA provides tariff concessions on selected products rather than eliminating or substantially reducing tariffs across most traded goods. Its limited product coverage is one reason for seeking expansion.
- The scope of the expanded agreement will be determined through Terms of Reference (ToR), which will define the sectors, products, negotiating structure and areas of mutual interest to be covered.
- The expansion can help India diversify its export markets in Latin America, improve access for sectors such as pharmaceuticals, automobiles, engineering goods, chemicals, textiles and agricultural products, and reduce excessive dependence on a few major trading partners.
- MERCOSUR offers India access to a large South American market and may support cooperation in critical minerals, food security, energy, infrastructure, agriculture and industrial supply chains. However, greater market access must also address tariff barriers, standards, logistics costs and non-tariff measures.
- India and MERCOSUR also signed the First Additional Protocol to the PTA to recognise electronic Certificates of Origin (e-CoO) as legally equivalent to paper certificates.
- A Certificate of Origin certifies the country in which a product qualifies as originating under applicable rules of origin. It is important for exporters seeking preferential tariff treatment and helps customs authorities prevent misuse of trade preferences.
- The Protocol amends Article 16 of Annex III on Rules of Origin and requires electronic certificates to be issued and digitally signed by authorised entities in accordance with the domestic laws of the participating countries.



- Acceptance of e-CoO will promote paperless trade, reduce documentation and verification time, lower transaction costs and improve customs efficiency. It also supports India's broader push for trade facilitation and digitalisation of logistics.
- The Protocol will enter into force after India and the MERCOSUR countries complete their respective internal procedures and notify one another. Its signing does not automatically mean immediate operational implementation.

53 . Great Indian Bustard Conservation and Savara Van Kavach

Syllabus Mapping: GS-III: Environment | Biodiversity conservation | Species recovery | Protected areas | Forest management |

- The Great Indian Bustard (GIB) (*Ardeotis nigriceps*) is a critically endangered, ground-dwelling grassland bird found mainly in the arid and semi-arid landscapes of India.
- Its major threats include habitat loss and fragmentation, conversion of grasslands, power-line collisions, predation, disturbance and invasive species such as *Prosopis juliflora*.
- The GIB is protected under Schedule I of the Wild Life (Protection) Act, 1972 and is listed as Critically Endangered on the IUCN Red List. It is also included in CITES Appendix I.
- The Great Indian Bustard is the state bird of Rajasthan. Important habitats include the Desert National Park landscape in Rajasthan, the Naliya grasslands of Kachchh in Gujarat and parts of Maharashtra, Karnataka and Andhra Pradesh.
- The GIB conservation breeding programme, supported by the Ministry of Environment, Forest and Climate Change (MoEFCC) and the Wildlife Institute of India (WII), aims to increase the captive population and support future recovery in the wild.
- The "jump-start" intervention involves replacing infertile eggs laid by wild GIB females with viable eggs from the conservation-breeding programme. The resulting chicks are raised with the aim of strengthening wild populations; the survival of a chick beyond the critical first three months in Gujarat is an important conservation milestone.
- Habitat-management measures in the Kachchh landscape include the restoration of around 11 sq. km. of grassland, construction of 30 km. of predator-proof fencing covering approximately 15 sq. km., and enhanced patrolling and rescue capacity.
- The Soft Release Centre at Naliya is intended to support the gradual release and adaptation of conservation-bred GIBs before their integration into suitable natural habitats.
- The conservation approach reflects in-situ conservation through habitat protection and restoration, along with ex-situ conservation through captive breeding. Their integration is essential for species whose wild population has declined sharply.
- The Savara Van Kavach initiative in Kachchh uses the Miyawaki method of dense, multi-layered plantation. It covers about 9.46 sq. km. and includes more than 10,000 saplings of 47 native species suited to saline and low-water conditions.

54 . Operation Deep Manifest

Syllabus Mapping: GS-II: India–Pakistan relations | National security | Government policies GS-III: Foreign trade | Customs administration | Economic security | Supply-chain integrity

- Operation Deep Manifest is a DRI-led enforcement drive to detect and prevent the entry of Pakistan-origin goods through third countries by identifying misdeclaration, transshipment and manipulation of import documents.
- Under the operation, the Directorate of Revenue Intelligence (DRI) seized over 362 MT of Pakistan-origin dry dates at CFS Ambad, Nashik. The goods were routed from Karachi → Jebel Ali → India, while the documents declared the UAE as the country of origin.
- Transshipment involves transferring goods from one vessel or container to another during transit. Such routing does not automatically change the country of origin of the goods.
- India prohibited the direct and indirect import or transit of goods originating in or exported from Pakistan from 2 May 2025 through DGFT Notification No. 06/2025-26, citing national-security concerns after the Pahalgam terror attack.
- The case highlights the importance of Rules of Origin, which determine the economic nationality of goods for applying tariffs, trade restrictions and import prohibitions. Mere repacking, relabelling or transshipment generally does not confer a new origin.
- The operation strengthens economic security by protecting trade restrictions, preventing customs fraud and securing supply chains against covert movement of prohibited goods.
- The DRI functions under the Central Board of Indirect Taxes and Customs (CBIC) and investigates serious customs violations, including smuggling, misdeclaration, under-invoicing and evasion of import restrictions.
- Effective enforcement requires coordination among DRI, Customs authorities, ports, shipping companies and freight forwarders, along with scrutiny of shipping routes, container changes, ownership patterns and country-of-origin declarations.



55. Vayu UTtaM

Syllabus Mapping: GS-III: Defence technology | Drone technology | Airspace management | Atmanirbharta | Internal security

- Vayu UTtaM is an indigenous, multi-mode Unmanned Traffic Management (UTM) system demonstrated by the Indian Air Force during Dronathon-2026 at the Pokhran Field Firing Range, Jaisalmer.
- During the real-time demonstration, it successfully detected and tracked both military and civilian Unmanned Aircraft Systems (UAS).
- Its main purpose is to manage the growing number of drones operating in congested airspace and support the identification and timely mitigation of unauthorised or rogue drones.
- UTM systems help coordinate drone movements by improving situational awareness, tracking and airspace deconfliction between different unmanned platforms and other airspace users.
- Vayu UTtaM has applications beyond defence, including civil aviation, critical infrastructure protection, airspace safety and public security.
- The system is important in the context of the rapid expansion of drone use in surveillance, logistics, agriculture, emergency response and military operations, which increases the risk of airspace congestion and unauthorised drone activity.
- Vayu UTtaM strengthens Atmanirbharta in Defence by developing indigenous capabilities in drone detection, tracking and airspace management instead of relying entirely on imported systems.
- It complements Counter-Unmanned Aircraft Systems (CUAS), which focus on detecting, identifying, tracking and neutralising hostile drones. UTM primarily supports the safe and coordinated management of drone traffic, while CUAS addresses security threats.
- The system reflects the shift from developing individual drones to building an integrated unmanned systems ecosystem, including communication networks, surveillance, identification, autonomy, airspace coordination and counter-drone capabilities.

56. TlCuSe_3 : Unusual Heat Transport and Thermoelectric Potential

Syllabus Mapping: GS-III: Science & Technology | Nanotechnology and advanced materials | Energy efficiency | Waste-to-energy | Industrial innovation

- Researchers at JNCASR, Bengaluru, have identified an unusual heat-transport mechanism in thallium copper selenide (TlCuSe_3), a copper chalcogenide with potential for efficient thermoelectric energy conversion.
- Thermoelectric materials convert a temperature difference directly into electricity. They can help recover waste heat from power plants, cement and steel industries, automobiles, data centres and battery systems.
- Conventional heat transport in crystals occurs through phonons, which are quantised lattice vibrations. In TlCuSe_3 , heat transport is unusual because strong anharmonicity and structural disorder promote wave-like coherence between vibrational modes.
- The material has a complex tetragonal, knot-like crystal framework with open channels along the c-axis. This structure restricts the movement of copper atoms and produces confined dynamic disorder, rather than liquid-like long-range ion migration.
- Restricted copper-ion movement generates strong anharmonicity, meaning atomic vibrations deviate from ideal harmonic behaviour. This disrupts conventional phonon propagation and leads to ultralow lattice thermal conductivity.
- Unlike superionic materials, where excessive ion migration can destabilise the crystal structure, TlCuSe_3 exhibits confined ion dynamics, helping suppress heat conduction while maintaining structural stability.
- The researchers used first-principles calculations and molecular-dynamics simulations to study atomic motion and explain the transition from particle-like phonon transport to wave-like thermal transport.
- TlCuSe_3 recorded a thermoelectric figure of merit (zT) of 1.7, indicating high thermoelectric performance among pristine ternary chalcogenides. A higher zT generally indicates better efficiency in converting heat into electricity.
- The study is significant for waste-heat recovery and thermal management, as materials with low lattice thermal conductivity and favourable electronic transport are desirable for thermoelectric devices and thermal-barrier applications.

57. World Circular Economy Forum (WCEF) 2026

Syllabus Mapping: GS-III: Environment | Circular Economy | Waste Management | Sustainable Development | Resource Efficiency
GS-II: International cooperation | Global environmental governance

- **WCEF 2026** is being hosted for the first time in **South Asia** at **Gandhinagar, Gujarat (15–18 September 2026)** under the theme **“Circular Economy: Transition for People and Prosperity.”**



- **Circular economy** seeks to keep products and materials in use through **reuse, repair, refurbishment and recycling**, reducing dependence on virgin resources and waste generation.
- The forum is jointly organised by **MoEF&CC, CPCB, Government of Gujarat, GPCB, Government of Finland and Finnish Innovation Fund Sitra**, bringing together **2,000+ stakeholders from 65+ countries**.
- A major focus of WCEF 2026 is **circular finance**—mobilising private investment and financial mechanisms for circular businesses, technologies and infrastructure, addressing the financing gap in the transition.
- The forum covers **AI and digitalisation, sustainable products, industrial solutions, energy, finance, governance, employment, start-ups and youth leadership**, linking circularity with both environmental sustainability and economic opportunities.
- The **125+ exhibitor International Expo** showcases practical circular-economy solutions and investment-ready innovations, particularly from **start-ups and innovators**.
- **10-Year Framework of Programmes on Sustainable Consumption and Production Patterns (10YFP)**: Its Board meeting is being held alongside WCEF; India has recently assumed the role of **Co-Chair**. The 10YFP provides an international framework for promoting **sustainable consumption and production (SCP)**.
- Circular economy directly supports **SDG 12 (Responsible Consumption and Production)** and has linkages with **SDG 9 (Industry, Innovation and Infrastructure)** and **SDG 13 (Climate Action)** through resource efficiency and reduced waste.

58. SARAL AI for Science Communication

Syllabus Mapping: GS-III: Science & Technology | Emerging technologies | AI | Scientific research & innovation | Public outreach

- **SARAL AI**, an initiative of **Anusandhan National Research Foundation (ANRF)**, uses AI to convert **scientific research papers into short, accessible videos**, helping bridge the gap between academic research and the wider public.
- The initiative addresses the **science communication gap**—scientific research often remains confined to academic publications; AI-based tools can simplify complex findings and improve their **discoverability, accessibility and public understanding**.
- **CSIR-NIScPR** is adopting SARAL AI to communicate research published in its journals, particularly for **students and non-specialist audiences**. This links AI with **science popularisation and scientific literacy**.
- The initiative is relevant to **responsible use of Generative AI** in knowledge dissemination: AI can simplify highly technical material, but scientific communication still requires **human editorial oversight, factual verification and preservation of scientific context**.
- **ANRF linkage**: ANRF is not only aimed at strengthening India's research and innovation ecosystem but also emphasises **wider dissemination and societal impact of research**. SARAL AI provides a technological mechanism for taking research beyond academic publications.
- **CSIR-NIScPR linkage**: NIScPR works at the intersection of **science communication and science-policy research**; therefore, adoption of AI for converting technical research into accessible content directly fits its institutional mandate.
- The broader significance is the democratisation of scientific knowledge: making publicly generated research understandable to citizens can strengthen **scientific temper, evidence-based public discourse and informed participation in a technology-driven society**.

59. UPI MDR Framework

Syllabus Mapping: GS-III: Digital Economy | Financial Inclusion | Digital Payments | Banking & Payment Systems GS-II: Government policies | Inclusive growth

- **UPI's zero-cost model has supported mass digital-payment adoption**, but maintaining payment infrastructure involves costs for banks, PSPs and app providers. The new MDR framework attempts to create **ecosystem revenue without charging users for P2P payments**.
- **MDR (Merchant Discount Rate)** is the fee paid within the merchant-payment ecosystem and is **not a government tax**. Its distribution among banks, PSPs and UPI apps provides a potential revenue source for maintaining and expanding payment infrastructure.
- Standard MDR of 0.4% applies to specified P2M transactions above ₹2,000, capped at ₹300 for transactions of ₹75,000 and above.
- **P2P transactions remain completely free**, while MDR is introduced only for specified **P2M transactions above ₹2,000**; thus, the framework separates **individual access from merchant-side monetisation**.
- The framework protects **small merchants and micro-businesses** through zero MDR for eligible merchants receiving up to **₹1 lakh/month**, addressing the concern that payment charges could discourage QR-based digital acceptance among low-margin businesses.



