

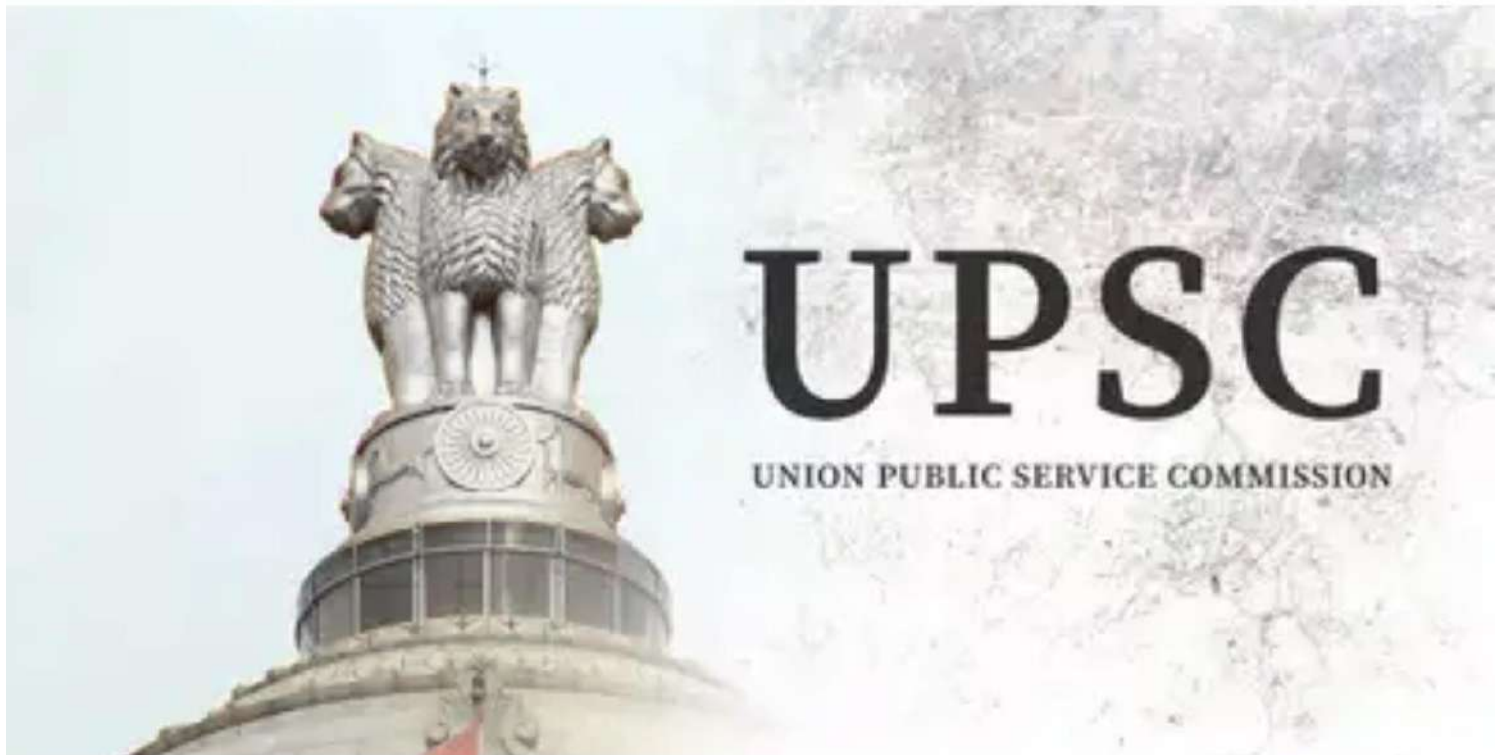


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# **CURRENT AFFAIRS MAGAZINE**

**APRIL 2025**

**Prelims Bits Compilation**



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## INDEX

### 1. HISTORY AND CULTURE.....6

1.1	Moinuddin Chishti.....	6
1.2	Mitathal and Tighrana Harappan Sites.....	6
1.3	Sarhul Festival .....	7
1.4	Jaya Sri Maha Bodhi Tree.....	8
1.5	Navkar Mahamantra Divas .....	9
1.6	Archaeological Excavation in Dwaraka.....	10
1.7	Amarnath Temple .....	11
1.8	Jallianwala Bagh Massacre & Sir Sankaran Nair.....	12
1.9	Dawoodi Bohra Community.....	13
1.10	Old Rock Art Sites in Mizoram.....	14
1.11	Manuscripts of Bhagavad Gita & Natyashastra added to UNESCO's Memory of the World Register ...	15
1.12	Kailash Mansarovar Yatra.....	16
1.13	Digambar Jain temples.....	16
1.14	Indira Gandhi National Centre for the Arts (IGNCA).....	17
1.15	Pandit Chatur Lal.....	18

### Other Important Topics.....18

Odisha Foundation Day or Utkal Divas.....	18
Remnants of the Megalithic Era .....	19
Wat Pho.....	19
Harit Yoga Initiative.....	19
Chittorgarh Fort.....	20
Khultabad Name Change to Ratnapur .....	20
Jallianwala Bagh Massacre .....	20

### 2. GEOGRAPHY.....23

2.1	Landfall of a cyclone .....	23
2.2	Causes of Myanmar's Earthquake .....	23
2.3	Hadean Protocrust.....	25
2.4	Atmospheric River .....	25
2.5	Agasthyamalai Landscape.....	26
2.6	Recent findings on Earth's Geological process.....	27

### Other Important Topics.....28

Chicken's Neck Corridor .....	28
Zojila Pass.....	28
Japan's Nankai Trough Megaquake Warning .....	28
Major Minerals .....	28
Kuirektykol Reserves .....	29
Kannadippaya – GI Tag.....	29
GI Tags for Products in West Bengal.....	29

Thar Desert Greening.....	29
GI Tags for Meghalaya's Textiles.....	30
Increased Activity at Mount Spurr.....	30

### 3. POLITY.....34

3.1	Centre for Processing Accelerated Corporate Exit (C-PACE) .....	34
3.2	Supreme Court on the Use of Urdu on the Signboard .....	34
3.3	Registration of Births and Deaths in India.....	35
3.4	New Chief Justice of India.....	36
3.5	Cabinet Committee on Security (CCS) .....	37
3.6	National Investigation Agency (NIA).....	37

### Other Important Topics .....38

NITI NCAER States Economic Forum Portal .....	38
Drug Quality Control in India.....	38
Pension Adalats.....	39
Entrepreneurship Planning Digital Tool (EPDT) & Helpline Number .....	39
GP-DRASTI Program.....	39
India Skills Accelerator .....	39
AadharFaceRD App .....	40
Revamped Microdata Portal .....	40
National Statistical System Training Academy.....	40
Booth Level Agents (BLAs).....	40
Chief Justice of India (CJI) .....	41
Justice Joseph Committee.....	41
Law Commission of India.....	41
Central Consumer Protection Authority (CCPA).....	41

### 4. GOVERNMENT POLICIES AND INTERVENTIONS.....42

4.1	The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.....	42
4.2	Maintenance and Welfare of Parents and Senior Citizens Act, 2007.....	42
4.3	Government e-Marketplace .....	43
4.4	Protection of Interests in Aircraft Objects Bill, 2025.....	44
4.5	PM-POSHAN Scheme.....	44
4.6	Waqf (Amendment) Bill, 2025.....	45
4.7	PM E-DRIVE SCHEME .....	47
4.8	Tribhuvan Sahkari University Bill, 2025.....	47
4.9	Revamping of MGNREGS .....	48
4.10	Jal Jeevan Mission (JJM).....	49

4.11	Tamil Nadu's ban on egg mayonnaise .....	50
4.12	Entry Denial for transport vehicles in Delhi ....	51
4.13	Regulatory Framework for Over-The-Counter (OTC) Drugs .....	51
4.14	Central Adoption Resource Authority (CARA). ..	52
4.15	Indian Cybercrime Coordination Centre (I4C) ..	53
4.16	Ayushman Vay Vandana scheme .....	54

## Other Important Topics .....54

National Council for Vocational Education and Training (NCVET).....	54
BioSaarthi: Nurturing India's Biotech Startups .....	55
Silk Samagra-2 Scheme .....	55
Sahkar Taxi .....	55
Operation Brahma.....	55
Sahakar Pragya Scheme.....	56
Stray Dogs.....	56

## 5. INTERNATIONAL RELATIONS & organisations.....61

5.1	Joint Crediting Mechanism (JCM) between India and Japan.....	61
5.2	Ottawa Convention.....	61
5.3	Arctic Council.....	62
5.4	China Suspends Rare Earth Exports .....	63
5.5	India–Middle East–Europe Economic Corridor.....	64
5.6	PM Modi awarded Sri Lanka's Mitra Vibhushana.....	65
5.7	India- Portugal Relationship.....	66
5.8	Indus Water Treaty Suspension.....	67
5.9	Artemis Accords .....	68
5.10	Optional Practical Training program .....	69
5.11	UN Security Council.....	69
5.12	SAARC Visa Exemption Scheme.....	70
5.13	11th BRICS Labour & Employment Ministers' Meeting 2025.....	71

## Other Important Topics.....72

Exercise Tiger Triumph IV.....	72
India-UK Economic and Financial Dialogue (EFD) ...	72
India-US Extradition Treaty, 1997.....	73
India-Japan Joint Working Group (JWG) Meeting.....	73
Country Partnership Framework (CPF) .....	73
Safeguard American Voter Eligibility (SAVE) Act .....	73
Sudan's Humanitarian Crisis .....	74
Harare Declaration.....	74
US Airstrikes Near Hodeidah Port.....	74

Africa India Key Maritime Engagement (AIKEYME), 2025.....	74
---	----

## 6. ECONOMY.....75

6.1	India Bio-Economy Report .....	75
6.2	Gold Monetization Scheme (GMS) .....	76
6.3	Childhood Mortality and Stillbirth .....	77
6.4	Banking Laws (Amendment) act, 2024 .....	78
6.5	Disclosure of Assets.....	79
6.6	Fiscal Health Index (FHI) .....	80
6.7	Past Risk and Return Verification Agency (PaRRVA).....	81
6.8	New Pamban Bridge.....	82
6.9	Bridge Inventory and Condition Rating System (BICRS) .....	83
6.10	Rishikesh-Karnaprayag Rail Link Project.....	83
6.11	Credit Guarantee under e-NWR.....	84
6.12	Reasons behind the recent spike in gold prices in India .....	84

## Other Important Topics .....85

India's Tea Export Triumph.....	85
SEBI's Revised FPI Disclosure Norms .....	85
SEBI's Revised FPI Disclosure Norms .....	86
Gold Monetisation Scheme: Changes Announced.....	86
Tamil Nadu's Economic Growth .....	86
Quick Commerce (Q-Commerce) .....	87

## 7. AGRICULTURE.....91

7.1	Global Strategy for Resilient Drylands (GSRD) 2030.....	91
7.2	Comprehensive Remote Sensing Observation on Crop Progress (CROP) .....	92
7.3	Magic of Indian Silk .....	93

## Other Important Topics .....94

AQUASTAT .....	94
IISR Surya.....	95
ISRO Forecasts Wheat Production.....	95
Root Rot.....	95

## 8. ENVIRONMENT.....96

8.1	Girnar Wildlife Sanctuary .....	96
8.2	2nd WHO Conference on Air Pollution and Health.....	97
8.3	International Treaty on Plant Genetic Resources for Food and Agriculture.....	98
8.4	Frankincense .....	98
8.5	Active Mobility.....	99
8.6	Naini Lake's water crisis .....	100

8.7	Efficient Air Conditioners (ACs) .....	100
8.8	International Big Cat Alliance (IBCA) .....	101
8.9	Ramsar Sites in India .....	102
8.10	Kinshasa Floods & Democratic Republic of Congo .....	104
8.11	Emission Reduction Compliance Mechanism .....	104
8.12	National Environmental Engineering Research Institute (NEERI) .....	105
8.13	Fourth Global Coral Bleaching .....	105
8.14	Community led initiatives for Marine Protected Areas (MPAs) .....	106
8.15	Urban Heat Island (UHI) .....	107

## Other Important Topics ..... 108

Siberian Tiger/Amur Tigers .....	108
India's Decarbonisation in Steel Sector .....	108
Reservoir Storage Monitoring System (RSMS) Portal .....	109
Global Lake Deoxygenation Crisis .....	109
Kasungu National Park .....	109
Cyphoderus Bihariensis .....	109
Joint Nilgiri Tahr Census .....	110
Nilgiri Tahr .....	110
Future Conservationist Award .....	110
Vembur Sheep .....	110
Nagaland Launches Ambitious Solar Mission .....	113

## SPECIES IN NEWS..... 115

8.16	Spade-toothed whale .....	115
8.17	Typhloperipatus Williamsoni .....	116
8.18	Sea Lions .....	116
8.19	Euphaea Wayanadensis .....	117
8.20	Painted Lady Butterfly .....	118
8.21	Long-snouted vine snake .....	119
8.22	Woolly Flying Squirrel .....	120
8.23	Theobaldius Konkanensis .....	121
8.24	Leptobranchium Aryatum .....	121
8.25	Mugger crocodile .....	122
8.26	Grizzled Giant Squirrel .....	123

## Other Important Topics..... 124

Malabar Grey Hornbill .....	124
-----------------------------	-----

## 9. SCIENCE & TECHNOLOGY..... 126

### PHYSICAL SCIENCE..... 126

9.1	Twisted bilayer tungsten diselenide (tWSe <sub>2</sub> ) .....	126
9.2	CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) .....	127

9.3	Cu-Phen .....	127
9.4	Real-time LAMP (rt-LAMP) Assay .....	128
9.5	Perovskite Solar Cells .....	129
9.6	Coenzyme Q (ubiquinone) .....	130
9.7	Indigenous HPV Test Kits for Cervical Cancer Screening .....	130
9.8	Quantum Gravity Gradiometers (QGGs) .....	131
9.9	New Method to Estimate Helium Abundance in the Sun .....	131
9.10	RNA-based antiviral for Plant Virus .....	132

## Other Important Topics ..... 133

Third Launch Pad (TLP) .....	133
MeitY's Deepfake Report to Delhi High Court .....	133
Gaia's Retirement: A Milestone in Galactic Mapping .....	134

## SPACE..... 137

9.11	Neutrinos .....	137
9.12	Saturn .....	138
9.13	Biomass Mission .....	139
9.14	Microbial Conditions on K2-18 b .....	140
9.15	NISAR (NASA-ISRO Synthetic Aperture Radar) Mission .....	140
9.16	LEDA 1313424, Bullseye Galaxy .....	141

## Other Important Topics ..... 142

## DEFENCE..... 144

9.17	Saras Mk2 Aircraft .....	144
9.18	Gaurav Glide Bomb .....	145

## Other Important Topics ..... 145

SAFE Agromet Project .....	145
Successful VLSRSAM Flight Test .....	146
Indian Naval Ship (INS) Sunayna .....	146
Mission IOS SAGAR .....	146
INS TRIKAND Medical Mission .....	146