- **96% of P2M transactions remain outside the MDR burden**, while specified larger transactions attract MDR. This reflects a **targeted monetisation approach rather than universal charging**.
- Special treatment for **railways, fuel, telecom, insurance and agricultural inputs** recognises that high-volume essential sectors often operate with relatively narrow margins; a flat **₹5 MDR** provides greater cost predictability.
- **UPI architecture**: UPI is an **interoperable instant-payment system developed by NPCI**, allowing multiple bank accounts to be accessed through a single mobile application and enabling **bank-to-bank fund transfers without requiring the customer to know the beneficiary's bank details**.
- **UPI vs digital-wallet model**: UPI primarily facilitates **direct bank-account-to-bank-account transactions**, unlike traditional wallets where money is first stored in a wallet. This account-based architecture has helped make UPI highly interoperable.
- The framework also addresses the **digital public infrastructure (DPI) sustainability question**: when a public digital platform is offered at very low user cost, a sustainable mechanism is needed to finance **network expansion, security, innovation and service providers** without reducing inclusion.
- The **5% contribution from MDR collections to a dedicated small-merchant fund** links monetisation with further digital inclusion by using part of the ecosystem revenue to expand UPI adoption among smaller businesses.

60. Yudh Abhyas 2026

Syllabus Mapping: GS-II: India–US strategic partnership | Defence cooperation

- **Yudh Abhyas** is a bilateral **India–US Army exercise**, with the **22nd edition (2026)** being conducted simultaneously at **Auli, Uttarakhand and Mahajan Field Firing Range, Rajasthan**, with **600 personnel from each side**.
- The exercise focuses on enhancing interoperability for **Integrated Battle Group (IBG)** operations in **mountainous and semi-mountainous terrain**, with emphasis on infantry-dominated operations.
- **IBG linkage**: An IBG is a **tailored, brigade-sized, self-sufficient combat formation** designed for rapid mobilisation and operations with integrated combat and support elements. Its inclusion reflects India's emphasis on **agile and integrated force structures**.
- **Technology infusion** is a major component, including **drones and autonomous systems** for surveillance and reconnaissance and demonstrations of contemporary weapon systems.
- The exercise also involves exchange of expertise on **multi-domain warfare**, reflecting the modern battlefield's integration of **land, air, cyber, space and electromagnetic domains**.

61. Periodic Labour Force Survey (PLFS)

Syllabus Mapping: GS-III: Employment | Labour force | Inclusive growth | Human capital | Economic development

- **Periodic Labour Force Survey (PLFS)** is conducted by the **National Statistical Office (NSO)** under the **Ministry of Statistics and Programme Implementation (MoSPI)** and is India's primary official source of data on **employment, unemployment and labour-force participation**.
- From **January 2025**, PLFS methodology was modified to provide **monthly and quarterly labour-market estimates**, in addition to its broader employment statistics.
- The monthly bulletin uses **Current Weekly Status (CWS)**, under which a person's activity is assessed with reference to the **preceding 7 days**; this makes it useful for capturing short-term changes in employment conditions.
- Three core indicators are reported: **Labour Force Participation Rate (LFPR)** = proportion of population that is working or seeking/available for work; **Worker Population Ratio (WPR)** = proportion actually employed; and **Unemployment Rate (UR)** = proportion of the labour force that is unemployed.
- For **August 2026**, among persons aged **15 years and above**, overall **LFPR rose to 55.6%**, **WPR to 52.8%**, while **UR stood at 5.0%**.
- The major movement was in **rural India**: rural LFPR reached **58.2%**, **WPR 55.8%**, while rural UR declined to **4.1%**. Urban UR remained comparatively higher at **6.8%**.
- **Female LFPR** increased to **34.8%**, with a significant rural–urban difference: **39.4% in rural areas** against **25.4% in urban areas**.
- **CWS vs Usual Status**: CWS uses a **7-day reference period**, whereas **Usual Status** assesses employment based on a **longer reference period of 365 days**. Hence, CWS is more suited to **short-term labour-market estimates**, while Usual Status captures more persistent employment conditions.
- A lower unemployment rate does **not automatically mean better employment conditions**. UR can fall if people stop seeking or being available for work; therefore, **LFPR, WPR and UR must be read together**.



62 . India Electric Mobility Index (IEMI)

Syllabus Mapping: GS-III: Electric Vehicles | Energy Security | Clean Energy Transition | Infrastructure | Environmental Pollution | Manufacturing

- **India Electric Mobility Index (IEMI)** is **composite index** developed by **NITI Aayog** in **collaboration with WRI India** that tracks the progress of **States and Union Territories in electric mobility**, enabling evidence-based policy and identification of areas requiring improvement.
- The **2nd edition** shows improvement in State performance: the **highest score rose from 77 to 84**, while the **median score increased from 36 to 40**. **29 of 36 States/UTs** have notified EV policies.
- Nearly **89% of India's crude-oil requirement is imported**; electrification of transport can reduce petroleum dependence, improve **energy security** and lower exposure to global oil-price volatility.
- EV transition is also an **urban environmental issue** as vehicle electrification can reduce **tailpipe emissions** and associated air-pollution exposure, particularly in cities. Its overall climate benefit, however, depends partly on the electricity-generation mix.
- Government support for EV transition exceeds **₹92,000 crore**, covering **FAME, PM E-DRIVE and PM-eBus Sewa**, along with **PLI schemes for Automobiles & Auto Components and Advanced Chemistry Cell (ACC) battery storage**.
- **Charging infrastructure** remains crucial for EV adoption. The **Unified Bharat e-Charge app** is intended to improve access to charging infrastructure, while oil marketing companies and private players are expanding charging networks.
- **Advanced Chemistry Cell (ACC):** ACC batteries are high-performance rechargeable battery technologies used for applications such as **electric vehicles and energy storage**; domestic manufacturing reduces dependence on imported battery cells and strengthens the EV supply chain.

63. World Ozone Day 2026

Syllabus Mapping: GS-III: Environment | Ozone Layer | Climate Change | International Environmental Conventions | Sustainable Cooling

- **World Ozone Day 2026** was observed with the theme **“Global Action for a Cooler Planet”**, highlighting the link between **ozone protection, climate action and sustainable cooling**.
- **Vienna Convention (1985)** provides the international framework for cooperation on ozone-layer protection, while the **Montreal Protocol (1987)** provides legally binding controls for the **phase-out of ozone-depleting substances (ODS)**.
- India has been a Party to the **Vienna Convention and Montreal Protocol since 1992** and has met its scheduled commitments for different ODS, demonstrating compliance with the Protocol.
- India has already phased out **CFCs (Chlorofluorocarbons), CTC (Carbon Tetrachloride) and Halons** for controlled applications, while **HCFCs (Hydrochlorofluorocarbons)** are being phased out under the accelerated Montreal Protocol schedule.
- **Kigali Amendment (2016)** expanded the Montreal Protocol's climate relevance by providing for the **phase-down of HFCs (Hydrofluorocarbons)**. HFCs generally do not deplete the ozone layer but many have **high Global Warming Potential (GWP)**.
- India **ratified the Kigali Amendment in September 2021**, which entered into force for India on **26 December 2021**. India's HFC phase-down is scheduled to begin in **2032**, followed by reductions of **10% (2032), 20% (2037), 30% (2042) and 85% (2047)** against the baseline.
- **Important distinction:** **CFCs and HCFCs → ozone-depleting substances**, whereas **HFCs → generally non-ozone-depleting but climate-warming gases**. Thus, the Kigali Amendment creates a direct **ozone–climate linkage**.
- The **India Cooling Action Plan (ICAP)** provides the domestic framework for sustainable cooling by promoting **energy-efficient cooling, climate-friendly refrigerants, reduced cooling demand and development of skilled manpower** in the refrigeration and air-conditioning sector.
- Under **HCFC Phase-out Management Plan (HPMP) Stage III** India is working towards further HCFC phase-out, particularly in the **refrigeration and air-conditioning servicing sector**, with emphasis on lower-impact alternatives and technician training.
- **248 Industrial Training Institutes (ITIs)** have been adopted by **12 refrigeration and air-conditioning manufacturers** to align technician training with industry standards and develop skills for **low-GWP, climate-friendly cooling technologies**.



64. India's Net Zero Portal & NAPCC Dashboard

Syllabus Mapping: GS-III: Climate Change | Environmental Governance | Net Zero | Technology-enabled governance | Climate-resilient development

- **India's Net Zero Portal** is a centralised digital platform for **voluntary registration and disclosure of Net Zero commitments** by Indian entities across sectors.
- Entities can disclose **GHG (Greenhouse Gas) emissions**, declare Net Zero targets and submit **annual progress updates**; **Scope 1 and Scope 2** reporting is encouraged, while **Scope 3** reporting remains voluntary.
- **GHG emission scopes:** **Scope 1** = direct emissions from sources owned/controlled by an entity; **Scope 2** = indirect emissions from purchased electricity/energy; **Scope 3** = other indirect value-chain emissions.
- Entities can also disclose their **Net Zero pathways**, including **clean-energy transition, energy efficiency, technological interventions and carbon removals**.
- The Portal creates a **common repository of voluntary climate commitments**, improving **transparency, disclosure and long-term climate planning**; entities declaring targets receive acknowledgement from **MoEFCC**.
- The **NAPCC Dashboard** provides a consolidated digital platform to monitor implementation and progress across India's **National Missions under the National Action Plan on Climate Change (NAPCC)**.
- The Dashboard enables **inter-ministerial monitoring**, evidence-based assessment of climate action, identification of implementation gaps and consolidation of inputs from different Ministries and Departments.
- **NAPCC:** Launched in **2008**, NAPCC is India's overarching framework for climate action and comprises **eight National Missions**, covering areas such as solar energy, energy efficiency, sustainable habitat, water, Himalayan ecosystems, Green India, sustainable agriculture and strategic climate knowledge.

65. Babu Jagjivan Ram

Syllabus Mapping: GS-II: Social Justice | Social Empowerment | Vulnerable Sections | Social Reform | Equality & Dignity

- **Babu Jagjivan Ram (1908–1986)** was a prominent freedom fighter, social reformer and political leader who worked extensively for the **rights and empowerment of Scheduled Castes and weaker sections**.
- Born in **Chandwa, Bihar**, he faced caste discrimination from an early age, which influenced his lifelong commitment to **social equality and eradication of untouchability**.
- He became associated with the **Indian National Congress** and participated in the freedom movement, emerging as an important leader representing the interests of historically marginalised communities.
- He served in several important Union ministries after Independence, including **Labour, Communications, Railways, Food & Agriculture and Defence**, reflecting his long **public career**.
- As **Union Minister for Food & Agriculture (1967–1970)**, he was associated with India's efforts towards agricultural transformation during the period of the **Green Revolution**.
- As **Defence Minister (1970–1974 and 1977–1979)**, he served during the **1971 India–Pakistan War**, when the Bangladesh Liberation War culminated in the creation of Bangladesh.
- He later became **Deputy Prime Minister of India (1977–1979)** and remained an important figure in national politics during the post-Emergency period.
- His social philosophy emphasised **equality, dignity, fraternity and equal opportunity**, with the objective of creating a **casteless and classless society**.
- His approach to social justice went beyond legal equality towards **political representation, economic empowerment and participation of marginalised communities** in public life.
- **Babu Jagjivan Ram National Foundation (BJRNF)** was established in **2008** under the Ministry of Social Justice & Empowerment to **propagate** his ideals of social reform and empowerment.
- His legacy connects closely with the **constitutional commitment to equality** under Articles **14, 15 and 17**, particularly the prohibition of untouchability under **Article 17**.

66. Special Campaign 6.0: e-Waste Management

Syllabus Mapping: GS-III: Environmental Pollution | e-Waste Management | Circular Economy | Critical Minerals | Resource Efficiency | Sustainable Development

- **Special Campaign 6.0** will be conducted from **2–31 October 2026**, with the Ministry of Mines focusing on **“Effective Collection, Segregation and Disposal of e-Waste.”**
- The **Preparatory Phase (15–30 September 2026)** will identify targets for pending references, public grievances, Parliamentary assurances and record management, followed by the **Implementation Phase (2–31 October)**.



- The Ministry has nominated **JNARDDC (Jawaharlal Nehru Aluminium Research Development and Design Centre)**, an autonomous body under the Ministry of Mines, to facilitate **e-Waste collection booths** in government offices.
- The initiative aims at **recycling and recovery of critical minerals from e-Waste**, linking e-Waste management with the **National Critical Mineral Mission (NCMM)**.
- E-waste contains valuable materials including **metals and critical minerals**, making recycling and urban mining important for resource efficiency and reducing dependence on primary extraction.
- Special Campaign 6.0 builds on Special Campaign 5.0, which helped improve **grievance disposal, file management, office-space utilisation and scrap disposal** across the Ministry and its organisations.
- The campaign reflects the principles of **circular economy**, where waste is treated as a resource through **collection → segregation → recycling → material recovery**.

67 . Pradhan Mantri Khanij Kshetra Kalvan Yojana (PMKKKY)

Syllabus Mapping: GS-II: Social Justice | Tribal Development; GS-III: Mining | Environmental Impact | Sustainable Development

- **PMKKKY** was launched by the **Ministry of Mines in September 2015** to ensure welfare and development of people and areas affected by mining operations.
- The scheme is implemented through **District Mineral Foundations (DMFs)**, which are **non-profit trusts** established in every mining-affected district under **Section 9B of the Mines and Minerals (Development and Regulation) Act, 1957**.
- **DMFs are funded through statutory contributions from mining lease holders: 10% of royalty** for leases granted on/after **12 January 2015** and **30%** for leases granted before that date.
- **PMKKKY has three broad objectives:** implementing welfare and development projects, mitigating the adverse **environmental, health and socio-economic impacts** of mining, and ensuring **sustainable livelihoods** for affected people.
- Under the **revised PMKKKY Guidelines, 2024**, at least **70% of DMF funds** must be spent on **high-priority sectors** such as drinking water, healthcare, education, environment, sanitation, housing, skill development and livelihoods.
- Up to **30%** can be utilised for **other priority sectors**, including physical infrastructure, irrigation, energy and watershed development and measures improving environmental quality.
- The 2024 guidelines specifically require at least **70% of funds to be spent in directly affected areas** and provide for **mandatory audit of DMF accounts by the CAG**, grievance redressal and a **State-level Monitoring Committee headed by the Chief Secretary**.
- In Scheduled Areas, DMF fund utilisation is guided by **Article 244, Fifth and Sixth Schedules, PESA Act, 1996** and the **Forest Rights Act, 2006**, recognising the special vulnerability of tribal communities in mining regions.
- The **MMDR Amendment Act, 2021** empowered the Central Government to issue directions regarding the **composition and utilisation of DMF funds**; subsequent directions also sought to strengthen participation and prevent transfer of DMF funds to State-level funds.
- **Gram Sabhas/local bodies** may assist in preparation of the **five-year Perspective Plan**, linking DMF planning with local needs and participatory governance.

68. India's First Soil Carbon Payments to Farmers

Syllabus Mapping: GS-III: Agriculture | Sustainable Agriculture | Carbon Markets| Environmental Pollution

- India's first **soil-carbon payments** are being made to **2,550 smallholder farmers in Punjab and Haryana**, linking adoption of regenerative farming with an additional income source.
- The payments are part of '**Aadi**', a **Grow Indigo farmer-carbon programme launched in 2019** with technical guidance from **ICAR (Indian Council of Agricultural Research)**.
- Farmers adopted **Direct Seeded Rice (DSR), reduced tillage and crop-residue management** during 2019–2022; resulting GHG reductions and soil-carbon gains were **measured and independently verified** before carbon credits were issued.
- The programme has issued agricultural carbon credits under the **Verra VM0042 methodology** and currently covers **2 million+ acres and 1 lakh+ farmers across seven States**.
- Farmers receive a share of the **carbon credits generated from their fields**, with the first issuance covering about **30,000 acres and 50,000+ carbon credits**; payments were around **₹3,000–₹15,000 per farmer**.
- **DSR** can reduce irrigation requirements compared with conventional rice transplanting, while improved residue management can reduce **stubble burning and associated air pollution**.
- ICAR institutions, including **ICAR-IARI (Indian Agricultural Research Institute)**, contributed to GHG accounting, soil sampling, crop modelling, field validation and remote-sensing approaches, reflecting the **Lab-to-Land approach**.
- The initiative demonstrates a **carbon-market incentive mechanism in agriculture**, where farmers can receive economic returns for verified environmental outcomes rather than relying only on conventional agricultural subsidies.



- The initiative also links with India's international cooperation on regenerative agriculture: the **16th BRICS Agriculture Ministers' Meeting (2026)** agreed to establish a **BRICS Network of Centres of Excellence on Agroecology and Regenerative Agriculture**.

69. Life Cycle Assessment (LCA) Framework for Solid Waste Management

Syllabus Mapping: GS-III: Environmental Pollution | Waste Management | Circular Economy | Climate Change | Sustainable Development

- **Life Cycle Assessment (LCA)** is a systematic method for assessing the **environmental impacts of a product, process or system across its entire life cycle**, rather than examining only one stage.
- In **Solid Waste Management (SWM)**, the LCA framework enables comparison of different waste-management pathways such as **recycling, composting, anaerobic digestion, waste-to-energy and landfilling**.
- The framework considers emissions and environmental impacts associated with the **collection, transportation, treatment, processing and final disposal** of waste.
- The framework can account for both **direct emissions and avoided emissions**; for example, recycling or energy recovery may avoid emissions associated with production of virgin materials or conventional energy.
- The **GHG Calculator** is a digital tool developed under the project to **quantify greenhouse-gas emissions associated with specific SWM technologies and operating scenarios**.
- It provides estimates of **net emissions, avoided emissions, logistics-related emissions and overall carbon footprint**, along with emissions of **methane, carbon dioxide, NO_x and black carbon**.
- The calculator covers **anaerobic digestion, incineration/waste-to-energy, composting, recycling and landfilling**, allowing ULBs to compare different waste-management scenarios.
- The tools enable **Urban Local Bodies (ULBs)** to select and plan comparatively **low-carbon waste-management pathways** and assess proposed projects/Detailed Project Reports (DPRs).

70. Skills4Future: EV & Green Skills Lab

Syllabus Mapping: GS-III: Skill Development | Electric Vehicles | Green Economy | Employment | Sustainable Mobility

- **Skills4Future** is a collaborative green-skilling initiative of **Shell India, Directorate General of Training (DGT), Ministry of Skill Development & Entrepreneurship (MSDE)** and **Edunet Foundation**.
- The programme focuses on **industry-aligned vocational training** in **Electric Vehicle (EV) technologies, battery systems, diagnostics, safety and other green technologies**.
- The **EV & Green Skills Lab at NSTI Bengaluru** provides hands-on training infrastructure, linking vocational education with emerging employment opportunities in **e-mobility and clean energy**.
- The programme has reached **290+ institutes across five States**, trained **70,000+ learners**, upskilled **258+ faculty members** and established **20 Green Skills EV Labs**.
- In **Karnataka**, Skills4Future has covered **101 Industrial Training Institutes (ITIs)** and trained **9,113 students**, strengthening the State's green-skills ecosystem.
- **National Skill Training Institutes (NSTIs)** function under the **Directorate General of Training (DGT), MSDE** and provide advanced vocational training and instructor-training facilities.
- The initiative addresses the **green-skills gap** by combining **industry participation + practical training + updated curriculum**, helping align the workforce with India's transition towards green mobility.

71. Electronics Components Manufacturing Scheme (ECMS)

Syllabus Mapping: GS-III: Manufacturing | Electronics Industry | Semiconductors | Atmanirbhar Bharat | Supply-Chain Resilience

- **Electronics Components Manufacturing Scheme (ECMS)** was notified on **8 April 2025** by the **Ministry of Electronics & Information Technology (MeitY)** to promote domestic manufacturing of critical **electronic components, sub-assemblies and related inputs**.
- The scheme was initially approved with an outlay of **₹22,919 crore**, which was enhanced to **₹40,000 crore under Union Budget 2026–27**; it has a **6-year tenure with an optional 1-year gestation period**.
- ECMS targets import-dependent components such as **Printed Circuit Boards (PCBs), camera and display modules, connectors, capacitors, lithium-ion cells and rare-earth magnets**, helping increase **domestic value addition** in electronics manufacturing.
- **As of August 2026**, **106 projects across 15 States** covering **30 electronic product domains** had been approved, involving **₹69,548 crore of investment**.



- The scheme is important because India's electronics sector has grown rapidly, but **assembly-led growth without a strong component ecosystem can leave the country vulnerable to imported inputs and global supply-chain disruptions.**
- The **National Policy on Electronics (NPE) 2019** aims to make India a global hub for **Electronics System Design and Manufacturing (ESDM)**; ECMS strengthens the component-manufacturing base required for this objective.
- The **Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)** provided capital-expenditure incentives for electronic components, semiconductor/display fabrication, **Assembly, Testing, Marking and Packaging (ATMP)** units and related capital goods; ECMS builds further depth in the component ecosystem.
- **ECMS complements the Semicon India Programme: Semicon India** focuses specifically on the semiconductor ecosystem such as **fabs, packaging/testing and chip design**, whereas ECMS covers the **broader electronics component and sub-assembly ecosystem.**
- **Rare-earth magnets and lithium-ion cells** under ECMS also highlight the link between electronics manufacturing and **critical-mineral/battery supply chains**, making domestic component capacity relevant to both technological and economic security.

72 . PM Vishwakarma Scheme

Syllabus Mapping: GS-II: Welfare Schemes | Vulnerable Sections | Inclusive Growth; **GS-III:** Skill Development | MSMEs | Employment | Traditional Industries

- **PM Vishwakarma** is a **Central Sector Scheme of the Ministry of Micro, Small & Medium Enterprises (MSME)**, launched on **17 September 2023** to provide end-to-end support to traditional artisans and craftspeople working with hands and tools.
- The scheme covers **18 traditional trades** including carpenter, blacksmith, goldsmith, potter, sculptor, cobbler, mason, barber, tailor and fishing-net maker, with the objective of strengthening the **Guru-Shishya/family-based traditional skill ecosystem.**
- **Three-stage verification** is used for registration, with beneficiaries receiving recognition through a **PM Vishwakarma Certificate and ID Card**; registration is facilitated free of charge through **Common Service Centres (CSCs)** using the biometric-based portal.
- The scheme provides **Basic Training of 5–7 days and Advanced Training of 15 days or more**, along with a **₹15,000 toolkit incentive** through e-vouchers and a training stipend of **₹500 per day.**
- **Credit support:** beneficiaries can access **collateral-free enterprise-development loans up to ₹3 lakh** in two tranches—**₹1 lakh + ₹2 lakh**—at a concessional **5% interest rate**, subject to scheme conditions.
- **Digital and market support:** beneficiaries receive incentives for eligible digital transactions and **marketing support through quality certification, branding, e-commerce platforms such as GeM, trade fairs and exhibitions**, helping artisans move towards wider value chains.
- The scheme has an approved outlay of **₹13,000 crore for FY 2023–24 to FY 2027–28** and is **fully funded by the Union Government**; implementation involves **MSME, MSDE and Department of Financial Services (DFS)**, with MSME as the nodal Ministry.
- After three years, **30 lakh artisans have completed the prescribed three-stage verification and been registered**, while around **24.50 lakh** have received Basic Skill Training; **6.18 lakh** have received loans up to ₹1 lakh, amounting to **₹5,297 crore**, and **18.15 lakh toolkits** have been delivered.

73. SEMICON India 2026: India's Transition to Semicon 2.0

Syllabus Mapping: GS-III: Semiconductor Ecosystem | Electronics Manufacturing | Technology | R&D | Supply-Chain Resilience

- **SEMICON India 2026** was held at **Yashobhoomi, New Delhi, from 17–19 September 2026**, marking a shift from creating basic semiconductor capabilities to building an **integrated semiconductor ecosystem.**
- **Semicon 2.0** expands the India Semiconductor Mission across **six pillars — Design, Equipment & Materials, Fabs, Advanced Packaging, Applied R&D and Talent**, thereby covering both manufacturing and the supporting ecosystem.
- A semiconductor ecosystem cannot depend only on chip fabrication; **specialised equipment, ultra-pure chemicals, materials, packaging, design capability and skilled manpower** are equally important for supply-chain resilience.
- **Semicon 1.0 → Semicon 2.0:** Semicon 1.0 established foundational capabilities, including **70,000 trained design engineers and EDA tools across 500+ organisations**; Semicon 2.0 seeks to deepen these capabilities across the wider value chain.
- India has now moved towards **commercial semiconductor production**, with new production lines at **CDIL Semiconductor, Mohali (discrete devices)** and **Suchi Semicon, Surat (packaging)**; these take operational commercial **ATMP units to five** among the 12 units approved under Semicon 1.0.
- A **fabrication plant (Fab)** manufactures semiconductor devices on silicon wafers through processes such as deposition, lithography, etching and doping. **ATMP/OSAT** facilities undertake **Assembly, Testing, Marking and Packaging** after



fabrication. Thus, **Dholera Fab = front-end manufacturing**, while **Jagiroad OSAT = back-end packaging**, and both serve different stages of the value chain.

- **Electronic Design Automation (EDA)** refers to software tools used to **design, simulate, verify and prepare semiconductor circuits for manufacturing**. India's earlier investment in design talent and EDA access is therefore important because chip manufacturing begins with **design capability**, not directly at the fab.
- **Tata Electronics' Dholera project** represents the fabrication side, with a **300-mm fab in Gujarat**, while its **Jagiroad, Assam facility** represents the packaging side through OSAT, illustrating India's attempt to develop both ends of the manufacturing chain.

74. 17th Kathakali Festival

Syllabus Mapping: GS-I: Indian Culture | Classical Dance | Performing Arts | Cultural Heritage

- The **17th Kathakali Festival**, organised by the **Kalakshetra Foundation under the Ministry of Culture**, is being held in **Chennai from 18–20 September 2026** with the theme “**Kadha Rasa Sangama – Confluence of Essence of Stories.**”
- **Kathakali** is a classical dance-drama tradition of **Kerala**, combining **dance, drama, music, elaborate costumes and facial expressions**, with stories traditionally drawn from epics and Puranic literature.
- A key feature of Kathakali is its **highly stylised abhinaya**, particularly facial expressions and hand gestures (**mudras**) used to communicate the narrative, with comparatively limited spoken dialogue.
- Its traditional repertoire is strongly connected with the **Ramayana, Mahabharata and Puranic narratives**, while performances are characterised by distinctive **make-up, elaborate costumes, rhythmic movement and expressive acting**.
- **Kalakshetra Foundation** was established in **1936 by Rukmini Devi Arundale** and is an important institution for the preservation and dissemination of **Indian classical arts**, particularly **Bharatanatyam, music and traditional crafts**.
- Kathakali is among the major Indian classical dance traditions recognised in India's cultural tradition; unlike **Bharatanatyam**, which developed prominently in Tamil Nadu, Kathakali originated in **Kerala**.