## HEALTH..... 150

9.19	Aortic Stenosis & TAVI .....	150
9.20	Signet Ring Cell Carcinoma (SRCC) .....	151
9.21	Magnetic Nanoparticles for Cancer Treatment .....	152
9.22	Acute Promyelocytic Leukemia (APL) .....	153
9.23	Fixed-dose combination drugs (FDCs) .....	153

## Other Important Topics ..... 154

Anemia Mukh Bharat (AMB) Strategy .....	154
Endometriosis .....	154



Homeopathic Medicine.....	155
Black Rats: Primary Hantavirus Carriers in Madagascar.....	155
Swap Kidney Transplant (SKT).....	155

## **10. INDICES AND REPORTS ..... 155**

10.1 Network Readiness Index (NRI) 2024 .....	155
10.2 Digital Threat Report 2024 .....	157
10.3 Panchayat Advancement Index.....	157
10.4 India Justice Report, 2025.....	158
10.5 NITI Aayog report on India's Hand & Power Tools Sector.....	159
10.6 Report on DBT implementation.....	160
10.7 World Economic Outlook, 2025 .....	162

## **Other Important Topics..... 162**

Landmark Gene Therapy Trial for Haemophilia.....	162
--	-----

## **11. OTHERS..... 163**

11.1 Sangita Kalanidhi Award .....	163
11.2 Breakthrough Prize, 2025 .....	163
11.3 MacGregor Memorial Medals.....	164
11.4 Navika Sagar Parikrama-II Expedition.....	165

11.5 Gantenerumab, drug on early-onset Alzheimer's disease.....	165
11.6 Equivalence Certificates for Foreign Degrees.....	166
11.7 Chintan Shivir 2025.....	167
11.8 Modernization of Command Area Development and Water Management .....	168
11.9 Niveshak Didi .....	169
11.10 World Haemophilia Day.....	169
11.11 Gonorrhea .....	170
11.12 Measles-Rubella Elimination Campaign (2025-26).....	171

## **Other Important Topics ..... 172**

Bodh Gaya Temple Act Protest .....	172
International Federation of Red Cross and Red Crescent Societies (IFRC) .....	172
Bollard Pull (BP) Tug Ojas.....	173
INS Tarkash.....	173
Tarang .....	173
Dharti Aaba TribePreneurs 2025.....	173
Mundi-Cut Passport .....	173
Healthy Beginnings, Hopeful Futures' Campaign .....	174
Poshan Pakhwada 2025 .....	176
Vanajeevi" Ramaiah: Environmentalist Dies .....	177

April 2025

## 1. HISTORY AND CULTURE

### 1.1 Moinuddin Chishti

Recently, an Ajmer court has admitted a petition that a Shiva temple lie under the Sharif dargah shrine of Khwaja Moinuddin Chishti in Rajasthan.

- Moinuddin Chishti is the **Persian-origin** Sunni Muslim philosopher and religious scholar.
- Born** – 1<sup>st</sup> February 1141 CE, in Sistan, a province in Persia (Iran).
- He is said to have been a **descendent of Prophet Muhammad**.
- He is known as Muinuddin, Muiniiddin, and Mu'in al-din.
- He is also known as '**Gharib Nawaaz**' and 'Benefactor of the poor'.
- In his spiritual journey Harooni became a mentor to Moinuddin and he led him to rigorous spiritual discipline.
- He was initiated into the **Chishti silsila (chain of spiritual descent)**.
- He came to the Indian subcontinent in the 13<sup>th</sup> century and settled in Ajmer, Rajasthan.
- He founded and spread the **Chishti Order of Sunni Islam** in the Indian subcontinent.
- The Chishti Order emphasised the doctrine of the unity of being with God and members of the order were also pacifists.
- His famous dictum was "**Sulh-i-Kul**" (Peace with all).
- His disciples spread the Chishti order in the Indian Subcontinent.

The **Chishti order** was founded in the 10<sup>th</sup> century by Abu Ishaq Shami in the town of Chisht near Herat.

The **Urs festival** is an annual festival held at Ajmer in Rajasthan which commemorates the death anniversary of Sufi saint Moinuddin Chishti.

Disciples	Year	Contributions
<b>Qutbuddin Bakhtiyar Kaki</b>	1173-1235	Established the Chishti order base in Delhi.
<b>Baba Fariduddin</b>	1173-1265	Spread the Chishti order's teachings in Punjab.
<b>Hamiduddin Nagauri</b>	1192-1274	Served as a spiritual leader in Nagaur.
<b>Nizamuddin Auliya</b>	1238-1325	His teachings and shrine in Delhi.
<b>Chirag Dehalvi</b>	1274-1356	He spread Moinuddin teachings after his death.

- Died on** – 15<sup>th</sup> March 1236 in Ajmer.
- The shrine was built by **Mughal King Humayun** in honour of this saint.

### 1.2 Mitathal and Tighrana Harappan Sites

The Haryana government has declared two sites of over 4,400-year-old Harappan civilization in Bhiwani district as protected monuments and archaeological sites.

- These are notified under the **Haryana Ancient and Historical Monuments and Archaeological Sites and Remains Act, 1964**.

#### Mitathal site

- The site was first discovered in 1913 when a hoard of coins belonging to Samudra Gupta of the Gupta dynasty was found.
- Archaeological excavation conducted in 1968 has thrown light on the Copper- Bronze Age culture, a complex of the Indo-Gangetic divide of the 3rd-2nd millennia BCE.

- From 1965 to 1968, beads and copper implements were discovered at the site, yielding proto-historic material.
- Mitathal bear out the Harappan tradition in town planning, architecture and in arts and crafts.
- The pottery was well-burnt, sturdy red ware painted in black with pipal leaf, fish scale, and other geometric designs.
- The site has yielded a variety of antiquities, such as beads, bangles, and terracotta, as well as stone, shell, copper, ivory, and bone objects.

### Tighrana site

- According to the Tighrana village site, the post-Harappan period remnants shed light on the development and persistence of human habitation in the area.
- Chalcolithic farming communities originally settled in the area around 2,400 BCE.
- These early settlers, often referred to as Sothians, resided in modest thatched-roofed mud-brick homes at Chang, Mitathal, Tighrana, and other locations.
- Some of their settlements may have been fortified and comprised 50 to 100 houses each.
- They used wheel-made ceramics decorated in bichrome with black-and-white motifs, domesticated cows, bulls, goats, and other animals, and engaged in agriculture.
- They used copper, bronze and stone implements as discovered in large numbers.
- The presence of beads and green carnelian bangles indicate a thriving industry of bead making and jewellery production.
- Remains from pre-Siswal, pre-Harappan, and post-Harappan settlements were found in Tighrana, making it an important archaeological site.

## 1.3 Sarhul Festival

*Adivasis in Jharkhand and the larger Chhotanagpur region will welcome the new year and the spring season with the Sarhul festival on Tuesday.*

- **Sarhul** – It literally means “worship of the Sal tree” and is among the most revered Adivasi festivals.
- **Nature worship** - Sal trees (*Shorea robusta*) are venerated in Adivasi tradition.
- **Sarna faith** - Jal (water), jungle (forest), jameen (land) – these three aspects of nature form the core of the Sarna faith.
- **Sarna Maa** – The Sal trees are seen as the abode of Sarna Maa, the deity protecting the village from inclement natural forces.
- **Union of Sun and Earth** – The festival celebrates the symbolic union of the Sun and the Earth.
- A male priest from the village (pahan) plays the role of the Sun, while his wife (pahen) becomes the Earth.
- **Sowing season** - Only after the rituals are completed, Adivasi folk begin ploughing their fields, sowing their crop, or entering the forest to gather produce.
- **Tribes** - Sarhul has been celebrated by tribes such as the Oraon, Munda, Santal, Khadia, and Ho, with unique names for the festival and particular ways of celebrations.
- **Sarna Sthals** - These are communally protected “sacred groves” and can be found near villages across Chotanagpur, including Jharkhand, parts of Chhattisgarh, Odisha, and Bihar.
- **Sarna flags** - In the lead up, homes and Sarna Sthals are lined with triangular, red and white Sarna flags.
- **Three-day festival** - The main rituals happen on day two of the three-day festival at Sarna Sthals.



- **First day event** - On the first day of Sarhul, the village's pahan, who observes a rigorous fast, fetches water for the ceremonies, houses and Sarna Sthals are cleaned, and Sal flowers gathered for rituals.
- **Second day event** - On the next day, the main rituals take place at the Sarna Sthal.
- The deity is presented with Sal flowers, and a rooster is sacrificed.
- Villagers seek prosperity, safety, and a good harvest.
- Holy water is then sprinkled across the village, with performances of traditional songs and dances such as **Jadur, Gena and Por Jadur**.
- Later, young men head to nearby ponds and rivers and participate in ceremonial fishing and crab-catching to gather food for the ceremonial feast.
- **Third day event** - The final day is marked by a grand community feast, in which people share **handia (rice beer)** and enjoy a variety of delicacies.
- The festival ends with the pahan's blessings and the villagers praying.
- **Evolution** - Over time, Sarhul evolved from being a hunting-centred tradition to one that revolves around agricultural processes, reflecting the evolving lifestyle of Adivasis in Chhotanagpur.
- **Celebration in other countries** - During the 19th and early 20th centuries, when tribes such as the Munda, Oraon, and Santal were sent to faraway places as indentured labour, Sarhul traveled with them.
- Today, the festival is celebrated in locations ranging from the tea gardens of Assam to the Andaman and Nicobar Islands, Nepal, Bangladesh, and Bhutan.
- **Sarhul procession** - In the 1960s, Adivasi leader Baba Karthik Oraon, who advocated for social justice and the preservation of tribal culture, began a Sarhul procession from Hatma to the Siram Toli Sarna Sthal in Ranchi.
- **Siram Toli** - In the past 60 years, festive processions have emerged as a crucial part of Sarhul, with the Siram Toli site becoming a major point of convergence for processions.
- **Political identity** - The procession and gathering has also made Sarhul increasingly political, and an occasion to assert the Adivasi identity.
- **Separate religion** - Adivasis following the Sarna faith have been demanding the inclusion of a Sarna religion column in the census.

*At present, under the census, there are codes for only six religions: Hinduism, Islam, Christianity, Sikhism, Buddhism and Jainism.*

#### 1.4 Jaya Sri Maha Bodhi Tree

Prime Minister Narendra Modi recently visited the Jaya Sri Maha Bodhi temple at the historic city of Anuradhapura during his trip to Sri Lanka.

- Jaya Sri Maha Bodhi tree is considered the **oldest living cultivated plant in the world**.
- It is believed to have grown from a branch that an Indian princess carried to **Sri Lanka**.
- This Bo (Ficus religiosa, Pipal in Hindi) tree is believed to have grown from a branch of the tree in Bodhgaya (Bihar) under which Gautam Buddha attained enlightenment.
- The branch was carried to Sri Lanka by **Sanghamitta** (or Sanghamitra), the Mauryan king Ashoka's daughter and Buddhist nun.
- **Spread of Buddhism in Sri Lanka** - During the reign of Ashoka, the 3<sup>rd</sup> Buddhist Council was convened, where it was decided to send missionaries to various regions to propagate the teachings of Buddhism.
- As part of this mission, Mahinda, Ashoka's son, travelled to Sri Lanka.
- There, he met **King Devanampiya Tissa**, who was the ruler of Anuradhapura, and successfully converted him to Buddhism.
- Sanghamitta had travelled to Sri Lanka in response to an invitation from King Devanampiya Tissa, as well as the request of her brother, Mahendra (or Mahinda).
- Her arrival in Sri Lanka with the tree is still celebrated as **Uduwapa Poya**, an annual festival observed on a full moon night in December.



- The tree, along with the other Buddhist shrines in the ancient city of Anuradhapura, is a major pilgrimage centre for Buddhists.
- **Anuradhapura** - It is a **UNESCO World Heritage Site**.
- Anuradhapura was established around the 4<sup>th</sup> century BCE by King Pandukabhaya, the first King of Sri Lanka.
- Anuradhapura remained the capital of Lankan rulers from 377 BC to 1017 CE.
- It is known for its ancient monuments, monasteries, and palaces, which have drawn pilgrims and historians alike for centuries.
- **Other Buddhist sites in Anuradhapura** - Jetavanaramaya Stupa, Ruwanwelisaya Dagoba, Isurumuniya Temple, Ranmasu Uyana.

### 1.5 Navkar Mahamantra Divas

Recently, Navkar Mahamantra Divas was inaugurated in line with celebration of Mahavir Jayanti.

**Mahavir Jayanti** is celebrated on April 9<sup>th</sup> every year to commemorate the birth of Lord Mahavir, the 24<sup>th</sup> Tirthankara of Jainism.

- **Navkar Mantra** – It is not just a mantra but the core of our faith and the essence of life.
- It is central to Jain prayer, is more than a collection of sacred syllables, it is a rhythmic flow of energy, stability, and light.
- 9 resolutions are anchored in a commitment to knowledge, action, harmony, and rooted progress.
- Repeating the mantra 9 times, or in its multiples like 27, 54, or 108 represents spiritual completeness and intellectual clarity.

On Mahavir Jayanti in April 2024, a commemorative stamp and coin on the occasion of 2550<sup>th</sup> Bhagwan Mahaveer Nirvan Mahotsav.

#### Navkar Mantra – Nine Resolutions for a New India

9 Resolutions	Description
<b>1</b> <b>Water Conservation</b>	Emphasizing the need to value and save every drop of water.
<b>2</b> <b>Plant a tree in Mother's Name</b>	Planting of over 100 crore trees in recent months and urging everyone to plant a tree in their mother's name and nurture it like her blessings.
<b>3</b> <b>Cleanliness Mission</b>	Understanding the importance and contributing to cleanliness in every street, neighbourhood and city.
<b>4</b> <b>Vocal for Local</b>	Promotion of locally made products, turning them global and supporting items that carry the essence of Indian soil and the sweat of Indian workers.
<b>5</b> <b>Explore India</b>	To explore India's diverse states, cultures, and regions before traveling abroad, emphasizing the uniqueness and value of every corner of the country.
<b>6</b> <b>Adopting Natural Farming-</b>	The Jain principle of "One living being should not harm another", and for freeing Mother Earth from chemicals, supporting farmers, and promoting natural farming.
<b>7</b> <b>Healthy Lifestyle</b>	Following Indian dietary traditions, including millets (Shri Anna), reducing oil consumption by 10%, and maintaining health through moderation and restraint.
<b>8</b>	Making yoga and sports a part of daily life, whether at home, work, school, or parks, to ensure physical health and mental peace.

<b>Incorporating Yoga and Sports-</b>	
<b>9 Helping the Poor</b>	Assisting the underprivileged, whether by holding a hand or filling a plate, as the true essence of service.

- **Ecological relevance of Jainism** - Lord Mahavir's timeless teachings align beautifully with Mission LiFE (Lifestyle for Environment), a national call for sustainable living.
- **Jainism's emblem, "Parasparopagraho Jivanam"**, meaning the mutual interdependence of all life offers a deeply ecological worldview.