75. Ultra High Performance Fibre Reinforced Concrete (UHPFRC) Technology

Syllabus Mapping: GS-III: Infrastructure | Construction Technology | Roads & Highways | Advanced Materials | Science & Technology

- The **Indora Chowk–Dighori Flyover in Nagpur**, constructed by **NHAI**, has used **UHPFRC technology** to enable longer spans between successive piers, reducing the number of supports and facilitating faster construction.
- **UHPFRC** is an advanced fibre-reinforced concrete with **very high strength, toughness and durability**, developed by using a dense cementitious matrix and fibre reinforcement.
- Its basic composition involves a **very dense cementitious matrix, fine aggregates, low water content and dispersed fibres**; the dense structure reduces porosity while fibres improve the behaviour of concrete under tensile and cracking stresses.
- **Why fibres?** Conventional concrete is strong in compression but relatively weak in tension; fibres **bridge cracks, control their propagation and improve tensile behaviour, toughness and ductility**.
- **High strength-to-weight ratio** allows relatively **slender and lightweight structural components** to carry high loads, making UHPFRC suitable for bridges, flyovers and other demanding infrastructure.
- **Long-span advantage:** Higher strength and crack resistance allow structural segments to span **greater distances between supports**, reducing the requirement for multiple piers.
- **Urban infrastructure advantage:** Fewer piers mean **less obstruction of roads and traffic**, making the technology particularly useful for congested urban corridors where conventional construction can create significant disruption.
- **Durability:** Its dense microstructure provides greater resistance to **water penetration, cracking and environmental deterioration**, potentially increasing service life and reducing maintenance requirements.
- **Construction advantage:** UHPFRC can be used in **prefabricated structural elements**, allowing controlled manufacturing and faster on-site assembly, thereby reducing construction time and traffic disruption.
- **Static distinction — RCC vs UHPFRC:** **Reinforced Cement Concrete (RCC)** primarily uses steel reinforcement to resist tensile stresses, while UHPFRC incorporates **fibres throughout the concrete matrix** for additional crack control, tensile performance and toughness; both can also be used together.
- **Where can it be used?** UHPFRC is particularly relevant for **bridges, flyovers, bridge decks, precast segments, rehabilitation/strengthening of structures and other structures requiring high strength with reduced structural weight**.



76. SLINEX-26: India–Sri Lanka Maritime Exercise

Syllabus Mapping: GS-II: India–Sri Lanka Relations | GS-III: Maritime Security | Defence Cooperation | Indian Ocean Region

- **SLINEX-26** is the **13th edition of the India–Sri Lanka bilateral maritime exercise**, being conducted at **Visakhapatnam from 17–21 September 2026**, with a **Harbour Phase** followed by a **Sea Phase**.
- The Indian Navy is represented by **INS Kavaratti**, an indigenous **Anti-Submarine Warfare (ASW) Corvette**, and **INS Jyoti**, a **Fleet Tanker**, while **SLNS Sindurala** represents the Sri Lanka Navy.
- **Static linkage — SLINEX:** The exercise was **conceptualised in 2005** and has evolved into a platform for **maritime cooperation, interoperability and mutual understanding** between the two navies.
- **Static linkage — Anti-Submarine Warfare:** ASW involves detecting, tracking and countering **submarines**, using capabilities such as sonar, maritime surveillance and specialised naval platforms; it is important for protecting sea lanes and naval assets.
- The **Harbour Phase** focuses on professional interactions, cross-deck visits and exchange of best practices, while the **Sea Phase** focuses on **coordinated maritime operations and operational interoperability**.

77. Pharmacovigilance, Biovigilance & National Formulary of India 2026

Syllabus Mapping: GS-II: Health | Public Health | Patient Safety | Pharmaceutical Sector | Health Governance; GS-III: Science & Technology | Biotechnology | Digital Health

- The **7th National Formulary of India (NFI) 2026** was launched by the **Ministry of Health & Family Welfare** through the **Indian Pharmacopoeia Commission (IPC)** to promote the **rational and safe use of medicines**.
- The **NFI 2026** contains **34 chapters, 20 appendices and 653 drugs**, including **42 fixed-dose combinations and 30 immunologicals**, and is also available digitally through **NFI Online**.
- The Government has approved the **Biovigilance Programme of India**, under which **IPC will monitor adverse events associated with medicines and biological products used in organ and tissue transplantation**, including products given to donors and recipients.
- India has around **1,150 Adverse Drug Reaction (ADR) Reporting Centres**, with plans to expand the reporting network to the **primary healthcare level**.
- India's contribution to the **WHO patient-safety database** has increased from **123rd position during 2009–2014 to 8th globally**, reflecting greater reporting and generation of medicine-safety data.
- The **6th National Pharmacovigilance Week (17–23 September 2026)** is being observed with the theme **“Promoting Rational Use of Medicines through Pharmacovigilance: A Step Towards Safer Healthcare.”**
- **Pharmacovigilance** is the science and activities concerned with the **detection, assessment, understanding and prevention of adverse effects or other medicine-related problems**.
- The **National Formulary of India** is a guidance document for healthcare professionals, published by **IPC since 2009**, to support **evidence-based and rational prescribing**; its linkage with the **National List of Essential Medicines (NLEM)** helps align prescribing with national health priorities.
- **IPC** is responsible for publishing the **Indian Pharmacopoeia**, India's official book of quality standards for medicines, while the **NFI** provides guidance on their **rational and safe use**.

78. Building India's Critical Minerals Recycling Ecosystem

Syllabus Mapping: GS-III: Critical Minerals | Mineral Security | Circular Economy | E-Waste Management |

- The **Ministry of Mines** organised a national seminar on **“India's Critical Minerals Recycling Ecosystem and Circular Economy”** to strengthen domestic recycling and recovery of critical minerals.
- Union Minister **G. Kishan Reddy** highlighted critical-mineral recycling as important for India's **clean-energy transition, defence preparedness, digital economy and advanced manufacturing**, and called for collaboration among government, industry, research institutions and startups.
- The seminar emphasised recovery of critical minerals from **End-of-Life (EOL) products**, responsible e-waste management, innovative technologies and greater **Jan Bhagidari**.
- The Ministry identified **e-waste, industrial waste and other EOL materials as secondary sources** of critical minerals, which can improve resource efficiency and reduce dependence on primary mineral sources.
- The Minister launched the **Concept Paper on Critical Mineral Recycling Ecosystem**, focusing on **secondary-resource recovery, resource efficiency and a circular and self-reliant recycling ecosystem**.
- The Ministry is promoting responsible e-waste disposal and its channelisation into the **formal recycling ecosystem** under **Special Campaign 6.0 and Swachhata Hi Seva**.



- India identified **30 critical minerals in 2023** based primarily on their **economic importance and supply risk**, covering minerals important for sectors such as **clean energy, electronics, semiconductors, defence and advanced manufacturing**.
- Important Indian critical minerals include **lithium, cobalt, nickel, graphite, copper, gallium, germanium, indium, tungsten, platinum-group elements and rare earth elements**; their applications span batteries, semiconductors, electronics, magnets and defence technologies.
- **Critical minerals and rare earth elements are not synonymous**: critical minerals are identified according to their **strategic/economic importance and supply vulnerability**, whereas rare earth elements constitute a specific group of **17 elements**.
- **Urban mining** refers to recovery of valuable materials from discarded products such as **e-waste and spent batteries**, making waste streams a potential source of critical minerals.

79. India–New Zealand Free Trade Agreement (FTA)

Syllabus Mapping: GS-II: India–New Zealand Relations | Bilateral Trade | International Agreements

- The **India–New Zealand FTA** will enter into force on **20 October 2026** after completion of internal processes; it was signed on **27 April 2026** in New Delhi, and the New Zealand Parliament passed the implementing legislation on **16 September 2026**.
- The FTA provides **duty-free access from day one for 100% of India's exports to New Zealand**, including textiles and apparel, leather and footwear, gems and jewellery, engineering goods and processed foods, where New Zealand's tariffs were as high as **10%**.
- Indian manufacturers will also receive tariff-free access to selected **industrial inputs**, including **wooden logs, coking coal and metal scrap**, improving input competitiveness.
- India has protected sensitive agricultural interests by excluding **dairy, most animal meat except sheep, key agricultural commodities, sugar and edible oils** from tariff concessions.
- New Zealand's **apples, kiwifruit and Manuka honey** will receive calibrated access through **Tariff Rate Quotas (TRQs), Minimum Import Price and seasonal import windows**, along with safeguards for domestic farmers.
- The agreement establishes an **Agriculture Productivity Partnership**, with dedicated action plans and proposed Centres of Excellence covering orchard management, post-harvest practices, supply chains, food safety and sustainable beekeeping.
- The agreement provides mobility opportunities through **5,000 Temporary Employment Entry visas** for skilled Indians and **1,000 Working Holiday visas annually** for young Indians, along with student mobility and post-study work rights of up to **3 years for STEM graduates and 4 years for doctoral scholars**.
- Indian pharmaceutical and medical-device exporters will benefit from New Zealand accepting inspection approvals from regulators including the **US FDA, EMA, UK MHRA and Health Canada**, potentially reducing regulatory delays for market entry.
- India and New Zealand also announced a **Strategic Partnership and India–New Zealand Strategic Partnership: Roadmap to 2030**, with an aspirational goal of doubling bilateral two-way trade in goods and services to **NZ\$7 billion by 2030**; bilateral merchandise trade was around **USD 1.1 billion in 2025–26**.
- An **FTA (Free Trade Agreement)** is a reciprocal trade agreement under which participating countries provide preferential market access by reducing or eliminating tariffs and other trade barriers on agreed products/services; it is different from a **customs union**, where members also adopt a common external tariff.
- **Tariff Rate Quota (TRQ)** combines two instruments: a specified quantity of imports receives a **lower/preferential tariff**, while imports beyond the quota may face a higher tariff; therefore, TRQs provide controlled rather than unlimited market access.

80. PM-SETU

Syllabus Mapping: GS-II: Skill Development | Employment | Inclusive Growth; GS-III: Human Capital | Manufacturing & Industry | Emerging Technologies | Vocational Education

- The **National Steering Committee (NSC) of MSDE** approved a **₹320 crore Strategic Investment Plan (SIP)** for the **Kurukshetra ITI Cluster, Haryana** under PM-SETU, with **Jindal Naveen Avsar Limited** as the Anchor Industry Partner.
- With this approval, cumulative PM-SETU investment has reached **₹2,491 crore across 10 ITI clusters**, aimed at transforming Government ITIs into **modern, industry-led and future-ready centres of excellence**.



- **PM-SETU** stands for **Pradhan Mantri Skilling and Employability Transformation through Upgraded ITIs** and is a flagship initiative of the **Ministry of Skill Development and Entrepreneurship (MSDE)** focused on upgrading Government ITIs with modern infrastructure and industry-aligned vocational training.
- The **ITI system** provides vocational training through trades designed to develop practical technical skills; it is therefore distinct from conventional academic higher education and is closely linked to **employability, apprenticeships and industrial workforce requirements**.
- The **Hub-and-Spoke model** concentrates advanced infrastructure and specialised training facilities at selected **Hub ITIs**, while **Spoke ITIs** are connected to and supported by the Hub, allowing infrastructure and expertise to be shared across multiple institutions.
- **NSTIs** are institutions under the **Directorate General of Training (DGT), MSDE**, providing advanced skill training and particularly important **instructor-training/Training of Trainers** functions within India's vocational-training ecosystem.
- **Apprenticeship** provides structured workplace-based practical training alongside institutional instruction, making industry participation important for reducing the **skill-job mismatch** and improving transition from training to employment.

81. Exercise NOMADIC ELEPHANT 2026

Syllabus Mapping: **GS-II:** India–Mongolia Relations | Bilateral Defence Cooperation; **GS-III:** Defence Exercises

- The **18th edition of Exercise NOMADIC ELEPHANT** commenced at the **Foreign Training Node, Pithoragarh, Uttarakhand**, and is being conducted from **21 September to 3 October 2026**.
- It is an **annual platoon-level bilateral military exercise** between the **Indian Army and Mongolian Armed Forces**, conducted **alternately in India and Mongolia**; the previous edition was held at **Ulaanbaatar in May–June 2025**.
- Both sides are represented by **45 personnel each**, with the exercise focused on enhancing joint capability for **Counter-Insurgency (CI) Operations in semi-urban and mountainous terrain under a UN mandate**.
- Training includes **Cordon and Search Operations, Room Intervention Drills, Special Heliborne Operations, Cyber Security Training, drones and counter-drone systems**, along with tactical-level operational drills.

82. Project Rhino & Greater One-Horned Rhinoceros

Syllabus Mapping: **GS-III:** Biodiversity & Conservation | Wildlife Protection | Species Recovery | Human–Wildlife Management

- On **World Rhino Day (22 September)**, the Prime Minister highlighted conservation efforts for the **Greater One-Horned Rhinoceros**, noting that **Assam holds nearly 80% of the world's rhino population**.
- **Kaziranga** has been highlighted for its efforts to control **rhino poaching**, while rhino populations have also been protected or restored in parts of **Bihar and West Bengal**.
- The successful **reintroduction of rhinos in Dudhwa, Uttar Pradesh** was highlighted as an example of active wildlife management and species recovery.
- **Project Rhino** has been initiated to provide **financial and technical support to rhino range states for protection, habitat management, genetic improvement and understanding population dynamics**.
- The **Greater One-Horned Rhinoceros (*Rhinoceros unicornis*)** is native to the **Indian subcontinent** and is distinguished by its single horn and characteristic skin folds giving it an armour-plated appearance.
- In India, the species is primarily associated with **Assam, West Bengal and Uttar Pradesh**, making these important rhino-range states; **Kaziranga National Park** is the major stronghold.
- **Kaziranga National Park, Assam**, is a **UNESCO World Heritage Site** and is located in the **Brahmaputra floodplain**, providing extensive grassland and wetland habitats favourable to the greater one-horned rhinoceros.
- **Dudhwa National Park, Uttar Pradesh**, forms part of the **Dudhwa Tiger Reserve** and is an important protected landscape for Terai biodiversity; rhino reintroduction there represents a species-recovery approach beyond its major Assam stronghold.
- The species is listed as **Vulnerable on the IUCN Red List** and is included in **CITES Appendix I**, placing international trade in the species under the strictest CITES controls.
- India's earlier rhino-conservation efforts include the **Indian Rhino Vision 2020 (IRV 2020)**, which focused on increasing rhino numbers and expanding their distribution through population management and translocation; **Project Rhino 2026** represents a newer national support framework.
- **Genetic improvement and population dynamics**, specifically mentioned under Project Rhino, are important because long-term species conservation requires not only increasing numbers but also maintaining **genetic diversity, viable populations and scientifically monitored population trends**.



83. India Cine Hub (ICH)

Syllabus Mapping: GS-III: Media & Entertainment Industry | Digital Infrastructure | Ease of Doing Business | Creative Economy

- **India Cine Hub (ICH)** is a **digital single-window platform** for streamlining film-shooting permissions across India, managed by the **National Film Development Corporation of India (NFDC)**.
- ICH consolidates coordination for **state approvals, police clearances, filming permissions, co-production applications and film-visa facilitation**, reducing the bureaucratic friction involved in shooting across multiple jurisdictions.
- International creators can use the platform for **filming permissions and Film Visa facilitation**, while the portal also provides guidelines relating to **aerial filming, animal filming, forests and filming at monuments**.
- The platform provides a **GIS-based location directory** containing information on filming locations, relevant permit authorities and filming hubs, while also listing verified local vendors such as **studios, equipment rentals, casting agencies, accommodation, medical and security services**.
- ICH is being expanded beyond film permissions to support **Live Event Permissions** through the **Live Events Development Cell (LEDC)**, using venue mapping to route applications to relevant authorities; **9 premier venues** have already been onboarded.
- The platform also supports **co-production applications** and provides information on relevant co-production arrangements, helping facilitate international collaboration in film production.
- **NFDC** is a Government of India organisation under the **Ministry of Information & Broadcasting** and has a mandate covering promotion and development of Indian cinema; it also organises/hosts **Film Bazaar India** alongside the **International Film Festival of India (IFFI)**, Goa.

84. Dadasaheb Phalke Award

Syllabus Mapping: GS-I: Indian Culture | Indian Cinema | Art & Culture | Cultural Heritage

- The **President of India** conferred the **72nd National Film Awards** at **Ekta Nagar, Gujarat**, marking the first time the ceremony was held outside Delhi as part of an effort to take the awards to important tourist destinations across States and UTs.
- **Anant Nag** received the **Dadasaheb Phalke Award 2024** for his distinguished contribution to theatre and cinema.
- The 72nd National Film Awards received **400 Feature Films across 34 languages** and **161 Non-Feature Films across 24 languages**, with **22 Feature Film and 23 Non-Feature Film awards** conferred.
- The awards highlighted India's **linguistic diversity**, with recognition extending beyond the languages listed in the Eighth Schedule through awards for **Garhwali and Tulu cinema**; a **Santhali film, Angen**, also received the Best Debut Film of a Director award.
- The President also emphasised **social security and dignity for workers, assistants, small artists and other vulnerable members of the creative economy**, and called for greater women's participation in award juries.
- The **National Film Awards** are India's national-level awards for excellence in Indian cinema and are administered by the **Ministry of Information & Broadcasting**; they recognise both **Feature and Non-Feature Films** as well as various individual contributions.
- The **Dadasaheb Phalke Award** is the **highest official honour in Indian cinema** and was instituted in **1969** in memory of **Dhundiraj Govind Phalke**, popularly known as **Dadasaheb Phalke**.
- **Dadasaheb Phalke** is widely regarded as the **Father of Indian Cinema** and directed **Raja Harishchandra (1913)**, regarded as India's first full-length Indian feature film.
- The award was instituted on the **centenary of Dadasaheb Phalke's birth**, and the **first recipient was Devika Rani in 1969**.
- The award is conferred **annually by the Government of India** for an individual's **outstanding contribution to the growth and development of Indian cinema**.
- The **Dadasaheb Phalke Award** is **separate from the National Film Awards**, although it is presented as part of the National Film Awards ceremony; the former recognises **lifetime contribution**, while the latter cover competitive categories for films and individual artistic/technical achievements.

85. Exercise Veer Guardian 2026

Syllabus Mapping: GS-II: India-Japan Relations | Strategic Partnership; GS-III: Defence Cooperation | Military Exercises

- **Exercise Veer Guardian 2026**, the bilateral air exercise between the **Indian Air Force (IAF)** and **Japan Air Self-Defense Force (JASDF)**, concluded at **Air Force Station Jodhpur on 22 September 2026** after **14 days** of joint training.
- The IAF participated with **Su-30 MKI, Rafale and indigenous LCA Tejas**, while the JASDF participated with **F-2A fighter aircraft**.



- The exercise included advanced flying missions involving **Within Visual Range (WVR) combat and coordinated multi-aircraft operations**, strengthening operational interoperability between the two air forces.
- **Within Visual Range (WVR) combat** refers to aerial combat where opposing aircraft are within visual range, involving manoeuvring and short-range engagement concepts; it differs from **Beyond Visual Range (BVR) combat**, which relies more heavily on sensors, networking and long-range weapons.

86. Sustainable Urban River Management (SURM) Framework & AI/ML-based Reservoir Sediment Management

Syllabus Mapping: GS-III: Water Resources | River Management | AI in Governance | Climate-Resilient Infrastructure

- The **9th India International Water Week (IIWW) 2026** was inaugurated by Vice-President C. P. Radhakrishnan at **Bharat Mandapam, New Delhi**, and is being held from **22–26 September 2026** with the theme “**Climate Resilient Water Management**.”
- The Vice-President emphasised **judicious use, conservation and integrated management of water resources**, highlighting the growing complexity created by **climate change, urbanisation and population growth**.
- He highlighted the need for an integrated approach combining **river-basin management, groundwater recharge, rainwater harvesting and efficient irrigation**, along with greater **recycling and reuse of water**.
- The Vice-President called for greater **inter-State cooperation** on water-sharing issues and highlighted **10 inter-State MoUs** for water sharing, including the **Kishau Multipurpose Project agreement involving six States**.
- Two technology-oriented initiatives were launched at IIWW 2026: the **Sustainable Urban River Management (SURM) Framework** and **AI/ML-driven Integrated Reservoir Sediment Management**.
- The **SURM Framework** focuses on improving the management of **urban rivers** through a more integrated and sustainable approach, particularly relevant as urbanisation increases pressure on river systems.
- The framework aligns with the broader emphasis of IIWW 2026 on **climate-resilient water management**, requiring urban river management to address changing hydrological conditions and increasing human pressures.
- **AI/ML-driven Integrated Reservoir Sediment Management** uses **Artificial Intelligence and Machine Learning** for technology-enabled management of sediment in reservoirs, supporting more informed and predictive reservoir-management decisions.
- Reservoir sedimentation is important because accumulated **sediment occupies reservoir storage space**, gradually reducing the effective capacity available for water storage and potentially affecting the long-term performance of reservoirs.
- The AI/ML approach represents a shift from **reactive sediment management towards predictive management**, where data-driven tools can help understand sediment accumulation and support timely management interventions.

87. Tokay Gecko Trafficking

Syllabus Mapping: GS-III: Biodiversity & Wildlife Conservation | Wildlife Trafficking | CITES | Environmental Governance

- The **Directorate of Revenue Intelligence (DRI)** seized **86 live Tokay Geckos** at **Mariani, Assam**, on **22 September 2026**, acting on intelligence regarding an illegal wildlife-trade deal, and arrested two persons.
- The Tokay Geckos were seized under the **Wildlife (Protection) Act, 1972** and handed over along with the apprehended persons to the **Mariani Range Forest Office, Assam** for further action.
- The **Tokay Gecko** is listed under **Schedule I of the Wildlife (Protection) Act, 1972** and **Appendix II of CITES**, thereby providing domestic legal protection and regulating its international trade.
- **Tokay Gecko (Gekko gekko)** is a large, predominantly nocturnal gecko recognised by its characteristic **bluish-grey body with orange/red spots** and loud call, and is native to parts of **South and Southeast Asia**.
- **CITES Appendix I vs II:** Appendix I covers species threatened with extinction for which **commercial international trade is generally prohibited**, whereas Appendix II covers species for which trade is permitted but **controlled through a permitting system**.
- **DRI** functions under the **Central Board of Indirect Taxes and Customs (CBIC), Ministry of Finance** and primarily investigates organised **smuggling and customs-related offences**, including illicit movement of wildlife and other restricted goods across India's borders.

88. National Rainfed Area Authority (NRAA) & REWARD Programme

Syllabus Mapping: GS-III: Rainfed Agriculture | Watershed Management | Sustainable Agriculture | Climate-Resilient Agriculture

- The **National Rainfed Area Authority (NRAA), Ministry of Agriculture & Farmers Welfare**, organised a **National Level Technical Committee (NLTC)** meeting on **22 September 2026** under the **REWARD programme** to strengthen watershed development and management.



- The meeting focused on validating the **National Technical Guidelines (NTG)** using field data generated through REWARD and developing a scientific framework for **future-generation watershed development**.
- **NRAA** emphasised that Odisha and Karnataka should share watershed data and **Decision Support Systems (DSS)** with stakeholders and technical partners for analysis, reporting and validation of the guidelines.
- **ICAR** stressed integration of **Land Resource Inventory (LRI) with hydrology**, enabling watershed planning to consider both the characteristics of land/soil and the movement and availability of water.
- The **National Rainfed Area Authority (NRAA)** is an apex institution concerned with **rainfed areas and watershed-based development**, particularly through technical and policy support for improving productivity and resilience in rain-dependent regions.
- NRAA's significance arises from India's large **rainfed agricultural area**, where agricultural production is highly dependent on rainfall and is therefore vulnerable to **rainfall variability, drought, soil degradation and water scarcity**.
- Its approach is **watershed-based rather than crop-only**, integrating **soil, water, land, vegetation and agricultural management** so that rainwater and other natural resources are conserved and used more efficiently.
- **REWARD — Rejuvenating Watersheds for Agricultural Resilience through Innovative Development** complements this role by promoting **data-driven watershed planning, modern technologies, scientific guidelines and institutional capacity**, particularly for climate-resilient agriculture.

89 . Ayushman Bharat & Universal Health Coverage

Syllabus Mapping: GS-II: Health | Universal Health Coverage | Social Justice | Digital Health | Public Health Infrastructure

- **Ayushman Bharat PM-JAY**, launched on **23 September 2018**, is a public health assurance scheme providing **cashless secondary and tertiary hospitalisation cover of up to ₹5 lakh per family per year** to eligible beneficiaries; by September 2026, over **48.51 crore Ayushman cards** had been issued, covering about **33% of India's population**.
- As of **31 August 2026**, PM-JAY had financed around **13.25 crore hospital admissions worth ₹2.03 lakh crore** through **38,000+ empanelled public and private hospitals**, strengthening financial protection against catastrophic medical expenditure.
- PM-JAY provides cashless treatment for **1,961 procedures across 27 medical specialties** and has been progressively expanded to vulnerable groups, including **ASHAs, Anganwadi Workers/Helpers** and, since September 2024, **all senior citizens aged 70 years and above**.
- PM-JAY follows a **Centrally Sponsored Scheme** funding pattern of **60:40** for most States, **90:10** for specified North-Eastern States, Himachal Pradesh, Uttarakhand and J&K, **100% Central funding for UTs without legislature**, and **60:40 for UTs with legislature**; the Union Budget allocation for 2026–27 is **₹9,500 crore**.
- **Ayushman Arogya Mandirs (AAMs)** form the **primary-care pillar** of Ayushman Bharat by upgrading frontline health facilities with human resources, essential medicines, diagnostics and IT systems, while expanding services to **NCDs, oral/eye/ENT care, mental health and first-level emergency/trauma care**.
- **PM-Ayushman Bharat Health Infrastructure Mission (PM-ABHIM)**, launched on **25 October 2021**, complements PM-JAY by strengthening health infrastructure, disease surveillance and health research, with an outlay of **₹64,180 crore for 2021–26**.
- **Universal Health Coverage (UHC)** means ensuring that people can access the health services they need **without financial hardship**; therefore, Ayushman Bharat combines financial protection, primary healthcare, digital health infrastructure and physical health-system capacity.
- **ABHA is a digital health identity, not health insurance**; it enables interoperable linking and access to health records, while PM-JAY provides the financial protection component for eligible beneficiaries.

90. WTO Agreement on Fisheries Subsidies (AFS)

Syllabus Mapping: GS-II: International Institutions | WTO | GS-III: Fisheries | Blue Economy | Sustainable Resource Management |

- The **Centre for Trade and Investment Law (CTIL)**, IIFT organised a webinar on the **WTO Agreement on Fisheries Subsidies (AFS)** on 21 September 2026, following **India's ratification of the Agreement on 20 July 2026**.
- The **AFS was adopted at the WTO's 12th Ministerial Conference (MC12) in 2022** and establishes disciplines on certain fisheries subsidies that contribute to harmful fishing practices.
- The Agreement disciplines subsidies linked to **Illegal, Unreported and Unregulated (IUU) fishing**, fishing of **overfished stocks subject to specified rebuilding conditions**, and fishing on the **unregulated high seas**.
- Members accepting the Agreement have to establish measures for its **domestic implementation and administration**, along with **notification and transparency requirements**, making reliable fisheries data, monitoring and reporting systems important.



- **Special and Differential Treatment (S&DT)** remains important for developing and least-developed countries because implementation involves financial, technical and institutional capacities, while fisheries also support **livelihoods and food security**.
- The AFS does not end WTO negotiations on fisheries subsidies; Members continue negotiations on additional disciplines concerning **fisheries overcapacity and overfishing**, which are related but distinct issues.
- The discussions also emphasised the position of **small-scale and artisanal fisheries**, where sustainability measures need to be considered alongside livelihood, food-security and developmental concerns.
- **IUU fishing** refers to fishing conducted illegally, without reporting or contrary to applicable conservation and management measures; combating it requires vessel identification, registration, monitoring, reporting and enforcement.
- **Overfishing and overcapacity are different**: overfishing concerns harvesting fish stocks beyond sustainable levels, whereas overcapacity refers to fishing capacity being greater than what available fish resources can sustainably support.
- **Unregulated high seas** are relevant because areas beyond national jurisdiction cannot be managed solely through the laws of individual coastal States, making international cooperation and fisheries-management organisations important.