## 1.6 Archaeological Excavation in Dwaraka

The Archaeological Survey of India's (ASI) Underwater Archaeology Wing has launched a new research expedition examining both onshore and offshore sites at Dwarka and Beyt Dwarka in Gujarat.

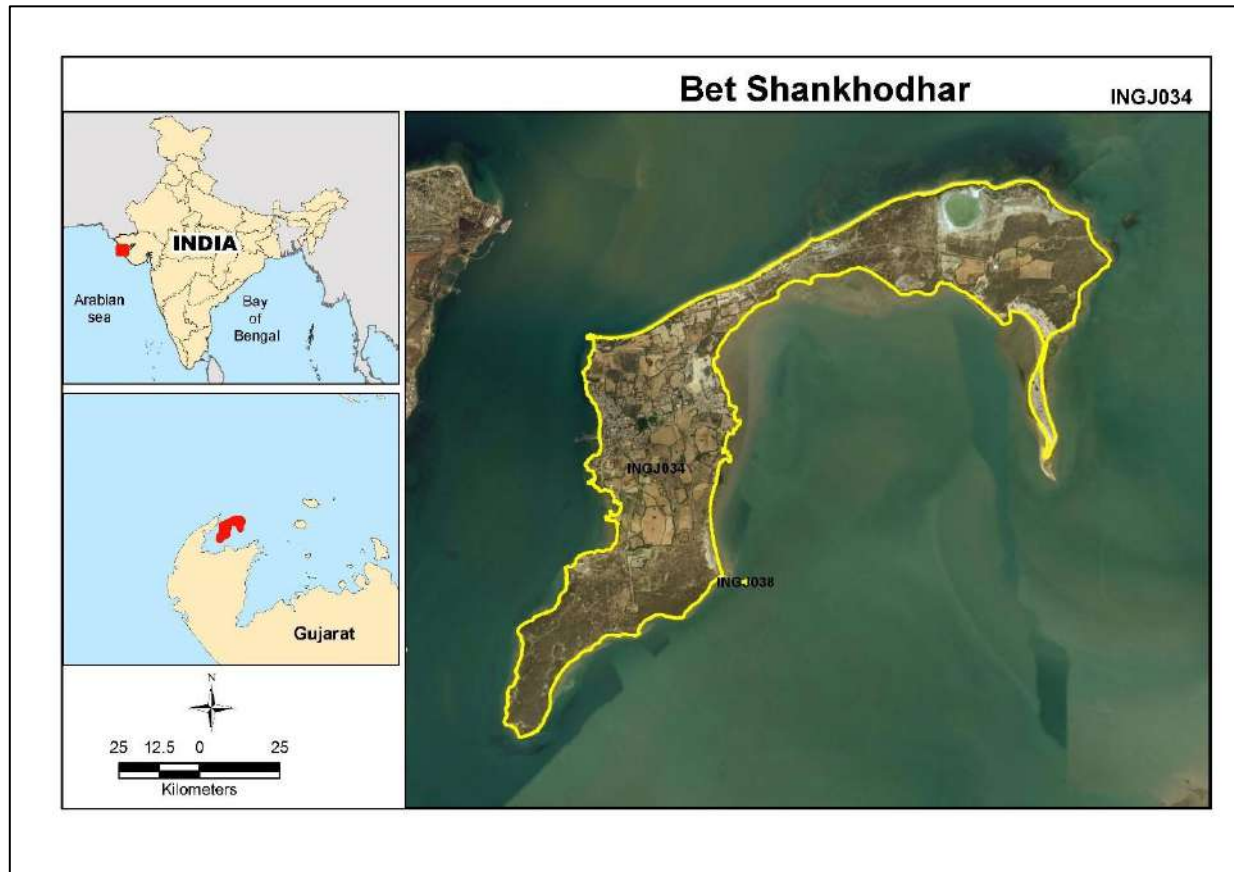
- **Present study** – It is being conducted by a 9-member team of the Underwater Archaeology Wing (UAW) of the ASI.
- **Coverage** – It includes both onshore and offshore expedition at **Dwarka and Beyt Dwarka in Gujarat**
- It is planned to cover an expanded area in Okhamandal city in Gujarat.
- **Focus areas**
  - Archaeological explorations
  - Identification of potential sites and places
  - Scientific study involving diving operations
  - Search and collection of archaeological remains, their proper documentation and study

Previous Studies of Dwaraka	Research & its Findings
<b>2025 Investigation at South of Gomati Creek (eastern side of Dwarka)</b>	<ul style="list-style-type: none"> <li>• <b>Aims</b> - Inspecting earlier explored areas and examine their present condition.</li> <li>• To identify probable areas for further investigations and study.</li> </ul>
<b>2005-07 Investigation</b>	<ul style="list-style-type: none"> <li>• It included both offshore and onshore exploration.</li> <li>• <b>Findings</b> – It revealed <u>clusters of submerged remains</u>.</li> <li>• It includes ancient <u>sculptures, stone anchors</u>, and other objects of historical importance.</li> </ul>
<b>2007 Excavation near Dwarkadhish Temple</b>	<ul style="list-style-type: none"> <li>• <b>Findings</b> – A deposit of about 10 metres having 26 layers was excavated.</li> <li>• Antiquities recovered includes <u>iron objects, beads, copper objects, rings</u>, etc.</li> <li>• Besides, <u>potteries</u> recovered during the excavation were also examined and studied thoroughly.</li> </ul>

### Quick Facts

- **Dwaraka** – It is located on the western tip of the Kathiawar Peninsula and is one of the 4 Char Dhams, India's holiest sites.
- **Beyt Dwarka** – It is an island off Gujarat's coast, believed to be Lord Krishna's ancient home.
- It is also known as Bet Shankhodhar due to its resemblance of Shankh shape.

**Char Dhams** are considered the most important Hindu pilgrimage sites in India they are Rameswaram, Puri, Dwarka, and Badrinath.



- **Dwarkadhish temple (Jagat Mandir)**- It is located in Dwarka and is believed to have been established over 2500 years ago by Lord Krishna's great-grandson, Vajranabh.
- It is situated at the junction of the Gomti River and the Arabian Sea.
- It was honored by Adi Shankaracharya, the 8<sup>th</sup> century Hindu theologian and philosopher.
- The original structure was destroyed by Mahmud Begada in 1472 and rebuilt in the 15<sup>th</sup>-16<sup>th</sup> century.

*In 2024 Prime Minister inaugurated Sudarshan Setu bridge which is the country's longest cable-stayed bridge of 2.32 km, on the Arabian Sea connecting Beyt Dwarka Island to mainland Okha in Dwarka district.*

## 1.7 Amarnath Temple

*The Amarnath Yatra will be held open soon which is organised only once a year and is conducted with tight security arrangements.*

- The Amarnath temple in **Jammu and Kashmir** is dedicated to Lord Shiva in the linga form.
- The linga is located on Amarnath mountain, in a cave at a height of 3,888 m, and is blocked by snow most of the year.
- **Discovered by** - It is believed to have been discovered by **ancient Sage Bhrgu**.
- **Hindu Myth** - Amarnath derives its name from the revelation of the secret of immortality (amaratva in Sanskrit) by Lord Shiva to his consort, Goddess Parvati.
- The cave is known as Amarnath because it is the site where the 'amar katha,' the story of immortality, was shared.
- Additionally, the location is referred to by other names such as **Amaresha and Amareshvara**.
- The linga at Amarnath is regarded as **swayambhu**, indicating that it emerged naturally without human intervention.
- **Geographical Features** - The linga is classified as a stalagmite, which forms from mineral deposits accumulating as water drips from the cave ceiling.
- As these water droplets freeze, they create the icy shivling. Consequently, Lord Amarnath is also affectionately known as Baba Barfani.

- The glaciers in the Lidder Valley, where the temple is situated, are believed to form concealed water channels that lead to the cave, serving as the source of the water.
- The Shivalinga experiences changes in size by the lunar cycle, reaching its largest form during the full moon in the month of Shravan (approximately in August).
- This ice lingam is thought to represent Lord Shiva, embodying his immortality and his ability to transcend time.
- **Related literary works - Kalhana's Rajtarangini**, written in the 12<sup>th</sup> century CE, mentions Amarnath at least twice.
- The significance of the place is narrated in an ancient work called Amreshwar Mahatamya.

### 1.8 Jallianwala Bagh Massacre & Sir Sankaran Nair

*Prime Minister Recently recalled Sir Chettur Sankaran Nair, who fought a battle against a senior official of the Raj who had sued Sir Sankaran for holding him responsible for the Jallianwala Bagh massacre.*

- He is a nationalist and jurist and a firm opponent of British colonialism.
- **Born in** - 1857 in an aristocratic family in Malabar's Palakkad district.
- **Graduated from** - Presidency College in Madras and got a degree in law.
- **Hired by** - Sir Horatio Shepherd who later became Chief Justice of Madras High Court.
- **Contributions** - Led the Indian National Congress Session in Amraoti in 1897.
- Sankaran Nair was designated as the public prosecutor in 1899 and later ascended to the position of judge at the Madras High Court in 1908.
- In 1912, he was honored with a knighthood by the British Crown.
- By 1915, he became a member of the Viceroy's Executive Council, focusing on educational reforms.
- In 1919, he played an important role in the expansion of provisions in the Montagu-Chelmsford reforms.
- However, in 1919, he chose to resign in protest against the Jallianwala Bagh massacre.
- Nair believed in India's right to self-government.
- Acted as the chairman of the All-India Committee, which engaged with the Simon Commission in 1928–29, albeit with limited success.
- Held the position of councillor to the **Secretary of State for India** from 1920 to 1921.
- In 1922, Nair published Gandhi and Anarchy, a book in which he spelt out his critique of Gandhi's methods of non-violence, civil disobedience, and non-cooperation.
- He also accused Michael O'Dwyer, who was Lieutenant Governor of Punjab at the time of the massacre, of following policies that led to the deaths.
- Nair passed away in 1934 at the age of 77.

*Montagu-Chelmsford reforms introduced a system of dyarchy in the provinces and increased participation of Indians in the administration.*

### Jallianwallah Bagh Massacre

- **Incident happened on** - April 13, 1919.
- It coincided with Baisakhi, a widely celebrated harvest festival in Punjab and northern India.
- Reason – To protest against the detention of two prominent leaders, **Satya Pal and Saifuddin Kitchlew**, as well as the enforcement of the Rowlatt Act.
- The gathering convened at Jallianwala Bagh; a park surrounded by walls with only a few small entrances.
- During the meeting, Brigadier-General Reginald Edward Harry Dyer, who had approached the scene with the intent to reprimand the assembled crowd, commanded the soldiers accompanying him to open fire on the attendees.

### Rowlatt Act



- **Passed on** - March 10, 1919.
- It authorizes the government to imprison or confine, without a trial, any person associated with seditious activities.

### 1.9 Dawoodi Bohra Community

*A delegation from the Dawoodi Bohra community met Prime Minister Narendra Modi recently to express their gratitude for the recently enacted Waqf (Amendment) Act, 2025.*

- The Dawoodi Bohras are a religious denomination within the **Ismaili branch of Shia Islam**.
- **Key populations** - They are primarily from West India, with members settled in over 40 countries worldwide.
- **Heritage** - The community traces its heritage to the Fatimid Imams, direct descendants of the Prophet Muhammad, in Egypt.
- **Leader**- Throughout the world they are guided by their leader known as the **al-dai al-mutlaq (unrestricted missionary)**, who first operated from Yemen and then, for the last 450 years, from India.
  - The present leader is the 53<sup>rd</sup> al-Dai al-Mutlaq, His Holiness Syedna Mufaddal Saifuddin.
- **Occupation** - They are generally highly educated, mostly self-reliant, typically traders, businesspersons, and entrepreneurs.
- **Faith** - The foundation of their faith is based on peace, love and humanity.
- **School of Thought** – They follow the Fatimi Ismaili Tayyibi school of thought.
- Their faith is based on the belief in one deity, Allah Ta'ala, in the Holy Quran as the word of Allah and in the sacred mission of the Prophets and their successors.
- **Language** - **Lisan al-Dawat**, a distinct language commonly known in the community as dawat ni zaban.
- **Power to excommunicate** - The members of the Dawoodi Bohra community acknowledge their leader's authority to excommunicate individuals from the community.
  - Excommunication entails being barred from entering the community's mosque or accessing its designated burial sites.

### Female genital mutilation (Khatna)

- Female genital mutilation (FGM) comprises all procedures **that involve partial or total removal of the external female genitalia**, or other injury to the female genital organs **for non-medical reasons**.
- It has no health benefits for girls and women.
- It can result in severe bleeding and problems urinating, and later cysts, menstrual difficulties, infections, as well as complications in childbirth and increased risk of newborn deaths.
- FGM is mostly carried out on young girls between **infancy and age 15**.
- FGM is a **violation of the human rights of girls and women**.
- The reasons for following this practice vary from one region to another as well as over time and include a mix of sociocultural factors within families and communities.
- In India it is predominantly **followed by the Bohra community**.
- More than 230 million girls and women alive today have undergone female genital mutilation (FGM) in 30 countries in Africa, the Middle East and Asia where FGM is practiced.
- **UNICEF and the United Nations Population Fund (UNFPA)** collaboratively spearhead the largest global initiative in 2008, aimed at **eradicating female genital mutilation (FGM)**.
  - It works alongside communities to educate them about the detrimental effects of FGM and to promote a change in social norms that encourages collective abandonment of the practice.

### 1.10 Old Rock Art Sites in Mizoram

The Archaeological Survey of India (ASI) has announced the discovery of 4 centuries-old rock art sites in Mizoram, estimated to date between the 16<sup>th</sup> and 19<sup>th</sup> centuries.

- **Survey conducted areas** - Champhai, Khawzawl, Saitual, and Serchhip districts.
- **Findings** - In Maite village, a rock cliff features a prominent human figure surrounded by smaller human figures, animals, gongs, a row of mithun heads, and some unidentified symbols.
- The **mithun (*Bos frontalis*)** is a semi-domesticated bovine found in the region.
- Carvings found at Lianpui in Champhai district include a prominent human figure, stacked rows of human figures, animals, fish, spears, dao (a type of machete), hornbills, and rectangular chambers.
- In Khawzawl district, findings at Tualte included etched mithun heads, human figures, grooved marks, and rectangular figurines on a vast rock surface.



- At Chhawrtu, also in Khawzawl, carvings comprised a unique combination of human figures, mithun heads, rows of human heads, a circular figurine with tendril-like lines, and a fish motif, all intricately carved.
- These discoveries highlighted the rich cultural heritage of Mizoram and the artistic expression of its ancient inhabitants.
- **Vangchhia site** - The recently identified rock art sites, recommended for preservation, are situated in the area around Vangchhia in the Champhai district.
- In January 2016, the Archaeological Survey of India (ASI) recognized Vangchhia as a location with indications of a substantial settlement, possibly linked to a "lost civilization" from the Neolithic Era, and referred to it as a **"living history museum."**
- The Vangchhia site, covering about 45 square kilometres yielded pictographs etched on large stone slabs, menhirs (large standing stones), a necropolis (a large burial ground), and other relics.
- Particularly noteworthy were a structure identified as a water pavilion and numerous strategically drilled holes, ranging from less than one foot to one metre in diameter, found in sandstones across several hill slopes.
- Archaeologists developed theories behind the seemingly simple science of water harvesting techniques employed at Vangchhia, likely capable of sustaining local populations for at least a year.
- They noted how inhabitants appeared to have trapped rainwater flowing down slopes by utilizing natural fissures and veins in the rocks, enhanced by the drilled holes.
- Researchers suggested this natural adaptation might have obviated the need for constructing large water tanks, despite the apparent capability to do so.
- Among the theories proposed for the drilled holes were denying enemies easy access to water sources, luring animals for hunting, and possible ritualistic practices.
- However, all theories converged on the primary function of efficient water harvesting.

### 1.11 Manuscripts of Bhagavad Gita & Natyashastra added to UNESCO's Memory of the World Register

*Manuscripts of the Bhagavad Gita and Bharata's Natyashastra are among the 74 new additions to UNESCO's Memory of the World Register this year.*

#### The Natyashastra

- Natyashastra is an ancient Sanskrit treatise on performing arts.
- Authorship** – Traditionally attributed to sage Bharata.
- Time period** – Estimated between 500 BCE to 500 CE.
- Composition** – Comprises 36,000 verses.
- Significance** – It provides a comprehensive set of rules that define,
  - Natya (drama)
  - Abhinaya (performance)
  - Rasa (aesthetic experience)
  - Bhava (emotion)
  - Sangita (music)
- It is often referred to as the fifth Veda, as it integrates elements from the four Vedas.

*The 4 Vedas are Rigveda (words), Samaveda (music), Yajurveda (gestures/actions), and Atharvaveda (emotions).*

#### The Bhagavad Gita

- Bhagavad Gita is a Hindu text in the ancient intellectual Indian tradition.
- Authorship** – Attributed to sage Vyasa.
- It is embedded in the sixth book (Bhishma Parva) of the epic Mahabharata.
- Composition** – 700 verses organized in 18 chapters.
- Time period** – Generally dated to first or second century BCE.
- Central theme** – Dialogue between Arjuna and Krishna before the Mahabharata war and Krishna's responses to Arjuna on dharma (duty), karma (action), and the nature of the divine.

#### India's Representation in the Register

- India has 13 submissions to the Memory of the World Register (including two joint submissions).
- Notable entries**
  - Rig Veda (added in 2005)
  - Abhinavagupta's works (added in 2023)
  - Non-Aligned Movement archives (joint submission with Algeria, Egypt, India, Indonesia and Serbia, 2023)
  - Dutch East India Company archives (joint submission Netherlands, South Africa and Sri Lanka, 2003)

#### UNESCO's Memory of the World Programme

- It is an initiative to safeguard the valuable archive holdings and library collections all over the world against the collective amnesia, preserve and ensure their wide dissemination.
- Aim** – Facilitate preservation of the world's documentary heritage, particularly in areas affected by conflict and/or natural disaster.
- Enable universal access to documentary heritage worldwide.
- Enhance public awareness about the significant of documentary heritage among the wider public.
- Established in** – 1992.
- Central Project** – Creation of a register of documents of world significance and outstanding universal value.
- The Register has been biennially updated, with the exception of a lengthy gap between 2017 and 2023 with between nine (in 1999) and 78 (in 2017) additions.

- It includes Books or collections of works, Drawings, Manuscripts, Audio recordings and Video recordings.
- **Selection Process** – Maximum two submissions from a country are added biennially.
- **Current Status** – 570 entries after the latest additions.

### 1.12 Kailash Mansarovar Yatra

*The resumption of the yatra was formally discussed for the first time at the Special Representatives meeting in Beijing, which has been suspended since 2020.*

- **Location** - Lake Mansarovar, known locally as Mapam Yumtso, is a high-altitude freshwater lake near Mount Kailash in the Ngari Prefecture of the **Tibet Autonomous Region (TAR)**.
- Both the lake and the adjacent high mountain are believed to be the home of **Lord Shiva**, are sacred in **Hinduism, Buddhism, Jainism, and the Tibetan Bon religion**.
- **Yatra** – Ministry of External Affairs organized the pilgrimage for Indians between the months of June and September each year.
- Pilgrims usually trek to Lake Mansarovar, and then circumambulate the nearby Mount Kailash.
- **Eligibility** - The journey usually took between 23 and 25 days, and was open to anyone holding Indian passports, displaying medical and physical fitness.
- **Age** - Between 18 - 70.
- The total cost of the yatra would be upwards of Rs 2 lakh.
- **The two routes** - There are two primary routes to reach Lake Mansarovar from India.
- **Lipulekh Pass Route** - Lipulekh pass lies at an altitude of 5,115 metres, on the border between **Uttarakhand and TAR**, near the trijunction with Nepal.
- It is an ancient passageway between the Indian subcontinent and the Tibetan Plateau, frequented by traders and pilgrims alike.
- While the Lipulekh pass route is the most direct way to get to Mansarovar from India, the lake is roughly 50 km from the border, the terrain makes the journey very challenging.
- Currently, this route entails roughly 200 km of hard trekking. Before 2020, it had been operational since 1981.
- **Nathu La Pass Route** - Nathu La pass lies at an altitude of 4,310 metres on the border between Sikkim and TAR.
- It is one of two mountain passes in the region, the other being **Jelep La** that have connected Sikkim and Tibet since ancient times.
- The route to Mansarovar from Nathu La is much longer in terms of distance lose to 1,500 km.
- But it is fully motorable, meaning pilgrims can make it all the way to the lake without any trekking. (They would only need to trekk 35-40 km for the circumambulation of Mount Kailash).
- This route became operational in 2015.
- On the Indian side, logistics were arranged by the **Kumaon Mandal Vikas Nigam** on the Lipulekh route, and the Sikkim Tourism Development Corporation on the Nathu La route.
- TAR authorities provided accommodation and logistics on the other side of the border.
- One could provide the preference of route during the registration process on the MEA portal.

### 1.13 Digambar Jain temples

*The Brihanmumbai Municipal Corporation (BMC) recently demolished most of the Digambar Jain temple, which Digambar Jain Mandir Trust managed in Vile Parle in the city's western suburbs, Mumbai.*

- Digambara Jain temples are significant in the religious landscape of India, particularly for the **Digambara sect within Jainism**.
- These temples, often referred to as **Digambara Jain Mandir**.



- These temples features elaborate carvings and sculptures of the **24-four Tirthankaras**, are integral to the faith's architecture and cultural practices.
- **Sub-sects** - Digambara temples can be found in different sub-sects, each with its own distinct rituals and practices, such as Mula Sangh, Terapantha, and Taranapantha.
- **Key features** - The presence of idols, the use of ashtadravya (eight sacred objects) for worship, and offerings of flowers and fruits, though some sub-sects may substitute these with dried versions.
- **Examples** - Ellora Caves (Maharashtra) and the Sri Digambar Jain Lal Mandir in Delhi.

### Digambara Sect

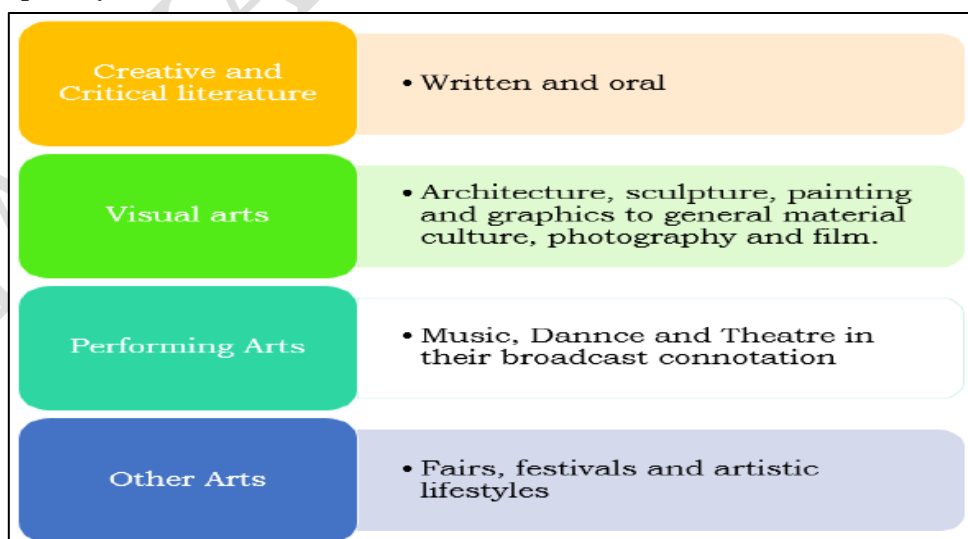
- The Digambara sect is one of the two main branches of Jainism, the other being the Shvetambara sect.
- The term "Digambara" literally translates to **"sky-clad,"** referring to the Digambara monks practice of **wearing no clothes.**
- They believe that renouncing all material possessions, which is essential for achieving liberation.
- **Historical Influence** - Digambara sect has a significant presence in South-West India, particularly in Maharashtra and Karnataka.
- **Text** - They does not believe in the existence of original canonical texts.
- **Possessions** - Digambara monks are allowed only two possessions, a Jainworld states peacock feather whisk (pinchi) for cleaning the path and a water gourd (kamandalu) for drinking water.
- **Diet and Eating Practices** - Digambara monks eat only once a day in a standing posture, at a single house.

### 1.14 Indira Gandhi National Centre for the Arts (IGNCA)

Recently, Indira Gandhi National Centre for the Arts (IGNCA) launched Essential Book on the Preservation and Interpretation of India's Manuscript Heritage.

- **IGNCA** – It is visualised as a centre encompassing the study and experience of all the arts.
- It envisions to place the arts within the context of the natural and human environment.
- **Established in – 1987 as an autonomous institution** under the Ministry of Culture.
- **Objectives** – To serve as a major resource centre for the arts, especially written, oral and visual source materials.

*IGNCA was initially conceptualised and launched in 1985 at a function where **5 rocks from 5 major rivers** – Sindhu, Ganga, Kaveri, Mahanadi and the Narmada (where the most ancient ammonite fossils are found) were composed into sculptural forms.*



- To undertake research and publication programmes of reference works, glossaries, dictionaries and encyclopaedia concerning the arts and the humanities.
- To establish a tribal and folk arts division with a core collection for conducting systematic scientific studies and for live presentations.

- To provide a *forum for a creative and critical dialogue* through performances, exhibitions, multi-media projections, conferences, seminars and workshops.
- To foster dialogue between arts and current ideas in philosophy, science and technology.
- To *promote a network* with national and international institutions.
- To conduct related *research in the arts, humanities and culture*.

### 6 Functional Units of IGNCA

- **Kala Nidhi** - The multi-form library.
- **Kala Kosa** – It is devoted mainly to the study and publication of fundamental texts in Indian languages.
- **Janapada Sampada** – It is engaged in lifestyle studies.
- **Kaladarsana** – It is the executive unit which transforms researches and studies emanating from the IGNCA into visible forms through exhibitions.
- **Cultural Informatics** – It applies technology tools for cultural preservation and propagation.
- **Sutradhara** – It is the administrative section that acts as a spine supporting and coordinating all the activities.

### 1.15 Pandit Chatur Lal

The Department of Posts, Government of India, will release a commemorative stamp to honour Pandit Chatur Lal in his centenary year celebrations.

- He was the **1st Indian percussionist to introduce tabla to the West** in the 1950s.
- **Born in** – Udaipur.
- Chatur Lal came from a family of court musicians and farmers.
- **Musical Career** - He learned tabla under the aegis of Ustad Abdul Hafiz Ahmed Khan, who trained from Jehangir Khan, the court musician of Indore who had trained in the **Farukhabad and Lucknow styles**.
- He played a crucial role in connecting Indian classical rhythms with Western music, paving the way for subsequent **Indo-jazz ensembles such as Shakti**.
- In 1952, Menuhin (American-born British violinist) visited India experienced a private concert featuring Shankar and Chatur Lal, which profoundly impacted him.
- **Awards** – He was the first Indian percussionist to be nominated at the Oscars in 1957 for his work in the Canadian short film **A Chairy Tale**.
- He was honoured with a **Special BAFTA Award**.
- **Passed away in** – 1965.

### Other Important Topics

#### Odisha Foundation Day or Utkal Divas

The people of Odisha on Utkala Dibasa, celebrating the state's formation.

- **Celebrated on** – April 1<sup>st</sup>, 2025, marking the 88<sup>th</sup> anniversary of **Odisha's statehood, achieved in 1936**.
- **From Bengal Presidency to Statehood** – Prior to 1936, **Odisha was part of the Bengal Presidency**, alongside Bihar and Jharkhand.
- The movement for a separate state gained momentum in the early 1920s.
- **Prominent leaders in the Statehood Movement** – Madhusudan Das, Utkalmani Gopabandhu Das, and Fakir Mohan Senapati.

#### New Chola Inscription

*A new inscription pertaining to Rajaraja Chola, has been discovered recently.*

- **Discovered at** – Somagiri hills at Melavalavu in Madurai, Tamil Nadu.
- **Time period** – It dated back around 1,000 CE.
- **Honorific title** – The inscription begins with the title Raja Mummudichola, a unique salutation found in this region, known as the Pandya country.
- **Information** – It mentions about capturing and ruling of the area by a military commander called Viranarana Pallavarayan.
- Malaiyappa Sambu, who cut the steps on the rock to reach a ledge where a temple had been constructed.

### **Remnants of the Megalithic Era**

*Recently, a rock-cut chamber and artefacts were unearthed at Manimoola village in Bandadukka, Kerala.*

- **Time period** – Nearly 2,000 years old under megalithic period.
- **Discovered items** – Black ware pots, five 4-legged jars, clay utensils resembling lids of large vessels, an iron stove stand with 3 support stones, and iron tools resembling penknives.
- Several bone fragments were also found.
- A nearby stone structure '**Pathaya Kallu**' is also believed to be a megalithic-era monument.

### **Wat Pho**

*Recently, the Prime Minister of India visited Wat Pho.*

- It is an ancient Buddhist temple complex, located in Rattanakosin Island, south of Bangkok, Thailand.
- **Official name** – Wat Phra Chetuphon Wimon Mangkhalaram Rajwaramahawihan, popularly known as Wat Pho.
- **Constructed in** – 16<sup>th</sup> century as a monastery and was restored in 1788 by King Rama-I.
- **Significance** – It is home to the Thailand's oldest center for public education, home to a school for Thai medicine and known as the birthplace of Thai massage.
- It houses both the largest collection of Buddha images and the largest Reclining Buddha statue in Thailand

### **Harit Yoga Initiative**

*Recently, the Minister of State for Ayush launched Harit Yoga.*

- **Part of** – 10 Signature Events of International Day of Yoga (IDY) 2025.
- **Objective** – To encourage individuals to plant trees as a symbolic act of nurturing both personal and planetary health.
- More than 5000 medicinal plants were distributed amongst the Yoga enthusiasts.
- It integrates yoga with environmental consciousness.