91. Sodium Benzoate & Phenoxyethanol: Mechanism of Antibacterial Action

Syllabus Mapping: GS-III: Science & Technology | Biotechnology | Food & Pharmaceutical Technology | Antimicrobial Resistance

- Researchers at **Institute of Nano Science & Technology (INST), Mohali**, an autonomous institute under the **Department of Science & Technology**, in collaboration with **Unilever R&D Bengaluru**, have elucidated how **Sodium Benzoate (SB)** and **Phenoxyethanol (POE)** inactivate bacteria.
- The study used **Transmission Electron Microscopy (TEM)** along with biochemical analyses to investigate the response of **Gram-positive *Staphylococcus aureus*** and **Gram-negative *Pseudomonas aeruginosa*** to the preservatives.
- The study revealed a **multi-target mechanism** in which preservatives damage the bacterial **cell envelope** while also causing accumulation of **reactive aldehydes and oxygen-derived species**, disrupting proteins, genetic material and other essential cellular functions.
- **Sodium benzoate** caused **cellular shrinkage and collapse**, whereas **phenoxyethanol** produced **membrane expansion followed by rupture**, indicating distinct pathways of bacterial inactivation.
- Sodium benzoate showed approximately **16-fold higher antibacterial activity under acidic conditions**, while phenoxyethanol maintained relatively consistent efficacy across a wider pH range, providing a basis for selecting preservatives according to formulation conditions.
- The researchers used **inhibition-zone and MIC assays** to assess antimicrobial effectiveness, **TEM** to observe structural changes, dye-leakage tests to detect membrane damage, and **MBTH/DCFDA assays** to examine intracellular biochemical changes.
- The findings can help industry optimise **preservative selection and concentration** according to product formulation, potentially reducing microbial spoilage, product wastage and unnecessary preservative use.
- **Sodium benzoate** has been used in foods such as pickles, ketchup and carbonated beverages since the early 20th century, while **phenoxyethanol** is widely used in products such as shampoos, moisturisers, sunscreens and some vaccines.
- **Gram-positive vs Gram-negative bacteria**: *S. aureus* is Gram-positive and has a thick **peptidoglycan cell wall**, whereas *P. aeruginosa* is Gram-negative and has a thinner peptidoglycan layer plus an additional **outer membrane**, influencing interactions with antimicrobial agents.
- **MIC (Minimum Inhibitory Concentration)** is the lowest concentration of an antimicrobial agent that prevents visible microbial growth under specified conditions, whereas an **inhibition zone** measures the clear area around an antimicrobial agent in a culture medium.

92. 20 mK Dilution Refrigerator for Quantum Applications

Syllabus Mapping: GS-III: Science & Technology | Quantum Technology | Emerging Technologies | Defence Technology |

- Under the **Technology Development Fund (TDF) scheme**, DRDO signed its **first high-value deep-tech project agreement** with Rajasthan-based start-up **Zero mK India Pvt. Ltd.** for indigenous development of a **20 mK Dilution Refrigerator** for quantum applications.
- The project is the **first high-value agreement under the ₹500 crore corpus** approved for deep-tech and cutting-edge projects, marking greater participation of Indian start-ups in strategic technology development.
- A **Dilution Refrigerator** is a specialised **cryogenic system** capable of achieving temperatures in the **millikelvin range**; the 20 mK-class system will provide the ultra-low-temperature environment required by several quantum-computing platforms and associated technologies.
- The project aims to develop this cryogenic capability **indigenously**, reducing dependence on imported specialised infrastructure and strengthening India's domestic ecosystem for **quantum technology and advanced cryogenics**.



- The project aligns with the **National Quantum Mission (NQM)** and is intended to contribute to a **quantum-ready and self-reliant ecosystem**, particularly in strategic and emerging technologies.
- The project is being **monitored, mentored and supported by DRDO's Solid State Physics Laboratory (SSPL)**, with participation from DRDO's relevant technology and computational-system divisions.
- **Dilution refrigeration** achieves ultra-low temperatures by exploiting the thermodynamic properties of a mixture of **helium-3 (^3He) and helium-4 (^4He)**; at very low temperatures, the two isotopes separate into different phases, enabling continuous cooling.
- The **millikelvin (mK) range** is extremely close to absolute zero: **0 K = -273.15°C** , while **20 mK = 0.020 K**, or approximately **-273.13°C** .
- Such ultra-low temperatures are important for **superconducting quantum computers**, where cooling suppresses thermal disturbances and helps maintain fragile quantum states (**qubits**) required for quantum operations.
- **Cryogenics** deals with the production and behaviour of materials and systems at very low temperatures; advanced cryogenic infrastructure is therefore an enabling technology for quantum computing, superconductivity and certain sensitive scientific instruments.

93. Nidhi Companies – MCA Advisory

Syllabus Mapping: GS-III: Indian Economy | Financial Sector | Banking & Financial Regulation | Investor Protection

- The **Ministry of Corporate Affairs (MCA)** has cautioned the public against **Nidhi Companies promising unusually high returns**, advising investors to independently verify whether a company has been officially declared/recognised as a Nidhi before depositing money.
- Every company seeking to function as a **Nidhi** is required to file **Form NDH-4** for being declared/updated as a Nidhi, and MCA observed that several companies have either not filed NDH-4 within the prescribed period or are not fully complying with applicable provisions.
- Only **395 companies** have been declared as Nidhis by the Central Government under the applicable provisions as of the advisory, highlighting the need to distinguish officially declared Nidhis from companies merely functioning or presenting themselves as Nidhis.
- **Deposits accepted by Nidhi Companies are not insured by the DICGC**, meaning depositors do not receive the protection available under the deposit-insurance framework if the company fails or fraud occurs.
- Nidhi Companies are **mutual-benefit companies regulated by MCA** under the **Companies Act, 2013 and Nidhi Rules, 2014**, and their core function is to accept deposits from and provide loans to **their members**.
- MCA advised the public not to rely solely on agents' assurances or unusually high-return promises and to verify the company's Nidhi status and carefully examine the **terms and conditions** before making financial decisions.
- A **Nidhi Company** is a mutual-benefit entity whose principal objective is to cultivate the habit of thrift and savings among its members and provide financial accommodation to members; unlike a bank, its deposit-taking and lending are restricted to its **members**.
- Under the **Companies Act, 1956**, Nidhis were declared under **Section 620A**; under the Companies Act, 2013, the relevant provision is **Section 406**, with detailed operational requirements prescribed through the **Nidhi Rules, 2014**.
- The **2019 amendments** to Section 406 and the Nidhi Rules reintroduced the requirement of **Central Government declaration** for a company to function as a Nidhi, making the **NDH-4 filing** an important regulatory compliance requirement.
- **DICGC deposit insurance applies to deposits with insured banks subject to the applicable framework; Nidhi Company deposits are outside this protection**, making it important to distinguish a Nidhi from a bank while evaluating deposit safety.
- The Nidhi framework is based on **member-to-member financial activity**, whereas banks operate within the broader banking regulatory framework and can accept deposits and provide credit to customers beyond a closed membership structure.

94. India–Netherlands Strategic Partnership on Water- Kalpasar Project

Syllabus Mapping: GS-III: Water Resources | Water Security | Climate-Resilient Development | Environmental Management

- On the sidelines of the **9th India International Water Week (IIWW) 2026**, India and the **Netherlands** reviewed their Strategic Partnership on Water, with particular focus on technical cooperation for the **Kalpasar Project in Gujarat**.
- Two **Tripartite MoUs** were signed among the **Central Water Commission (CWC)**, **Kalpasar Department of Gujarat**, and Dutch knowledge institutions **Deltares and TU Delft** for technical cooperation, knowledge transfer and capacity building.
- The **Kalpasar Project** envisages creation of a **freshwater reservoir** using runoff from the **Sabarmati, Mahi and Dhadhar rivers**, supplemented by water conveyed from the **Narmada River**.



- Dutch expertise will support areas including **hydraulic and hydrological modelling, coastal and structural engineering, climate resilience, sluice and pumping systems, dyke technologies, ecological solutions, digital applications and capacity building.**
- During an Indian delegation's visit to the Netherlands in July 2026, India gained technical insights into **flood protection, coastal infrastructure and water-management technologies**, with the Dutch **Afsluitdijk** providing a relevant engineering and water-management reference.
- The cooperation also emphasises **ecological considerations and fish migration**, highlighting the need to integrate environmental concerns with large-scale water and coastal infrastructure.
- **Afsluitdijk** is a major Dutch water-management structure separating the **Wadden Sea from the IJsselmeer**, demonstrating the Netherlands' long experience in flood protection, coastal engineering and management of water levels.

95. Exercise VARUNA 2026 – India–France Maritime Cooperation

Syllabus Mapping: GS-II: Bilateral Defence Cooperation; GS-III: Maritime Security | Defence Exercises | Indian Ocean Region

- **INS Trishul** arrived at **Toulon, France, on 22 September 2026** to participate in the **24th edition of Exercise VARUNA**, the bilateral maritime exercise between the **Indian Navy and French Navy**.
- VARUNA 2026 will include both **harbour and sea-phase engagements**, including cross-deck visits, operational interactions and sporting activities, providing opportunities for both navies to exchange experiences and best practices.
- The exercise aims to enhance **interoperability and mutual understanding** through professional interactions and coordinated maritime activities, strengthening the operational relationship between the **two navies**.
- The participation of INS Trishul reflects the **expanding India–France maritime partnership** and the growing scope of bilateral naval cooperation.
- **Interoperability** refers to the ability of forces from different countries to operate together effectively through compatible procedures, communication, coordination and operational practices.
- **Cross-deck visits** involve personnel from one navy visiting another navy's ship, facilitating professional interaction, exchange of operational practices and mutual familiarisation.

96. Bio-based Biodegradable Plastic under BioE3

Syllabus Mapping: GS-III: Biotechnology | Bioeconomy | Biomanufacturing | Waste-to-Wealth | Environmental Sustainability

- The Government has formally launched the **commercial use of bio-based biodegradable plastic based on Polylactic Acid (PLA)** under the **BioE3 framework**, marking a move towards sustainable, biotechnology-driven manufacturing.
- **Balrampur Chini Mills Limited (BCML)** is developing the initiative with a **₹75 crore grant from BIRAC under the Department of Biotechnology (DBT)** for a **100 TPA pilot-scale R&D facility** for PLA and co-polymers at its integrated manufacturing complex in **Kumbhi, Uttar Pradesh**.
- The pilot facility will focus on developing **specialised PLA grades and advanced PLA co-polymers** for high-value applications and generate techno-economic data, process know-how and product-validation capabilities required for subsequent commercial-scale production.
- The project creates a pathway from **renewable sugar-based feedstock → lactic acid → PLA/biopolymers**, demonstrating how agricultural resources such as **sugarcane can be diversified from food/industrial use towards sustainable materials**.
- The facility is intended to accelerate **technology indigenisation and scale-up**, while strengthening collaboration between **industry, academia and research institutions** and providing a platform for skilled manpower development.
- **PLA (Polylactic Acid)** is a bio-based polymer generally produced from renewable carbohydrate-rich feedstocks through fermentation to produce **lactic acid**, followed by polymerisation; it can be used to manufacture various plastic and packaging materials.
- **BioE3** stands for **Biotechnology for Economy, Environment & Employment** and provides a policy framework for accelerating India's **biomanufacturing capabilities**, linking biotechnology with economic growth, environmental sustainability and employment generation.

97. DDU-GKY 2.0: Skill Training for Rural Youth

Syllabus Mapping: GS-II: Government Schemes | Rural Development | Social Justice | Inclusive Growth; GS-III: Skill Development | Employment | Human Capital | Rural Economy

- The **Ministry of Rural Development** is set to commence **DDU-GKY 2.0** training batches across most States/UTs from **October 2026**, with around **70,000 rural youth** expected to begin training through **2,015 batches across 24 States/UTs**.



- **DDU-GKY (Deen Dayal Upadhyaya–Grameen Kaushalya Yojana)** is the rural-focused skilling component under the **National Rural Livelihoods Mission (NRLM) framework**, aimed particularly at poor rural youth and employment-oriented skill development.
- Under DDU-GKY 2.0, **5.6 lakh training targets** covering **1,200+ projects** have already been allocated to **Project Implementation Agencies (PIAs)** by 24 States/UTs, while other States are at advanced stages of target allocation.
- DDU-GKY 2.0 has allocated **more than 9 lakh targets across all 31 participating States/UTs** for the **2026–28 period**, making the current phase focused on scaling up placement-linked rural skilling.
- **DDU-GKY is a Centrally Sponsored Scheme** providing **placement-linked skill training to poor rural youth**, with training duration ranging from **3 to 12 months** depending on the course.
- States/UTs are responsible for mobilising eligible rural youth and organising **demand-driven, placement-linked training in PPP mode**, with courses aligned to the **National Skill Qualification Framework (NSQF)**.
- The scheme seeks to connect **skill training with sustained employability**, rather than merely providing training, by linking courses with market demand and employment opportunities.