**International Day of Yoga 2025** will be celebrated on **21<sup>st</sup> June 2025**, with a theme of '**Yoga for One Earth One Health**'.

### **Gorkha Community**

*Recently, the Ministry of Home Affairs (MHA) convened a meeting to resolve issues related to the Gorkha community.*

- **Gorkha Community** – It is a group of ethnic communities of people who speak Nepali language, which is included in the 8<sup>th</sup> schedule of the Indian Constitution.
- **Distribution** – They are residents of Nepal and Indian states like Assam, Sikkim, West Bengal, Uttarakhand and other parts of the country.
- **Sub-castes:**
- Bahuns (Brahmins), Chhetry, Bhujel, Tamang, Magar, Rai, Limbu, Gurung, Pradhan, etc.

### **Chittorgarh Fort**

Recently, the Rajasthan government informed the Supreme Court that it is “actively considering” a complete ban on mining activities up to 10 kilometres from the outer boundary of the historic Chittorgarh Fort.

- It stands as the largest fort complex in India.
- **Location** – On the Banks of river Gambhiri and Berach, Rajasthan.
- **Construction** – Initially constructed by Chitrangad of the Mori (Mourya) dynasty during the 7<sup>th</sup> century AD.
- **Key structures** – It houses 65 historic structures, including 20 large temples, 6 palaces, memorials, and victory towers.
- Rani Padmini’s Palace, Fateh Prakash Palace Museum, and the Tower of Victory.
- **Recognition** – It is a UNESCO World Heritage Site.

### **Khultabad Name Change to Ratnapur**

Recently, Maharashtra government announced the renaming of the historic town Khultabad to its original name, Ratnapur.

- **History of Ratnapur/Khultabad** - Originally known as Ratnapur, the town's name was changed to Khultabad during the Mughal era.
- **Location** - Situated approximately 25 km from Chhatrapati Sambhaji Nagar (formerly Aurangabad)
- **Tomb of Aurangzeb** – The town houses the tomb of Mughal emperor Aurangzeb, along with the graves of his son Azam Shah and Asaf Jah I, the founder of the Hyderabad Nizam dynasty.

### **Jallianwala Bagh Massacre**

On a recent occasion, the Prime Minister honored those who tragically lost their lives in the Jallianwala Bagh massacre of 1919.

- This horrific event unfolded on 1919, in Jallianwala Bagh, Amritsar.
- **Tragedy** – Hundreds of unarmed and peaceful civilians gathered to protest against the Rowlatt Act of 1919.
- **Causes** – The Gurkha British Indian army, acting under the command of Brigadier R.E.H. Dyer, carried out the brutal firing upon the defenseless crowd.

### **Ambedkar Jayanti**

Recently, India observed the 135<sup>th</sup> Dr. Ambedkar Jayanti on April 14<sup>th</sup>, 2025.

- It is observed annually to commemorate Dr. Ambedkar birth anniversary.
- Bhimrao Ramji Ambedkar, popularly known as Babasaheb was born in 1891 at Mhow, Central Province(now



Madhya Pradesh).

- He was a renowned jurist, economist, and social reformer.
- He was the *Chairman of the Drafting Committee* for the new Constitution.
- He is known as the *Father of the Indian Constitution* and was the *1<sup>st</sup> Law Minister*.

### ***Fourth Anglo-Mysore War***

*The Fourth Anglo-Mysore War commenced on April 17, 1799, and concluded swiftly with the fall of Seringapatam on May 4, 1799.*

- **Initial British Military Successes** – Early in the conflict, Tipu Sultan faced significant defeats at the hands of English Generals Stuart and subsequently Harris, weakening his forces.
- **Tipu Sultan's Final Stand** – The war culminated in Tipu Sultan's courageous defense of his capital, Seringapatam, where he ultimately met his death while valiantly fighting the British forces.
- **Consequences for Tipu's Family** – Following Tipu Sultan's demise, the British took his family into custody, detaining them at Vellore, and seized his considerable wealth and treasures.

### ***Karnataka Village-Level Antiquities Survey***

*Recently, Karnataka has become the 1<sup>st</sup> Indian state to complete a comprehensive village-level antiquities survey.*

- **First-of-its-Kind Documentation** – The state's Department of Archaeology is surveying 119 taluks for detailed antiquities documentation.
- **Geo-tagging for Heritage Tracking** – The survey includes geo-tagging inscriptions, sculptures, and monuments for precise location-based records.
- **Expanding Protected Monuments List** – A proposal to add 110 monuments to the protected list is underway, with a future goal of protecting 1,000 more.
- **Addressing Conservation Challenges** – Karnataka faces resource and coordination hurdles in protecting its over 25,000 monuments.
- **CSR Initiatives for Monument Upkeep** – The 'Adopt a Monument' initiative seeks corporate social responsibility (CSR) funding for heritage conservation.

### ***Mehrgarh Farming Settlement***

*Recently, radiocarbon dating using Accelerator Mass Spectrometry (AMS) has adjusted the timeline of the farming settlement in Mehrgarh from 8000 BCE to 5200 BCE.*

- **Location** – Mehrgarh, a Neolithic site, is situated at the entrance of the Bolan Pass in Balochistan, Pakistan.
- **Early agricultural practices** – The site reveals the presence of an early farming village with evidence of domesticated wheat, barley, and cattle.
- It is the earliest known location where cotton was utilized in the Old World.
- **Excavations** – Preserved mud brick structures, burial sites, and distinctive pottery known as Togau ware.
- **Implications** – The revised dating to 5200 BCE provides a more accurate chronological framework for understanding the development of early agriculture and settlement patterns in the region preceding the Harappan civilization.

### ***Vaikom Satyagraha Agreement***

*A century ago (100 years), the Travancore Government fully implemented the agreement reached during the*

### *historic Vaikom Satyagraha in Kerala.*

- **Vaikom Satyagraha (1924-25)** - Held in Vaikom village, Kottayam district.
- **Aim** - To eradicate untouchability and secure freedom of movement in public areas.
- Dalits faced severe restrictions, being barred from entering the Vaikom temple premises and even using the roads surrounding it, igniting the Satyagraha.
- **Key Leaders** – K. Kelappan, T. K. Madhavan, and K. P. Kesava Menon spearheaded the movement, which also received crucial support from Mahatma Gandhi, who visited in 1925.
- **Success in Opening Temple Roads** - The persistent Satyagraha ultimately achieved its goal, successfully opening the temple roads to people of all castes.
- **Legacy of Equality and Social Justice** - The full implementation of the agreement marked a significant victory in the fight against untouchability and a crucial step towards social equality and justice in Kerala.

### *Passing of Historian Muttayil Govinda Sankara Narayanan*

*Recently, India mourns the demise of the eminent historian MGS Narayanan, widely known as M G S Narayanan, who passed away at 92, leaving a significant void in Indian historiography.*

- **Early Life and Background** - Born on August 20, 1932, in Ponnani, Kerala, a region steeped in cultural history.
- **Leadership Roles in Historical Research** - Narayanan held key positions, serving as Member Secretary and later as Chairman of the esteemed Indian Council of Historical Research (ICHR), guiding historical scholarship in India.
- **Academic Contributions** - He was closely associated with the University of Calicut, making substantial contributions to its research endeavors and overall academic development.
- **Prolific Author and Researcher** - Authored over 200 books and articles, including an impressive 112 research papers published in renowned national and international journals.
- **Specialization in South Indian History** - His research extensively focused on Kerala's ancient history, temple inscriptions, Brahmin settlements, and broader social transformations across South India.

### *Bajirao Ballal*

*Baji Rao I, also known as Bajirao Ballal, was a significant figure in the Maratha Empire passed away on 28<sup>th</sup> April 1740 at Raverkhedi, near the banks of the Narmada River in present-day Madhya Pradesh.*

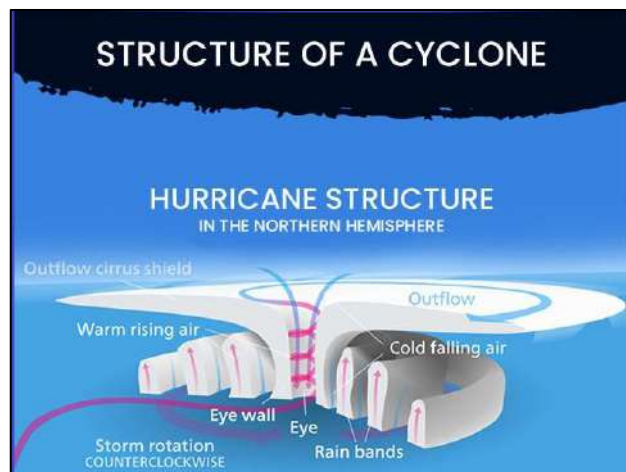
- **Birth**- Born as **Visaji** on **August 18, 1700**, in Sinnar, near Nashik.
- **His parents** - Were **Balaji Vishwanath Bhat**, the Peshwa of Chhatrapati Shahu, and **Radhabai Barve**.
- **About Baji Rao I** - Baji Rao I served as the **7<sup>th</sup> Peshwa** of the Maratha Empire and is renowned for his military prowess, strategic thinking, and significant expansion of the Maratha influence.
- He is credited with transforming the Maratha kingdom into a vast empire through a series of successful military campaigns.
- He never lost a battle in his 20-year military career.
- His campaigns extended the Maratha influence significantly into North India, including **Gujarat, Malwa, Rajputana, and Bundelkhand**.
- **Political Influence** - He played a key role in establishing Maratha supremacy in the Indian subcontinent, effectively displacing Mughal dominance.

## 2. GEOGRAPHY

### 2.1 Landfall of a cyclone

The India Meteorological Department (IMD) recently reported that Cyclone Fengal, tropical cyclone made landfall over Puducherry.

- **Formation of a cyclone** - Cyclones are large storms that form when water evaporates from the surface of a sea into the air.
- As it rises, the air cools and becomes saturated with vapor, eventually forming clouds.
- These clouds and the air circulation around them eventually start to rotate.
- The warmer the sea, the more powerful the cyclone will be. There are many requires for a cyclone to form.
- Once it is fully formed, all tropical cyclones (in the northern hemisphere) have a complex 3D structure.
- At this point it has 2 important features, among others - the eye and the eyewall.
- **Eye of a cyclone** - The eye is the small centre around which the cyclone rotates. It consists of cold air descending from the cyclone's top with warm air rising in a spiral around it.
- **Eyewall of a cyclone** - The eyewall consists of high thunderstorms that bring rain, lightning, and powerful winds.
- These storms may also have large cloud tops called a central dense overcast that obscure a view of the eye as seen from above.
- As long as the cyclone moves over water, it can draw more moisture from below to produce new clouds and rain events around it.
- But when the storm crosses over onto land, its **moisture supply declines drastically** and the cyclone weakens.
- **Landfall** - Landfall is the event of a **tropical cyclone coming onto land** after being over water.
- A tropical cyclone is said to have made landfall when the **centre of the storm or its eye moves** over the coast.
- Landfalls can last for a few hours, with their exact duration **depending on the speed of the winds and the size of the storm** system.
- As because the strongest winds in a tropical cyclone are not located precisely at the centre, it is possible for a cyclone's strongest winds to be experienced over land even if landfall does not occur.



### 2.2 Causes of Myanmar's Earthquake

India's National Centre for Seismology says soil liquefaction caused severe damage in the recent earthquake that stuck in Myanmar.

- **Earthquake** – It is the shaking of the earth's surface caused by a sudden release of energy within the earth's crust.
- **Epicentre** – Mandalay in Myanmar
- **Cause of earthquake** – Mainly due to **Sagaing Fault**.

**Focus or Hypocenter** is the point within the Earth where an earthquake rupture starts. **Epicenter** is the point at the surface of the Earth above the focus.

#### Sagaing Fault

- It is a major fault line located 1,200 km east of the **Indo-Burma subduction zone**.
- **Geography** – To the east of the Sagaing Fault is the Sunda Plate.

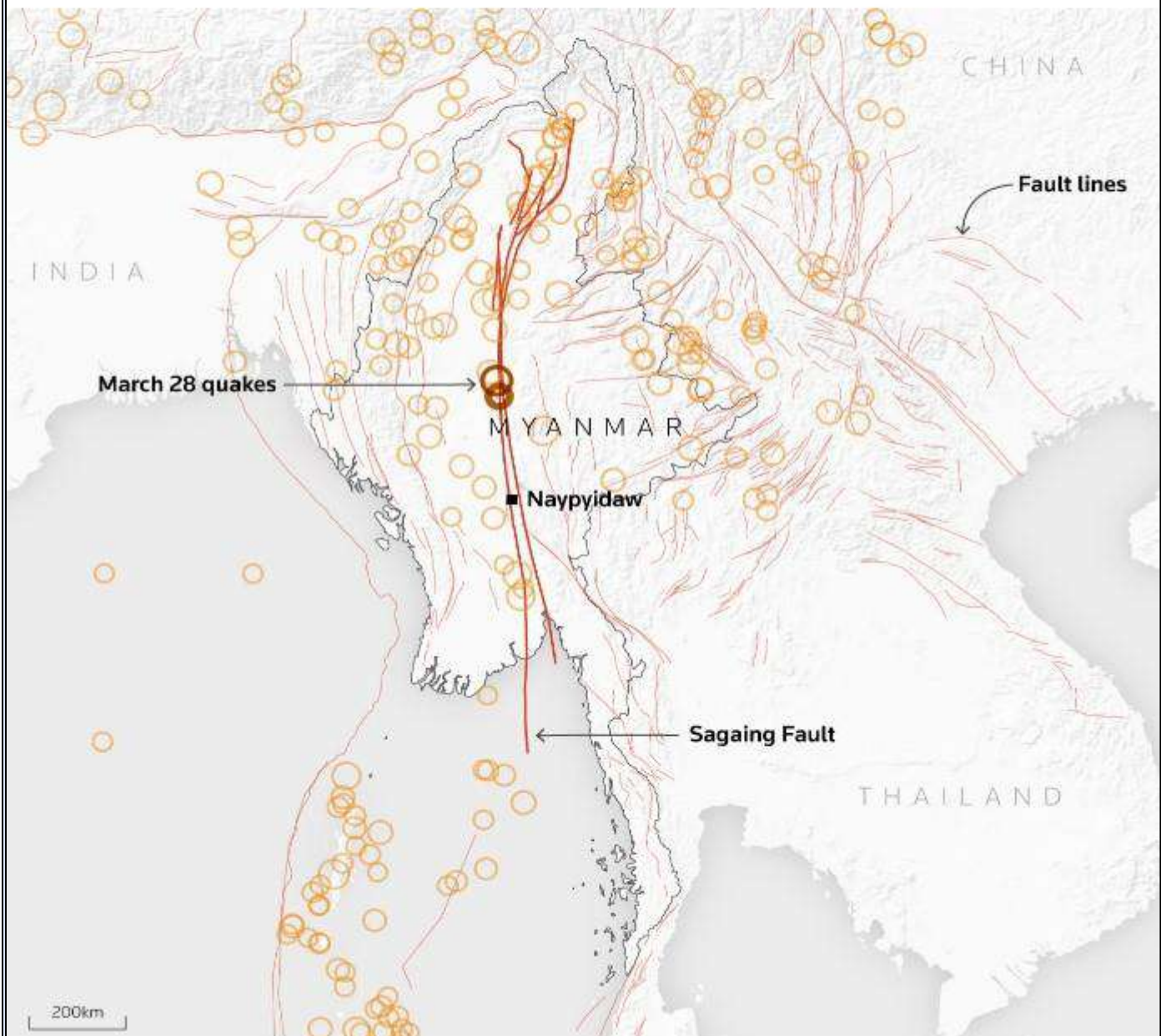


- The Fault is the partitioning between the Myanmar plate and the Sunda plate.
- **Concept** – It is a 'strike-slip' fault, which means that the Indian and Sunda landmasses are moving horizontally against each other which releases a lot of energy.