98. Exercise TARANG SHAKTI 2026

Syllabus Mapping: GS-II: International Relations | Strategic Partnerships | Defence Diplomacy; GS-III: Defence Technology | Military Exercises | Air Power | Aerospace Security | Interoperability

- **Exercise Tarang Shakti 2026**, a **multilateral air exercise conducted by the Indian Air Force**, is being held from **26 September to 12 October 2026** with the theme **“Power in Partnership”**, emphasising interoperability and operational cooperation among participating air forces.
- The **operational phase commenced at Air Force Station Jodhpur**, with seven **Friendly Foreign Countries (FFCs)** participating: **Australia, USA, UAE, France, Germany, Sri Lanka and Bangladesh**.
- The participating foreign aircraft represent diverse air-power capabilities, including **F-35 Lightning II, Rafale, F-16, A400M, MRTT, C-130/C-130J and KC-30A**, covering combat, strategic/tactical airlift and **air-to-air refuelling** roles.
- Building on the inaugural edition in **2024**, Tarang Shakti 2026 provides opportunities for **advanced joint training, exchange of operational expertise and consolidation of professional experience** through coordinated missions with the IAF.
- The exercise focuses on **interoperability, mutual learning, aerospace safety and understanding of operational procedures**, involving not only aircrew but also **mission planners and operational support personnel**.
- Several other Friendly Foreign Countries are participating as **observers**, while the exercise also includes professional and outreach activities such as a **dedicated seminar, industrial tour, Sekhon Marathon, heritage tours and yoga sessions**.
- The industrial engagement provides foreign contingents exposure to India's **aerospace and defence ecosystem**, while the exercise allows the IAF to demonstrate its operational capabilities and growing indigenous aerospace and defence capacity.

99. India's First LNG-Diesel Dual-Fuel Train

Syllabus Mapping: GS-III: Infrastructure | Railways | Transport Infrastructure | Green Technology | Energy Efficiency | Indigenous Technology | Railway Safety

- Development projects worth **₹1,472 crore** were inaugurated at **Sabarmati Railway Station, Ahmedabad**, including the country's first **LNG-powered train** and a **WAG-12 locomotive maintenance shed**, with a focus on environmental sustainability, passenger amenities and railway safety.
- The **LNG-powered train** is an initiative towards reducing dependence on conventional diesel fuel in rail transport and promoting **lower-emission alternative fuels** in railway operations.
- The initiative is linked with the expansion of **Dedicated Freight Corridors (DFCs)**, which separate freight movement from passenger traffic on designated routes, enabling higher freight efficiency, faster movement and improved network capacity.
- A successful trial of India's first **double-stack long-haul container train** from **JNPT, Mumbai to Vadodara** was highlighted, demonstrating the potential of carrying two layers of containers on suitable freight routes and increasing freight-carrying capacity.
- Railway diesel consumption declined from **293 crore litres in 2015–16 to 108 crore litres in 2024–25**, alongside substantial expansion of railway electrification; **99.6% of the railway network is now electrified**.
- **LNG (Liquefied Natural Gas)** is natural gas cooled to approximately **–162°C**, at which it becomes a liquid and occupies much less volume, facilitating storage and transportation; it is mainly composed of methane.
- **LNG is different from hydrogen:** LNG is a natural-gas-based fossil fuel, whereas hydrogen is a separate energy carrier; therefore, an LNG-powered train should not be classified as a zero-emission hydrogen train.
- **LNG is not the same as CNG:** LNG is stored in liquid form at cryogenic temperature, whereas CNG is natural gas compressed to high pressure and stored as a gas.



- LNG is primarily **methane (CH₄)** and, compared with conventional diesel, generally produces lower emissions of **CO₂, particulate matter and SO_x** during combustion, although it remains a fossil fuel.
- LNG requires **cryogenic storage tanks** because it must be maintained at very low temperatures; therefore, LNG infrastructure involves liquefaction, cryogenic storage, transportation and regasification.

100. India's First Port-based e-Methanol Production Facility – Kandla

Syllabus Mapping: GS-III: Renewable Energy | Green Hydrogen | Decarbonisation | Maritime Transport | Biofuels | Net Zero

- **Deendayal Port Authority (DPA), Kandla, Gujarat** is establishing India's first **port-based e-methanol production facility**, with the foundation stone laid on **26 September 2026**.
- The plant will have a total capacity of **150 tonnes per day (TPD)** and will use **renewable power, water and biogenic CO₂** to produce e-methanol for use as a **green fuel in shipping**.
- The project has a total investment of **₹2,300 crore** and is being jointly implemented by **DPA and Assam Petro-Chemicals Ltd. (APCL), Namrup**.
- The project will be developed in two phases: **Phase I – 50 TPD, ₹1,200 crore, targeted January 2027; Phase II – additional 100 TPD, ₹1,100 crore, targeted March 2027**.
- The e-methanol is intended for supplying vessels operating on the **Asia–Europe International Trade Corridor**, linking green-fuel production at an Indian port directly with international maritime transport.
- The project is linked with India's **Net Zero 2070** objective and the broader goals of **energy self-reliance, Make in India and green maritime development**.
- **Methanol (CH₃OH)** is a simple alcohol that can be used as a **chemical feedstock and fuel**; its importance in shipping comes from its ability to be stored and handled as a liquid fuel under comparatively manageable conditions.
- **e-Methanol** is produced using **green hydrogen and a carbon source such as captured/biogenic CO₂**; in simplified form: **Renewable electricity → Green H₂ + CO₂ → Methanol**.
- **Green hydrogen** is produced by splitting water through electrolysis using renewable electricity; when this hydrogen is combined with CO₂ to synthesise methanol, the resulting fuel is termed **e-methanol**.
- **Biogenic CO₂** refers to CO₂ originating from biological sources or biomass-related processes; its use in e-methanol production can contribute to a lower-carbon carbon cycle compared with fossil-derived carbon sources.
- **Green methanol ≠ conventional methanol:** conventional methanol is commonly produced from fossil feedstocks such as natural gas or coal, whereas green/e-methanol uses renewable hydrogen and a lower-carbon carbon source.

101. Arogya Manthan 2026 – AB PM-JAY & ABDM

Syllabus Mapping: GS-II: Health | Universal Health Coverage | Social Justice | Government Schemes | Digital Health | Health Infrastructure | Data Governance

- **Arogya Manthan 2026**, organised by the **National Health Authority (NHA)** on 25 September 2026, marked **8 years of AB PM-JAY and 5 years of ABDM**.
- **AB PM-JAY** has covered **60+ crore beneficiaries**, facilitated **13+ crore hospital admissions** and supported treatment worth **₹2 lakh crore+**.
- The scheme has been expanded to cover **all citizens aged 70 years and above**, irrespective of socio-economic status; portability enables beneficiaries, particularly migrants, to access treatment across locations.
- **ABDM** has generated **97.8+ crore ABHA IDs**, linked **121+ crore health records**, and registered **5.6+ lakh health facilities** and around **11 lakh healthcare professionals**.
- Arogya Manthan 2026 launched the **National Healthcare Providers Registry (NHPR) Mobile App, NHCX Implementation Guide for Payers, Model Digital Health Facility Guidebook, Secure Data Environment (SDE) and Auto-Adjudication Framework for AB PM-JAY claims**.
- The **Secure Data Environment**, developed by NHA with **IISc Bengaluru**, provides an isolated environment where approved entities can analyse **de-identified health data** or execute code, with outputs reviewed before release.
- The **National Health Claims Exchange (NHCX)** seeks to connect hospitals and insurers through a common digital claims infrastructure, enabling standardised and interoperable health-insurance processes.
- **AB PM-JAY** is the **hospitalisation/health-assurance component** of Ayushman Bharat, while **ABDM** is the **digital-health infrastructure component**; the two therefore address different but complementary dimensions of healthcare.
- **Universal Health Coverage (UHC)** means that people should have access to needed quality health services **without suffering financial hardship**; PM-JAY addresses financial protection for eligible hospitalisation, while primary-care and digital-health systems support the wider continuum of care.
- **ABHA (Ayushman Bharat Health Account)** is a **digital health identity/address**, not an insurance policy; it enables an individual to link and access health records within the digital-health ecosystem.



102. PM-MKSSY (Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana)

Syllabus Mapping: GS-III: Fisheries | Blue Economy | Agriculture & Allied Activities | Government Schemes

- **PM-MKSSY (Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana)** was approved on **8 February 2024** as a **Central Sector Sub-Scheme under PMMSY**, for **FY 2023–24 to FY 2026–27**, with an estimated outlay of **₹6,000 crore**.
- The scheme seeks to address structural constraints in fisheries, particularly **informality, inadequate crop-risk mitigation, weak access to institutional finance, and gaps in safety and quality of fishery products**.
- Under **Component 1-B**, PM-MKSSY incentivises adoption of **aquaculture insurance**, with the broader objective of creating a viable market for aquaculture insurance products and encouraging insurers to develop suitable products.
- The aquaculture insurance component is particularly relevant because India's rapidly expanding aquaculture sector is exposed to **disease, summer kill, pollution, earthquakes, cyclones, floods and other natural calamities**, which can result in complete crop loss.
- India's fish production reached **19.8 million tonnes in 2024–25**, while aquaculture contributes around **74% of total fish production**, making crop-risk management increasingly important as production becomes more intensive.
- Under PM-MKSSY, the farmer receives a **one-time incentive for one crop cycle** against purchase of an aquaculture insurance policy; the incentive is routed through the **National Fisheries Digital Platform (NFDP)** and delivered through **DBT**.
- The incentive is **40% of the insurance premium**, subject to **₹25,000 per hectare of water-spread area**, with a maximum of **₹1 lakh per farmer for up to 4 hectares**.
- For intensive systems such as **cage culture, RAS, biofloc and raceways**, the incentive remains **40% of the premium**, with a maximum of **₹1 lakh** and an eligible unit size of up to **1,800 m³**.
- **SC, ST and women beneficiaries** receive an additional incentive of **10% of the incentive payable to the General Category**.
- The scheme's insurance framework distinguishes between **Basic Insurance**, covering yield losses from specified non-preventable perils such as summer kill, pollution, cyclones, floods and natural calamities, and **Comprehensive Insurance**, which additionally covers specified **disease-related risks**.
- The **NFDP**, launched under PM-MKSSY on **11 September 2024**, is intended to provide a digital ecosystem for fisheries and aquaculture, including **work-based digital identities, institutional credit, aquaculture insurance, cooperatives, traceability and training/capacity building**.

103. Pradhan Mantri Anusuchit Jaati Abhyuday Yojana (PM-AJAY)

Syllabus Mapping: GS-II: Social Justice | Welfare Schemes for Vulnerable Sections | Scheduled Castes | Inclusive Development

- **PM-AJAY** is a **100% centrally funded scheme**, launched in **FY 2021–22** by the **Ministry of Social Justice & Empowerment** for the socio-economic and educational empowerment of Scheduled Castes.
- PM-AJAY is a **merger of three erstwhile Centrally Sponsored Schemes: Pradhan Mantri Adarsh Gram Yojana (PMAGY), Special Central Assistance to Scheduled Castes Sub Plan (SCA to SCSP), and Babu Jagjivan Ram Chhatrawas Yojana (BJRCY)**.
- The scheme has three broad objectives: **reducing poverty through employment and livelihood opportunities; improving socio-economic indicators through infrastructure and services; and increasing literacy/enrolment through educational and residential facilities**.
- Under the **Adarsh Gram component**, SC-dominated villages are developed into model villages by filling gaps in **basic infrastructure and essential services**.
- As of September 2026, the Adarsh Gram component has covered **47,243 villages**, with **46,944 development works completed**, **27,032 Village Development Plans (VDPs)** prepared and **18,093 villages declared Adarsh Grams**.
- For the **Grants-in-Aid component**, priority is given to families/persons with annual income of **not more than ₹2.50 lakh**; SC members of SC-majority groups are also eligible.
- Under **Infrastructure Development**, villages with **40% or more SC population and total population of at least 500** are eligible for grants.
- Grants-in-Aid supports **livelihood projects, skill development, related infrastructure, infrastructure development in SC-dominated villages and residential educational facilities**.
- More than **₹1,730 crore** was released directly to States under Grants-in-Aid during **FY 2021–22 to FY 2025–26**, supporting more than **2.5 lakh individual and group beneficiaries**.
- The **Hostel component** supports construction and repair of student hostels to improve access to quality education, particularly for SC students from **rural and remote areas**; **785 hostels** had been completed by September 2026.
- For **FY 2026–27**, **₹61.46 crore** in central assistance has been allocated for **two hostel projects**, one for girls and one for boys, providing accommodation for **264 students**.



- Component-wise allocation includes **up to 50% for gap-filling activities in selected Adarsh Gram villages, up to 5% for TSG/PIUs, up to 2% for hostel construction and repair**, with the remaining funds used for Grants-in-Aid projects.

104. Agnibaan Reusable Launch Vehicle

Syllabus Mapping: GS-III: Space Technology | Reusable Launch Vehicles | Rocket Propulsion | Private Space Sector | R&D and Innovation | Indigenous Technology

- **Technology Development Board (TDB), Department of Science & Technology (DST)** has signed an agreement with **Agnikul Cosmos** for **₹200 crore RDI support** for development of the **Agnibaan Reusable Launch Vehicle (RLV)**.
- The project aims to take the technology from **TRL-4 and above towards TRL-8**, indicating progression from validated technology towards a much higher level of technological maturity and demonstration.
- The project focuses on **full-system reusability**, moving beyond the conventional approach of recovering only the first stage of a launch vehicle.
- The proposed reusable architecture is intended to enable **high-frequency and repeatable launches**, while reducing **launch/manufacturing costs and space debris**.
- The project is supported through the **RDI Fund**, with the financial assistance structured through **Optionally Convertible Debentures (OCDs)**.
- Agnibaan RLV combines a **lightweight reusable upper stage, precise orbital insertion capability and semi-cryogenic liquid propulsion** designed for **deep throttling and restart capability**.
- The proposed architecture includes **descent propulsion and controlled descent/recovery technologies**, requiring integration of propulsion, ascent, orbital insertion, guidance and recovery systems.
- Agnikul has previously developed and tested **Agnibaan**, its indigenous orbital-class launch vehicle, and **Agnilet**, a **single-piece 3D-printed rocket engine** developed and manufactured in-house.
- TDB had earlier supported Agnikul in development and commercialisation of a **modular configurable launch vehicle for small-satellite missions**.
- The new RDI-supported programme extends this technology pathway from launch-vehicle development towards **reusability, repeatability and operational efficiency**.
- **TRL (Technology Readiness Level)** is a scale used to indicate the maturity of a technology; movement towards **TRL-8** represents progression towards a system that has been demonstrated in an operationally relevant/near-operational environment.

105. FCV (Flue-Cured Virginia) Tobacco

Syllabus Mapping: GS-III: Agriculture | Commercial Crops | Agricultural Marketing | Export Agriculture | Government Regulation

- The Government has approved a **one-time, interest-free loan of ₹50,000 per barn** for **FCV tobacco growers in Andhra Pradesh** under the **Interest-Free Working Capital Assistance Scheme**.
- The intervention is aimed at providing **timely liquidity** to growers amid changing global demand, geopolitical developments and evolving international trade conditions affecting tobacco procurement and marketing.
- Auctions for the **2025–26 crop season in Andhra Pradesh** began on **25 March 2026**, with around **100 million kg of FCV tobacco** auctioned so far.
- FCV tobacco is predominantly cultivated in **Andhra Pradesh and Karnataka**.
- The proposed assistance covers approximately **44,000 growers**, involving a financial intervention of around **₹220 crore**.
- The assistance is proposed to be transferred **directly to farmers through DBT**, providing immediate working capital support.
- The assistance is intended to help growers meet **household requirements, repay institutional loans, purchase inputs for the ensuing crop season and reduce dependence on private borrowing**.
- The Government is simultaneously undertaking measures to **facilitate procurement, enhance market participation and promote exports**, while engaging exporters, buyers, growers and other stakeholders to strengthen the FCV tobacco sector.
- **FCV (Flue-Cured Virginia)** is a tobacco type whose leaves are cured in specially designed barns using **heated air circulated through flues**, without direct exposure of the leaves to smoke.
- **Flue-curing** is therefore different from curing methods in which tobacco leaves are directly exposed to smoke; controlled temperature and ventilation help produce the characteristic colour and quality associated with FCV tobacco.
- FCV tobacco is an important **commercial/export-oriented crop**, making growers particularly sensitive to changes in **international demand, prices, trade conditions and procurement arrangements**.



106. Bharat Maritime Insurance Pool (BMIP)

Syllabus Mapping: GS-III: Infrastructure | Maritime Security | Shipping | Insurance | Energy Security | Blue Economy | Economic Security

- **Bharat Maritime Insurance Pool (BMIP)** was approved on **18 April 2026** and formally launched on **12 May 2026** as India's first domestic maritime insurance pool, with insurance capacity of **₹13,906.50 crore (USD 1.5 billion)**.
- The Pool has **sovereign backing of ₹12,980 crore (USD 1.4 billion)** and aims to reduce India's dependence on foreign maritime insurers, particularly for high-value and war-risk coverage.
- BMIP covers **Hull & Machinery, Cargo, Protection & Indemnity (P&I), and War risks** for eligible maritime activities.
- Eligible vessels include those that are **Indian-flagged, owned/managed/controlled by Indian entities, or cargo vessels destined to or originating from India**.
- The Pool has a **10-year duration**, extendable up to **15 years**, providing a longer-term domestic framework for maritime insurance.
- Policies are issued by **domestic insurers that are members of the Pool**; the risks are collectively reinsured among Pool members according to their committed capacity.
- **General Insurance Corporation of India (GIC Re)** acts as the **Pool Administrator**, while a **Governing Body** oversees the Pool and an **Underwriting Committee** ensures consistent risk assessment.
- Claims up to **USD 100 million** are met through accumulated reserves and reinsurance recoveries; for larger claims, the **sovereign guarantee is activated after exhaustion of Pool reserves**.
- BMIP was created against the backdrop of India's heavy dependence on maritime trade, with **95% of trade value and 70% of trade volume** moving through maritime routes according to the PIB material.
- Geopolitical disruptions, particularly around the **Red Sea and Strait of Hormuz**, have increased maritime insurance risks and premiums, highlighting the importance of domestic insurance capacity for India's trade and energy security.

107. Nanomedicine – Precision Medicine & Personalised Healthcare

Syllabus Mapping: GS-III: Science & Technology | Biotechnology | Nanotechnology | Health & Medicine | Emerging Technologies

- The **World Congress on Nanomedicine 2026** was inaugurated on 27 September 2026 at Vigyan Bhawan, New Delhi, with over **2,000 participants**, focusing on emerging applications of nanomedicine.
- **Department of Biotechnology (DBT)** is supporting **210 R&D projects** in nanomedicine with financial support of **₹174 crore**.
- The supported research spans **targeted drug delivery, cancer nanomedicine, infectious-disease nanomedicine, nucleic-acid and vaccine delivery, nano-diagnostics and imaging, regenerative medicine, wound healing, nanotoxicology and regulatory science**.
- Emerging Indian research areas include **oral insulin nanoparticles, nanobots for breast cancer, precision nanoinjection and targeted breast-cancer nanomedicine**.
- Nanomedicine can support **precision medicine** by enabling interventions at the cellular level and tailoring treatment according to factors such as a patient's **genetic profile, lifestyle, dietary habits and environmental factors**.
- India has established a regulatory framework for **nanopharmaceuticals** through guidelines developed jointly by **DBT, ICMR and CDSCO**, covering aspects of **safety, quality and efficacy**.
- **Nanomedicine** refers to the application of nanotechnology in medicine, involving structures and materials at the **nanometre scale (one-billionth of a metre)**.
- **Targeted drug delivery** uses nanoscale carriers to deliver therapeutic agents preferentially to specific cells or tissues, potentially increasing treatment effectiveness while reducing exposure of healthy tissues.
- **Nano-diagnostics and imaging** use nanoscale materials or devices to improve detection, identification or visualisation of disease-related biological processes.
- **Nucleic-acid delivery** involves transporting molecules such as DNA or RNA to target cells; nanoparticles can help overcome problems of degradation and cellular delivery.
- **Nanotoxicology** studies the potential toxicological effects of nanoparticles and nanomaterials, making safety assessment important alongside therapeutic development.
- **Precision medicine** seeks to tailor prevention, diagnosis and treatment according to individual biological and environmental characteristics, while **personalised healthcare** is the broader approach of adapting healthcare to individual patient needs.



108. Viksit Panchayat – NITI Aayog’s State Support Mission

Syllabus Mapping: GS-II: Panchayati Raj | Decentralisation | Local Governance | Rural Development | E-Governance | Inclusive Growth

- **NITI Aayog**, under its **State Support Mission (SSM)**, organised the national workshop “**Viksit Panchayat: Connecting People, Places, Resources and Opportunities**” on 28 September 2026 in collaboration with **GBSIPRD, Government of Assam**.
- The workshop focused on strengthening **Panchayats as institutions of inclusive growth, public service delivery and sustainable grassroots development**, aligned with the vision of **Viksit Bharat@2047**.
- Four major areas of discussion were **decentralised and spatial planning, grassroots capacity development, spatial planning for priority sectors, and integration of spatial planning into the GPDP process**.
- Spatial information was proposed to be integrated with **GPDP, eGramSwaraj and the Panchayat Advancement Index (PAI)** for more **evidence-based and convergence-oriented local planning**.
- **eGramSwaraj** provides a digital platform for Panchayat-level planning, progress monitoring and financial management, while **PAI** is used to assess Panchayat performance across development dimensions.
- The **73rd Constitutional Amendment Act, 1992** gave constitutional status to Panchayati Raj Institutions by inserting **Part IX (Articles 243–243O)** and providing for a three-tier Panchayati Raj structure.
- **Eleventh Schedule** contains **29 subjects** that may be devolved to Panchayats under Article 243G, but actual devolution of functions, funds and functionaries depends on State legislation.
- **GPDP (Gram Panchayat Development Plan)** is the local-level planning framework through which Gram Panchayats identify local needs, priorities, resources and development interventions through participatory planning.
- **District Planning Committee (Article 243ZD)** is intended to consolidate plans prepared by Panchayats and Municipalities and prepare a **draft development plan for the district**, making it important for **integrated rural–urban planning**.
- **State Support Mission (SSM)** is an umbrella initiative of NITI Aayog for structured and institutionalised engagement with States/UTs, supporting them in developing state-specific development roadmaps aligned with national priorities and their socioeconomic goals.
- **Panchayat Advancement Index (PAI)** is an assessment framework of the **Ministry of Panchayati Raj** for measuring the development performance of **Gram Panchayats**.
- PAI is a composite assessment framework of the Ministry of Panchayati Raj for assessing the performance of Gram Panchayats/Equivalent to Gram Panchayats across nine themes of Localisation of Sustainable Development Goals (LSDGs).
- **PAI 2.0** assesses Panchayats across **nine LSDG-aligned themes** using outcome-oriented indicators and provides theme-wise and composite scores.

109. Forest & Landscape Restoration – India at COFO 28

Syllabus Mapping: GS-III: Environment | Biodiversity | Climate Change | Land Degradation | International Environmental Cooperation

- **COFO 28**, the 28th Session of the **FAO Committee on Forestry**, is being held in **Rome from 28 September–2 October 2026**, with India highlighting its forest and landscape restoration initiatives.
- India’s **forest and tree cover is 82.74 million hectares**, covering **25.17% of its geographical area**; **FAO’s Global Forest Resources Assessment 2025** ranks India **9th globally in forest area and 3rd in net annual forest-area gain**.
- India reported an additional **carbon sink of 2.29 billion tonnes CO₂ equivalent by 2021** and has enhanced its target to create an additional **3.5–4.0 billion tonnes CO₂ equivalent carbon sink by 2035**, compared with 2005 levels.
- Under its **Bonn Challenge commitment**, India aims to restore **26 million hectares of degraded and deforested land by 2030**, of which **21.76 million hectares** have already been brought under restoration.
- Under the **Aravalli Green Wall**, approximately **6.45 million hectares of degraded land** have been identified for restoration.
- **MISHTI** is being used for **mangrove restoration in coastal landscapes**, linking ecosystem restoration with **climate resilience and local livelihoods**.
- India highlighted **Ek Ped Maa Ke Naam – Plant4Mother**, a whole-of-government and whole-of-society initiative under which **more than 3.5 billion saplings** have been planted.
- India reaffirmed its support for the proposed **UN Decade for Afforestation and Reforestation, 2027–2036**, linking it with **Sustainable Forest Management** and a continuum from degraded ecosystem restoration to resilient, productive and inclusive forest landscapes.
- **Forest and Landscape Restoration (FLR)** is a landscape-level approach to restoring ecological functionality while considering the **livelihoods, needs and priorities of local communities**, rather than focusing only on increasing tree cover.
- **Bonn Challenge** is a global commitment to bring **350 million hectares of degraded and deforested landscapes into restoration by 2030**; India’s 26 million hectare commitment forms part of this broader restoration effort.



- **FAO's Committee on Forestry (COFO)** is FAO's highest forestry statutory body and provides a forum for governments to identify emerging forestry issues, review international forestry programmes and advise FAO on priorities.

110. Exercise KAZIND-2026

Syllabus Mapping: GS-III: Defence & Security | International Military Exercises | Counter-Terrorism | India–Central Asia Relations

- **KAZIND-2026** is the **9th edition** of the India–Kazakhstan Joint Military Exercise, being conducted at **Oskemen, Kazakhstan, from 28 September–11 October 2026**.
- The Indian contingent comprises **60 personnel**, mainly from a battalion of the **Garhwal Rifles**, along with personnel from other arms and services and the **Indian Air Force**; Kazakhstan is fielding a contingent of matching strength, primarily from its Land Forces.
- The exercise focuses on **joint counter-terrorism operations in a sub-conventional environment under a UN mandate**, aimed at enhancing interoperability and joint operational capability.
- Training will focus on **semi-urban and mountainous terrain**, including joint planning and execution, **air mobility**, **Unmanned Aerial Systems (UAS) and Counter-UAS capabilities**.
- The contingents will practise **raids, search-and-destroy missions, cordon-and-search operations, securing helipads and landing sites, and Special Heliborne Operations**.
- KAZIND-2026 is intended to strengthen **military-to-military cooperation, interoperability, mutual trust and professional bonds** between India and Kazakhstan.

111. India–France Space Cooperation

Syllabus Mapping: GS-II: India–France Bilateral Cooperation | GS-III: Space Technology | Human Spaceflight | Space Start-ups

- **India-France space cooperation**, dating back to the **1960s sounding rocket experiments**, has expanded to **joint satellite missions, launch-vehicle technologies, human spaceflight and emerging space applications**.
- **Megha-Tropiques** and **SARAL** are joint satellite missions developed by **ISRO and France's CNES**, representing major milestones in bilateral space cooperation.
- The third joint satellite mission, **TRISHNA**, is progressing, with cooperation focused on its development and applications.
- **CNES is supporting India's Gaganyaan programme**, including supply of consumables and training of **flight surgeons**; discussions have also begun on **microgravity research and parabolic flights**.
- India-France scientific cooperation extends beyond space to **biotechnology, digital sciences and technologies and ocean sciences**, with mechanisms such as **CEFIPRA** supporting bilateral scientific collaboration.
- **ISRO–CNES** is the principal institutional channel highlighted in the PIB for India-France space cooperation, covering satellite missions, launch-related technologies and human-spaceflight cooperation.
- **Megha-Tropiques** was developed by ISRO and CNES for studying the **tropical atmosphere and climate-related processes**, while **SARAL** is a joint satellite mission focused on **oceanographic studies and precise ocean-surface measurements**.
- **TRISHNA** is a joint ISRO–CNES Earth-observation mission, making it important for studying **land-surface temperature and water-stress-related applications**.
- **CEFIPRA (Indo-French Centre for the Promotion of Advanced Research)** is a bilateral mechanism supporting collaborative research between Indian and French scientists and institutions.