## Myanmar rattled by magnitude 7.7 earthquake

The Sagaing fault line runs through or close to major cities including Yangon, Naypyidaw and Mandalay.

### Magnitude 6+ earthquakes since 1900



Source: USGS

Sudev Kiyada • March 28, 2025 | REUTERS

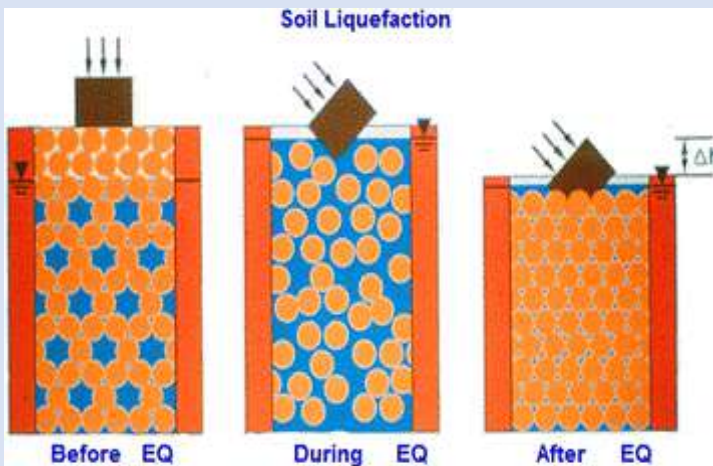
- **Major causes for damage**
  - **Resonance Effect** – The natural frequency of a structure matches with the frequency of seismic waves, causing amplified vibrations.



○ **Soil liquefaction.**

### Soil liquefaction

- **It is a phenomenon that occurs when saturated, loose soil loses its strength and behaves like a liquid due to intense seismic shaking.**
- **Conditions** – It usually occurs in places with loose, wet soil like sandy areas near rivers or the coast.
- **Concept** – When the earthquake shakes the ground, the water between the soil particles pushes them apart, making the soil lose its strength.
- **Consequences** – As a result, buildings, roads and other structures may sink, tilt or collapse.



*Thailand's capital Bangkok, which is more than 1,000 km away from the epicentre suffered significant damage as the rupture's direction was towards it.*

**National Centre for Seismology** is the nodal agency involved in monitoring seismic activity across the country with the help of National network consisting of 166 stations. It works under Ministry of Earth Sciences and are aimed at better earthquake monitoring, early warning systems, and research into seismic activity.

### 2.3 Hadean Protocrust

*New research suggests that Earth's first crust, formed over 4.5 billion years ago.*

- The Hadean protocrust is the name for the **earth's crust**, its outermost layer when it first formed.
- **Hadean Aeon** - The term 'Hadean' denotes the initial geologic aeon of the planet.
- **Conditions of Earth** - During this period, approximately 200 million years after its formation, the Earth's surface was **partially in a molten state** and was frequently struck by extraterrestrial rocks.
- The surface was extremely hot and hellish, as numerous volcanoes erupted simultaneously.
- **Formation of Crust** - As the magma ocean began to cool, the initial fragments of the crust started to form.
- However, it remained somewhat unstable, with certain sections breaking away while new areas solidified.
- **Plate Tectonics** - The thicker parts of the crust slowly formed the first continents, which moved like plates on the **asthenospheric mantle**, a layer of hot, gooey rock going 400 km down.
- These plates began to converge, occasionally sliding past one another or submerging beneath each other.
- Over thousands of years, these tectonic movements have imprinted distinctive chemical signatures in the crust.
- Indeed, researchers have been able to trace the history of plate tectonics by examining these signatures.

### 2.4 Atmospheric River

*Recently United States witnessed heavy rain, strong winds and severe thunderstorms due to a type of storm known as an atmospheric river.*

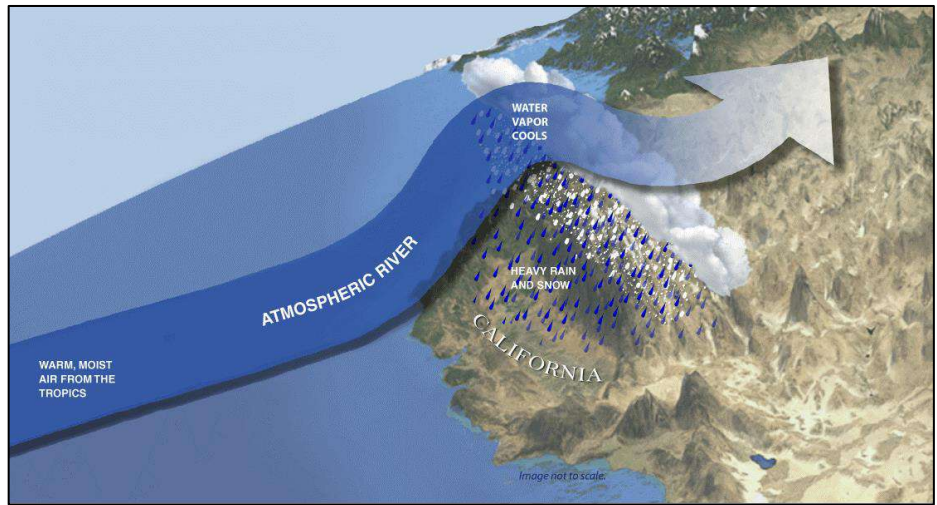
- **Atmospheric rivers** – They are a **narrow, fast-moving band of moisture and wind** like a river in the sky.
- It transport large amounts of water vapour.
- **Occurrences** – They occur all over the world but **most common in the mid-latitudes**.

*The "Pineapple Express" is one of the strongest known atmospheric rivers, carrying moisture from tropical Pacific near Hawaii to the North American west coast.*

- **Formation** – They form when large-scale weather patterns create narrow channels of intense moisture transport.
- They **start over warm water** typically tropical oceans, and are and guided towards the coast by low-level jet streams ahead of cold fronts of extratropical cyclones.

**Extratropical cyclones** are also called *wave cyclone or mid-latitude cyclone or temperate cyclones*.

- **Characteristics** – It can vary in size and strength
- **Width** - 402-606 km
- **Length** - Can exceed 1600 km
- **Impact** – While providing essential rainfall, it can also cause,
  - Flooding
  - Mudslides
  - Hurricane-like conditions
  - Property damage



#### Impact of Climate Change on Atmospheric River

- **High moisture retention** – With global temperatures soaring, more water is evaporating into the air.
- As warmer air can hold more water vapour for every 1°C rise in average temperature, the atmosphere can hold about 7% more moisture.
- **Increase in intensity** – More moisture can lead to increase in precipitation intensity, which ultimately causes severe flooding across the world.
- **More frequent atmospheric river** – NASA's 2018 study projected atmospheric rivers becoming significantly longer and wider, leading to more frequent atmospheric river conditions.

According to the National Oceanic and Atmospheric Administration (NOAA), when atmospheric rivers pass over land they can cause conditions similar to those of hurricanes with intense and rapid rainfall, cyclone force winds, and significantly increased wave heights.

## 2.5 Agasthyamalai Landscape

The Supreme Court of India has directed the Central Empowered Committee (CEC) to conduct a detailed survey of the tropical forest ecosystems in the Agasthyamalai landscape.

#### Agasthyamalai Biosphere Reserve

- **Location** – In the Southern Western Ghats including **Tamil Nadu and Kerala**.
- It is part of the Western Ghats biodiversity hotspot.
- **Status** – It is recognised by the UNESCO as a Biosphere Reserve.
- **Named After** – The Sage Agastya, with cultural and spiritual significance in Tamil tradition.
- **Fauna** - Lion-Tailed Macaques, Bengal Tiger, Nilgiri Marten, Nilgiri Tahr, Malabar Spiny Dormouse, Great Pied Hornbills, Gaur, and Sloth Bear.
- **Flora** - Abundant in rare herbs and medicinal plants, with around 2,000 medicinal plants used in Ayurvedic treatments found here.
- **Protected Areas**
  - Neyyar, Peppara, and Shendurney Wildlife Sanctuaries,
  - Kalakad Mundanthurai Tiger Reserve,
  - Periyar Tiger Reserve and
  - Srivilliputhur Grizzled Squirrel Wildlife Sanctuary (TN).

- **Tribes** – Kani Tribes inhabited in this area.

### Supreme court judgment on Agasthyamalai Landscape

- The judgement came on 2 separate petitions,
- **Public Interest Litigation** – It was initiated by environmental activists who sought judicial intervention to protect this biodiversity hotspot.
- **Private litigation** – It was filed by tea estate worker, seeking rehabilitation and compensation following their displacement from the Singampatti tea estate (Tamil Nadu) as it was reclassified as a reserved forest and tiger habitat between 2007 and 2018.
- **Judgement** – The Supreme Court directed the Central Empowered Committee (CEC) to conduct a detailed survey of the Agasthyamalai landscape to assess encroachments and non-forestry activities.

### Role of Central Empowered Committee (CEC)

- It is a **Supreme Court** appointed body to ensure compliance with environmental norms and court orders.
- It is tasked with preparing a comprehensive report on the extent of encroachments and suggesting restorative measures.
- Will provide guidelines for the rehabilitation of affected communities, such as those evicted from forest lands.
- **Areas included in the CEC survey**
  - The Periyar Tiger Reserve
  - Kalakad and Mundanthurai Tiger Reserve (KMTR)
  - Meghamalai and Tirunelveli Wildlife Sanctuaries
  - Sivilliputhur Grizzled Squirrel Sanctuary

## 2.6 Recent findings on Earth's Geological process

*Scientists have recently discovered that a rare geological process is tearing the Indian Plate apart deep beneath the surface.*

- Researchers revealed the India plate is delaminating, its dense lower layer peeling off and sinking into the Earth's mantle.
- The process called delamination was detected beneath the Tibetan Plateau using seismic waves and helium gas analysis from natural springs.
- This shift could reshape earthquake patterns **across the Himalayas and beyond.**
- The findings reveal that parts of these plates especially their deeper sections can soften, break off, and sink back into the Earth over geological time.
- These findings have raised urgent scientific questions about the stability of one of Earth's most active tectonic zones.
- **Impact** - The Himalayan region is already one of the most earthquake-prone areas in the world.
- With the Indian Plate tearing from below, new stress lines could be forming in the crust above.
- The tearing and sinking of the plate could create new stress points in the Earth's crust, triggering more frequent and potentially more powerful quakes.
- Particular attention is being paid to the **Cona-Sangri Rift**, a deep fracture in the Tibetan Plateau.
- Scientists believe it may be directly connected to this hidden tear. If confirmed, regions around this rift could face heightened earthquake threats in the coming decades.
- The implications go beyond India. The study suggests that delamination may not be unique to the Indian Plate.
- Researchers are now scanning other continental plates for signs of similar activity.
- Researchers continue to monitor seismic activity and helium levels across the region, using these tools to paint a clearer picture of the miles beneath the Earth's surface.

## Other Important Topics

### Chicken's Neck Corridor

Bangladesh has invited China to invest in a river conservation project near the Chicken's Neck Corridor, raising strategic concerns for India.

- **Chicken's Neck or Siliguri Corridor** – It is a narrow land strip in West Bengal, crucial for connecting India's mainland to its northeastern states.
- **Link to north-eastern states** – Arunachal Pradesh, Assam, and Sikkim, vital for their integration with the rest of the country.
- **Bordered by** – Nepal, Bhutan, and Bangladesh.
- **Strategic importance** – It is essential for military movement and supply, and any disruption could isolate India's northeast, posing a severe security threat.
- **China's role** – Its proximity to the India-China border, especially the Chumbi Valley, where China has military infrastructure.

### Zojila Pass

Border Road Organization (BRO) has recently opened Zojila Pass in record time after a mere closure for 32 days.

- **Located on** – Srinagar-Kargil-Leh highway (NH-1) at a height of 11,650 feet, which connecting Kashmir Valley to Ladakh.
- It is one of the most critical and challenging **high-altitude passes in the world**.
- It remains closed for almost half of the year due to heavy snowfall.
- **Historical background** – It was the site of the Indo-Pakistan War of 1947-48.
- **Operation Bison** – The pass itself was captured by the Indian Army on 1<sup>st</sup> November 1948.

### Japan's Nankai Trough Megaquake Warning

Japan has recently issued warnings regarding a potential "megaquake" in the Nankai Trough, Japan.

- **Megaquake magnitude** – It indicating a magnitude of 8 or greater.
- **Location** – The Nankai trough is located off Japan's southwest Pacific coast, extending approximately 900 km.
- It's a subduction zone where the Philippine Sea Plate is subducting beneath the Eurasian Plate.

A **subduction zone** is a geological area where 2 tectonic plates collide, with one plate sliding beneath the other.

### Major Minerals

Recently, mining leases for the major minerals issued in the 5<sup>th</sup> and 6<sup>th</sup> Schedule areas.

- Major minerals include iron ore, coal, bauxite, gold, and now, Barytes, Feldspar, Mica, and Quartz
- **Mines and Minerals (Development and Regulation) (MMDR) Act, 1957** – It empowers the State Governments to grant mineral concessions for the minerals located within their respective jurisdiction.
- **Responsibility of State Government:**
  - To collect the revenue generation.
  - Rehabilitation of displaced people.
- **Madhya Pradesh** – It has been granted above 7 leases after obtaining all requisite permissions.
- Gujarat, Rajasthan and Chhattisgarh states were not granted mining lease in the past 5 years.



### Kuirektykol Reserves

Recently, 10,00,000 tonnes of largest rare Earth metals deposit discovered in Kuirektykol site.

- **Located in** – To southeast of Astana in Kazakhstan.
- **Deposits** – Elements like Cerium, lanthanum, neodymium, and yttrium with an average concentration of 700 grams per ton.
- Rare earth metals are vital for technologies such as electric vehicles, wind turbines, and defense systems.

### Kannadippaya – GI Tag

Recently, Kannadippaya has received the Geographical Indication (GI) tag.

- It is a unique tribal bamboo mat which is mainly woven by 5 ethnic groups:
  - Oorali, Mannan, Muthuva, Malayan, and Kadar tribes.
- **Unique properties** – It is woven with a 'kannadi' pattern, made from the soft inner layers of reed bamboo.
- It provides warmth during winter and cooling effect in summer.
- **GI Tag** – Boundary covers central & southern Kerala and along the western boundary of Tamil Nadu.
- It is the 1st tribal handicraft product from Kerala to receive the GI tag.

### GI Tags for Products in West Bengal

Recently, West Bengal has earned Geographical Indication (GI) tag for 7 products.

GI Tagged Products	Description
<b>Nolen Gurer Sandesh</b>	Sweet made from <u>fresh curdled milk</u> and the season's prized <u>date palm jaggery</u> (nolen gur).
<b>Baruipur Guavas</b>	Specific variety of guava, often described as <u>sweet and seedless</u> .
<b>White Bonde</b>	Mild sweet, dry and <u>milky-white boondi</u> .
<b>Chhanabora</b>	Sweet made from <u>cottage cheese</u> , sugar syrup, known for its unique and crispy texture.
<b>Motichur Laddoo</b>	Sweet made from gram flour, ghee and sugar syrup.
<b>Radhunipagal Rice</b>	Brownish white colored small grain aromatic rice, known for its <u>sweetish taste</u> and potential medicinal properties.
<b>Nistari Silk Yarn</b>	<u>Naturally yellow</u> (Bombyx Silk), high-quality silk yarn, known for its fine texture and durability.

- With these additions, a total of 32 items entered into the GI list from West Bengal.

### Thar Desert Greening

The Thar Desert in India saw a striking 38 per cent rise in greening annually over the last two decades, a new study showed.

- **Thar Desert** – It is an arid region in the north-western part of the Indian subcontinent that covers an area of 200,000 km<sup>2</sup> in India and Pakistan.
- **Thar desert States** - Rajasthan, Gujarat, Punjab and Haryana.
- It is the world's 18th-largest desert, and the world's 9th-largest hot subtropical desert.

- **Unique phenomena** - Thar was the only desert in the world with the highest concurrent increase in population, precipitation and vegetation during the last few decades.
- This remarkable transformation stands in contrast to vegetation trends observed in other deserts globally.
- Thar is among only four major deserts (Thar, Arabian, Negev and Eastern Gobi) worldwide that have experienced significant precipitation increases during this period.
- **Reason for greening:**
  - Enhanced South West Monsoon rainfall
  - Groundwater pumping for irrigation.

### ***GI Tags for Meghalaya's Textiles***

*Recently, the Geographical Indication (GI) tags to Ryndia silk and Khasi handloom, two significant traditional textile products from Meghalaya.*

- **Ryndia Silk** – It is a hand-spun eri silk which is naturally dyed, and organically produced and ethically sourced.
- **Ryndia** – It is the Khasi name for eri, named after the ryndia (castor) plant that nourishes the eri silkworms.
- **Peace Silk, or Ahimsa Silk** - Its yarn is extracted without cruelly boiling the silkworms and killing them, unlike other silks.
- **Region** - It is particularly associated with the Umden-Diwon region, designated as Meghalaya's first Eri Silk Village in 2021.
- **Khasi Handloom** – It is the traditional textile art of the Khasi community.
- **Uniqueness** - This handloom is known for its distinctive weaves and the use of natural dyes.

### ***Increased Activity at Mount Spurr***

*A recent surge of Mount Spurr over 50 earthquakes in a single week, monitored by the Alaska Volcano Observatory (AVO), signals magma movement beneath the surface.*

- Mount Spurr, near Anchorage, Alaska, is experiencing heightened volcanic activity, causing concern among scientists and local populations.
- **Seismic Swarm Indicates Potential Eruption** – This significant increase in seismic events strongly suggests a potential volcanic eruption is possible. The observed magma movement is a key indicator of rising volcanic unrest and the potential for ash clouds and other hazardous events.
- **Anchorage Prepares for Volcanic Hazards** – In response to the escalating volcanic activity, the city of Anchorage is actively preparing for potential impacts. These preparations likely include strategies to mitigate the effects of ash fall and other hazards associated with a volcanic eruption.
- **Key Geographical Information** – Mount Spurr is the tallest volcano within the Aleutian Arc. It is situated approximately 130 kilometers west of Anchorage, Alaska, in proximity to Chakachamna Lake.
- **Volcano Type and Structure** – Classified as a stratovolcano (or stratocone), Mount Spurr features a prominent horseshoe-shaped caldera. This large caldera spans about 5 kilometers in width and opens towards the south.

### ***Devastation on Tuti Island***

*In recent times, Tuti Island has suffered immense devastation due to Sudanese Civil war which erupted on April 15, 2023.*

- **Located in** – Khartoum, Sudan, at the confluence of the Blue Nile and White Nile rivers.
- **Historical significance** – As one of Khartoum's oldest settlements, Tuti Island is deeply rooted in history. The Mahas community, who settled there in the 15th century, consider it a vital symbol of their indigenous identity.
- **Traditional livelihoods** – The 8-square-kilometer island was traditionally known as "Khartoum's garden" due to its fertile land, supporting the livelihoods of its inhabitants through farming and fishing.

- **Impact of the Sudanese conflict** – The ongoing civil war has had a catastrophic impact on Tuti Island, contributing to the wider crisis in Khartoum, where UN estimates indicate mass displacement, casualties, and severe famine conditions.

### *GI Tag for Banaras Shehnai*

*Recently, the Banaras Shehnai has been granted the Geographical Indication (GI) tag, recognizing its significant intangible cultural heritage.*

- **Symbolic and cultural value** – Beyond being a musical instrument, the shehnai symbolizes sacred and ceremonial music in Varanasi (Kashi). It is traditionally played in temples, weddings, on ghats, and in classical performances.
- **Artisan recognition** – For the traditional artisans of Varanasi, this GI tag is more than official recognition. It's a deeply felt cultural validation of their generational legacy, unwavering commitment, and exceptional craftsmanship.
- **Ustad bismillah khan's legacy** – Ustad Bismillah Khan, a native of Varanasi, played a pivotal role in elevating the Banaras Shehnai to global prominence, becoming its iconic face and bringing it classical acclaim.

### *Etalin Hydroelectric Project (EHEP)*

*The Arunachal Pradesh government has recently allocated ₹269.97 Crore for the development of EHEP, located in the Dibang Valley.*

- It is a significant 3,097 MW hydropower initiative planned in the Dibang Valley of Arunachal Pradesh, making it one of India's largest proposed hydropower projects by installed capacity.
- **Project structure** – It is designed as a combination of two run-of-the-river schemes. It involves the construction of two concrete gravity dams, with heights of 101.5 metres and 80 metres, on the Dri and Tangon rivers, which are tributaries of the Dibang River.
- **Ecological significance** – The project area is situated within a region recognized as the "richest biogeographical province of the Himalayan zone" and is part of a global "mega biodiversity hotspot," highlighting its ecological importance.
- **Local communities** – The project area is primarily inhabited by indigenous populations belonging to the Idu-Mishmi tribes, whose way of life and environment are directly linked to the region.
- **Project execution** – The Etalin Hydro Electric Power Company Limited, a joint venture between Jindal Power Limited (74% stake) and Hydro Power Development Corporation of Arunachal Pradesh Limited (26% stake), is responsible for executing the project.

### *Red Sea*

*Recently, Environmental advocates are expressing serious concerns over Egypt's plans for extensive tourism development at Ras Hankorab Beach, which is a part of the Red Sea.*

- **Red Sea** – It is a semi-enclosed tropical sea, an extension of the Indian Ocean and spans approximately 1,930 km from the Suez Canal to the Bab el-Mandeb Strait.
- **Border by – 6 countries** – Saudi Arabia, Yemen, Egypt, Sudan, Eritrea, and Djibouti.
- **Geographical connections** – It connects the Mediterranean Sea through the Suez Canal and the Arabian Sea via the Gulf of Aden.
- **Geological formation** – It was formed by the separation of the African and Arabian tectonic plates, a process that continues today, widening the sea by about 15 mm annually.
- **Marine Ecosystem** – It harbors climate change-resistant coral reefs, crucial for global marine biodiversity and provides habitat for endangered species like hawksbill turtles and dugongs.
- **Environmental threats** – Over-tourism, coastal development, oil spills, and the increasing risk of coral bleaching due to rising sea temperatures.

### *China Restricts Rare Earth Elements (REEs) Exports*

*Recently, China has imposed new export restrictions on 7 critical Rare Earth Elements (REEs).*

- **REEs** – They are a set of 17 metallic elements possessing similar chemical characteristics and a silvery appearance and it encompasses the lanthanides along with scandium and yttrium.
- **7 restricted REEs** – Samarium, Gadolinium, Terbium, Dysprosium, Lutetium, Scandium, and Yttrium.
- **Vital properties and applications** – It exhibits exceptional magnetic and optical properties, making them indispensable in manufacturing magnets for electric vehicles and wind turbines, as well as digital displays, defense systems, smartphones, and lasers.
- **Reasons for restrictions** – China cites national security, adherence to international obligations, and non-proliferation concerns as the reasons behind these export limitations.
- **Global implications** – These restrictions are anticipated to create significant disruptions across global industries, underscoring the pressing need for supply chain diversification.

### ***Vizhinjam Seaport Inauguration***

*PM Narendra Modi will inaugurate the Vizhinjam International Seaport in Kerala on May 2, 2025.*

- **India's First Deep–Water Transshipment Hub** – This marks a significant advancement as India's first semi–automated, truly deep–water international container transshipment port.
- **Public–Private Partnership** – The project is a collaborative effort involving the Kerala government, the Centre, and Adani Ports through a Public–Private Partnership (PPP).
- **Strategic Trade Location** – Its proximity to major international shipping lanes is expected to significantly boost India's trade and establish Kerala as a key maritime center.
- **Key Project Benefits** – The port will reduce transit times, accommodate large vessels, enhance regional trade with Southeast Asia, the Middle East, and Africa, and generate economic growth and jobs for Kerala.
- **Adani Group's Extensive Port Operations** – Adani Ports operates extensively on both the east and west coasts of India and manages international ports in Israel, Tanzania, and Sri Lanka, handling a substantial portion of India's port traffic.

### ***Dal Lake***

*Recently, tourists shikara overturned in Srinagar's Dal Lake due to strong winds, causing four people (a tourist family and a boatman) to fall into the water.*

- **Location and Setting** – Dal Lake is a mid–altitude urban lake situated in Srinagar, Jammu and Kashmir, surrounded by the Pir Panjal mountains.
- **Tourism Significance** – Integral to Kashmir's tourism and recreation, it's known as the "Jewel in the crown of Kashmir" or "Srinagar's Jewel" and also as the "Lake of Flowers."
- **Shoreline Features** – Its 15.5 km shoreline is lined with Mughal gardens, parks, houseboats, and hotels.
- **Size and Depth** – The lake covers 18 sq. km and is part of a larger 21.1 sq. km wetland with floating gardens ("Raad") that bloom with lotuses in July–August; its average depth is about 5 ft, with a maximum of 20 ft.
- **Basins and Islands** – The wetland is divided into four basins: Gagribal, Lokut Dal, Bod Dal, and Nagin (sometimes considered separate); Lokut–dal and Bod–dal have central islands called Rup Lank (Char Chinari) and Sona Lank.
- **Floating Market Attraction** – Dal Lake is also famous for its floating market where vendors sell goods from their shikaras to tourists.

### ***Davis Strait Proto-Microcontinent***

*Davis Strait proto-microcontinent, a hidden landmass has been found beneath the icy waters of the Davis Strait recently.*

- It is a newly identified submerged microcontinent located in the Davis Strait, lies between Canada's Baffin Island and Greenland.
- **Thickness** – Ranging from 19 to 24 km.
- **Bordered by** – 2 narrow bands of thinner continental crust measuring 15 to 17 km.
- These bands serve as a separation from the mainland of Greenland and Baffin Island.



- **Geological formation** – Its formation linked to the tectonic evolution of the strait.
- Millions of years ago, the tectonic plates beneath the 2 islands shifted, leading to a reconfiguration of the Earth's crust.
- This process resulted in the development of a substantial continental crust beneath the ocean, which is now recognized as a newly discovered primitive microcontinent.

### ***South Eastern Coalfield Limited (SECL)***

*Recently, SECL is set to be the 1<sup>st</sup> coal PSU in India to adopt innovative paste fill technology for underground mining.*

- **Agreement for Singhali Mine** – SECL has signed a Rs 7040 crore agreement with TMC Mineral Resources Private Limited to implement this technology in the Singhali underground coal mine in Korba.
- **Paste Fill Technology Explained** – This eco-friendly method involves filling mined-out voids with a paste made from fly ash, crushed overburden, cement, water, and binding chemicals, eliminating the need for surface land acquisition.
- **Environmental and Safety Benefits** – Paste filling prevents land subsidence, ensures mine stability, and promotes waste recycling by utilizing industrial byproducts. This is crucial for the densely populated area above the Singhali mine.
- **Revitalizing the Singhali Mine** – Approved in 1989, the Singhali mine with 8.45 million tonnes of reserves can now proceed with large-scale production (8.4 million tonnes over 25 years) without surface disruption.
- **A Landmark for Sustainable Mining** – This initiative marks a significant step towards green mining in India, enhancing coal production while minimizing environmental impact and potentially paving the way for similar applications in other constrained underground mines.

### ***Eruption at Poás Volcano***

*Recently, highly active Poás volcano, a significant tourist draw, has recently experienced an eruption.*

- **Location** – Situated within the Poás Volcano National Park, Costa Rica.
- It is classified as a composite stratovolcano and reaches an elevation of 2,708 meters above sea level.
- Its irregular and complex structure covers a substantial basal area of approximately 400 square kilometers.
- **Characteristics** – It is characterized by its formation from several adjacent eruptive centers featuring large collapse craters.
- The volcano's principal crater is measuring about 1.5 kilometers in width and reaching a depth of 300 meters, ranking it among the largest active craters globally.
- **Recent activity** – Throughout 2024 and continuing into 2025, the crater lake has been drying up.
- **Impacts** – This process has triggered ash-producing eruptions and elevated gas levels, accompanied by small rock-ejecting explosions, indicating ongoing volcanic activity.

### ***Krishna River Faces Early Drying***

*Krishna River to dry up prematurely this year due to extreme heat, severely impacting irrigation in Karnataka's Bagalkot, Vijayapura, and Yadgir districts.*

- **Source and Course** - Originating near Mahabaleshwar in Maharashtra's Western Ghats, the Krishna River flows eastward for approximately 1,400 km, eventually emptying into the Bay of Bengal near Vijayawada in Andhra Pradesh.
- **Key Tributaries** - Include the Venna, Koyna, Panchganga, Dudhganga, Ghataprabha, Malaprabha, and Tungabhadra. The major left bank tributaries are the Bhima, Musi, and Munneru.
- **Unique Characteristics** – It is a 2<sup>nd</sup> -largest east-flowing River in Peninsular India and is heavily reliant on rainfall, leading to considerable fluctuations in its water flow throughout the year.
- **Major Hydroelectric Projects** - Installations along the river include Srisailem, Nagarjuna Sagar, and the Tungabhadra project.

- **Important Irrigation Projects** - Key irrigation initiatives include the Tungabhadra Project in Karnataka, the Srisailem and Nagarjuna Sagar Dams in Andhra Pradesh/Telangana, the Prakasam Barrage in Andhra Pradesh, and the Ghataprabha & Bhima Projects in Maharashtra.

### Netravathi river

Recently, Kallapu-Sajipa Riverfront Road project along Netravathi river in Mangaluru receives a Rs 40 crore boost from the state government.

- **This vital road will link** - Mangaluru to key areas including Harekala, Pavor, Innoli, and Ranipura along Netravathi River.
- **Geographical Significance** - Flows westward and drains into the Arabian Sea south of Mangalore.
- **Origin Point** - Begins in the Western Ghats, specifically the Bangrabalike Valley of Yelaneeru Ghat.
- **Kudremukh Range Connection** - Its source lies within the Kudremukh range of the Chikkamagaluru district.
- **Alternative Origin Mention** - Some sources also cite Gangamoola, a hill in the same district, as a potential origin.

About Netravathi River - A significant west-flowing river in Karnataka, India, also known as the Nethravathi Nadi.

## 3. POLITY

### 3.1 Centre for Processing Accelerated Corporate Exit (C-PACE)

The central government announced that corporate exits are now processed in 70-90 days under Centre for Processing Accelerated Corporate Exit (C-PACE).

- C-PACE is a system to streamline and centralize the **process of removing companies** from the MCA Register.
- **Established on** - March 17, 2023.
- **Established by** - The Ministry of Corporate Affairs (MCA).
- **Supervision** - The Director General of Corporate Affairs (DGCoA) oversees the functioning of C-PACE.
- **Features** - It was established to facilitate and speed up the voluntary winding up of these companies to less than 6 months with process re-engineering.
- The central government recently announced that corporate exits are now processed in **70-90 days** under Centre for Processing Accelerated Corporate Exit (C-PACE).
- It facilitated the 'Ease of Doing Business' with an idea to eliminate the necessity for physical interactions with stakeholders.
- It established for providing hassle-free filing, timely and process-bound striking off companies.
- C-PACE operates under the Registrar of Companies (RoC) which is a part of the MCA.
  - **Under** – Sub-section (1) of section 396, Registrar of Companies (RoC).
- **Updation** - The Ministry of Corporate Affairs had empowered the C-PACE for processing of eForms related to striking off Limited Liability Partnerships (LLPs) as well.

According to the data given in the Parliament, **13,560 companies** were struck off under section 248(2) of the Companies Act, 2013 through C-PACE in FY24.

### 3.2 Supreme Court on the Use of Urdu on the Signboard

The Supreme Court recently upheld the use of Urdu on a municipal signboard in Maharashtra's Akola district, declaring that language should unite, not divide.

- **Origin of Urdu** – Urdu is an **Indo-Aryan language** emerged around the 12<sup>th</sup> century in Northern India.

- **Constitutional Status** – In India, it is an **8<sup>th</sup> Schedule language** and it has been adopted as the second official language by several states.

### Supreme court Judgement

- The Supreme Court described Urdu as the finest specimen of Ganga-Jamuni Tehzeeb, or the Hindustani Tehzeeb.

Article 345 of the Constitution of India states that a state's legislature can adopt one or more languages or Hindi as the official language of the state.

### Ganga-Jamuni Tehzeeb (Hindustani tahzeeb)

- **Ganga-Jamuni Tehzeeb** – It refers to the syncretic Indo-Islamic cultural tradition that developed in plains of northern and central India.
- The term is a metaphor derived from these two rivers the Ganga and the Yamuna (Jamuna), which flow separately but eventually meet and blend their waters.
- **Ganga-Jamuni** – Hindi word, meaning mixed.
- **Tehzeeb** – Urdu word, meaning civilization, culture, and development.
- It represents the harmonious blending of Hindu and Muslim cultural elements, traditions, arts, architecture, music, cuisine and language.

- **Similarities with Hindi** – Supreme court noted that Hindi and Urdu were fundamentally one language with similarities in syntax, grammar and phonology.
- **Exchange of vocabularies** – The word Hindi itself comes from the Persian word Hindavi.
- Urdu also has many words borrowed from other Indian languages, including Sanskrit.
- **Hindi-Urdu controversy** – The separation of Hindi and Urdu was partly due to moralist on both sides where Hindi became more Sanskritised and Urdu more Persian.
- **Religious polarization** – The framing of Hindi is the language of the Hindus and Urdu of the Muslims undermines the principles of unity in diversity and universal brotherhood.
- Sc emphasized that A language is only a means of communication and does not represent a religion,
- Language is the yardstick to measure the civilizational march of a community and its people.

The main difference is that Urdu is mainly written in Nastaliq script and Hindi in Devanagari script.

### 3.3 Registration of Births and Deaths in India

Recently, the Registrar General of India (RGI), under the Union Home Ministry, issued directions to private and government hospitals to report incidents of births and deaths within 21 days.

- **Registration of Birth and death** – The Civil Registration System (CRS) in India, as the birth and death registration system, is a framework for recording vital events—births, deaths, and stillbirths.
- CRS falls under the Concurrent list of the Constitution of India.
- **Registrar** – Government hospitals have been entrusted with the responsibility of functioning as registrar.
- Private hospitals are supposed to report the events in their jurisdiction to the registrar.
- **Legal provision** – Registration of Birth and Death (RBD) Act, 1969 mandates registration of all births and deaths.
- As per Section 23(2) of the RBD Act, negligence by the registrar in registering any birth or death is punishable with a fine.
- **BDR 2023 amendment** – It mandated all births and deaths in the country are to be digitally registered through the Civil Registration System portal.
- It also mandates RGI to maintain a database at the national level and it is obligatory that Chief Registrars and Registrars share the information with the Centre.

Stillbirth is when a baby dies before she or he is born, after 28 weeks of pregnancy.

- **Current status of registration** – Approximately 10% of births and deaths remain unregistered in India despite legal requirements.
- 90% of birth or death events are getting registered which marks significant improvement from 2011, the registration levels were 82.4% for births and 66.4% for deaths.

### National Population Register (NPR)

- The NPR is a comprehensive database of residents in India, serving as a foundation for identity management and policy planning.
- It is also the first step toward creating the National Register of Citizens (NRC), as **mandated by the Citizenship Act, 1955.**
- First compiled in 2010, Updated in 2015.
- Current database covers 119 crore residents.
- **Current Status** – The NPR update is on hold, as it is designed to occur simultaneously with the first phase of the Census.
- The Census, originally scheduled for 2021, has been indefinitely delayed due to logistical challenges, including the COVID-19 pandemic and other administrative issues.

### 3.4 New Chief Justice of India

Chief Justice of India Sanjiv Khanna recently wrote to the Union Law Ministry, naming Justice B R Gavai, the 2<sup>nd</sup> - most senior judge of the Supreme Court, as his successor.

#### Justice B R Gavai

- **Born in** - Amravati in Maharashtra.
- **Joined the Bar on** - March 16, 1985, and worked with Raja S Bhonsale, former Advocate General and judge of the Bombay High Court, till 1987.
- He served as Additional Judge of the Bombay High Court on November 14, 2003, and became a **permanent Judge of the High Court** on November 12, 2005.
- Elevated as a **judge of the Supreme Court** on May 24, 2019.
- **Landmark Rulings**
  1. Supporting demonetization of currency notes of Rs 500 and Rs 1,000.
  2. Allows sub-categorization of scheduled castes, extending the creamy layer principle to Scheduled Castes (SCs) and Scheduled Tribes (STs) to achieve real equality.
  3. Upheld the Centre's decision to abrogate Article 370, which gave special status to the erstwhile state of Jammu and Kashmir.
  4. Struck down the Electoral Bonds Scheme.
  5. Criticized the use of bulldozers against properties of crime accused, and ruled that demolition of properties of citizens without following due process is contrary to the rule of law.

### Chief Justice of India (CJI)

- **Appointment** - The **President** appoints the CJI under **Article 124(2)** of the Constitution.
- He is appointed based on a recommendation from the **Supreme Court Collegium.**
- The collegium system was established through judgments of the Supreme Court, particularly the **Second Judges Case in 1993.**
- **Collegium** - The collegium consists of the CJI and 4 senior-most judges of the Supreme Court.
- As per the convention, the senior most judge of Supreme Court will be chosen as CJI.
  - The seniority is measured by the **length of service** on the Supreme Court.
- **Qualification** - Must be a citizen of India.
  - Must have served as a judge in a High Court for at least five years **or**



- Must have practiced as an advocate in a High Court for at least ten years **or**
- He can be someone deemed as a distinguished jurist by the President.
- **Removed by** - The **President** only after Parliament presents an address, supported by a special majority in both Houses (a majority of total members and at least two-thirds of those present and voting).

### 3.5 Cabinet Committee on Security (CCS)

Recently, Prime Minister convened an urgent CCS meeting at his residence following the Pahalgam terrorist attack.

- CCS is a high-powered committee responsible for **debates, discussions and appointments** of/ in the *national security bodies*.
- Major decisions with respect to significant appointments, issues of national security, and defence expenditure are taken by the CCS.
- The CCS discusses and takes decisions on urgent concerns on **India's national security**.
- The CCS brainstorms on issues relating **to law and order and internal security**.
- It also considers matters relating to *atomic energy*.
- **Structure and Composition – Members -**
  - Prime Minister (**Chairperson**)
  - Defence Minister
  - Home Minister
  - Finance Minister
  - External Affairs Minister
- It can also include the defence chiefs and other senior bureaucrats, depending on the situation and the nature of the discussion.
- The National Security Advisor (At present - Ajit Doval) acts as **secretary-level coordinator**.
- The Cabinet Secretariat maintains records of all CCS meetings.

A Cabinet Committee is extra-constitutional and are not mentioned in the Indian Constitution.

CCS meetings have been called during major events in India's history, including the wars with Pakistan, the Kargil conflict and the Kandahar hijack.

#### Recent decisions made by CCS after the Pahalgam attack

- Suspension of Indus-water treaty - The Indus Waters Treaty of 1960 will be held in abeyance with immediate effect, until Pakistan credibly and irrevocably abjures its support for cross-border terrorism.
- **Closure of Attar-wagah border** - The Integrated Check Post Attari will be closed with immediate effect.
- **Visa suspension** - Suspension of SAARC Visa Exemption Scheme (SVES) visas.
- **Diplomatic measures** - The Defence/Military, Naval and Air Advisors in the Pakistani High Commission in New Delhi are declared Persona Non Grata. They have a week to leave India.
- India will be withdrawing its own Defence/Navy/Air Advisors from the Indian High Commission in Islamabad.
- Five support staff of the Service Advisors will also be withdrawn from both High Commissions.
- The overall strength of the High Commissions will be brought down to 30 from the present 55 through further reductions.

### 3.6 National Investigation Agency (NIA)

In a major update in the Pahalgam terror attack case, the Ministry of Home Affairs (MHA) recently handed over the investigation to the National Investigation Agency (NIA).

- It is the **central counter-terrorism law enforcement agency** in India.
- **Established in** - 2008.

- **Head Quarters** - New Delhi.
- **Nodal Ministry** – Ministry of Home Affairs (MHA).
- **Purpose** - To **investigate and prosecute offences** affecting the sovereignty, security and integrity of India, security of State, friendly relations with foreign States and actions violating existing Acts and international treaties.
- **Established under** - **National Investigation Agency Act, 2008** after the deadly 26/11 terror attacks on Mumbai.
- **Investigation of Scheduled offences** - If the Central government believes that a Scheduled Offence has been committed and is to be investigated under the Act, it may, Suo motu (on its own), direct the agency.
- These include offences under Acts such as the Atomic Energy Act, 1962, and the Unlawful Activities Prevention Act, 1967.
- The Centre can also receive reports from state governments for such cases.
- The State Government shall extend all assistance and co-operation to the Agency for investigation of the Scheduled Offences.
- **Special Courts** - The legislation grants authority to both central and state governments to set up Special Courts for adjudicating scheduled offences, with the right to appeal to the High Court of the relevant state.

### National Investigation Agency (Amendment) Act, 2019

- **Jurisdiction of the NIA**- Empowered NIA to investigate scheduled offences involving Indian citizens or Indian interests that are committed outside India.
- **Scheduled offences** – The mandate of NIA has also been expanded to investigate offences related to Explosive Substances Act, 1908, Human Trafficking, Counterfeit currency or bank notes, Cyber Terrorism and Arms Act, 1959.
- **Special Courts** - The legislation grants the central government the authority to appoint Sessions Courts as Special Courts for the adjudication of specified offences.
- Additionally, state governments are now permitted to designate Sessions Courts as Special Courts as well.
- When more than one Special Court has been designated for any area, the senior-most judge will distribute cases among the courts.

### Other Important Topics

#### NITI NCAER States Economic Forum Portal

*NITI NCAER States Economic Forum portal was launched recently.*

- **About** – It is a comprehensive repository of data on social, economic and fiscal parameters, research reports, papers and expert commentary on State Finances for a period of about 30 years (1990-2023).
- **Launched on** – April 1, 2025.
- **Launched by** – NITI Aayog and the National Council of Applied Economic Research (NCAER).
- **4 main components** – State Reports, Data Repository, State Fiscal and Economic Dashboard, and Research/Commentary.

#### Drug Quality Control in India

*India Strengthens Pharmaceutical Quality Control through various measures.*

- **Drug and Cosmetics Act, 1940** – It empowers drugs inspectors to randomly sample drugs for quality checks.
- **CDSCO drug alerts** – The Central Drugs Standard Control Organization (CDSCO) publishes lists of Substandard, spurious, misbranded, or adulterated drugs under Drug Alert.

- **SUGAM (System for Unmanned Gateways Approval of Manufacturers) Labs portal** – It automates the entire workflow for testing of Medical Products (Drugs, Vaccine, Cosmetics & Medical devices).

### **Pension Adalats**

*The government aspires to organize additional Pension Adalats recently.*

- **About** – It is a long standing redressal of pension grievances pertaining to Central Government Pensioners.
- **Objective** – To provide on-the-spot resolution of unresolved and chronic grievances in Centralized Pension Grievance Redress and Monitoring System (CPENGRAMS).
- **Unresolved cases** – These cases are revisited and their status is considered before holding the next Pension Adalat.

### **Entrepreneurship Planning Digital Tool (EPDT) & Helpline Number**

*Recently, the EPDT and a toll-free number was launched.*

- **Launched by** – Ministry of Rural Development (MoRD)
- **Developed by** – LoKOS, a Mobile App that empowers users to efficiently manage Self Help Groups (SHGs).
- **Objective** – To support aspiring Lakhpati Didis (SHGs members) in crafting effective business plans.
- **Features** – Simplifies data entry for SHG members, tracks entrepreneurial progress, and offers necessary guidance for fostering entrepreneurship.
- **Helpline number** – To assist women with queries related to becoming Lakhpati Didis, with timely and effective support.

### **GP-DRASTI Program**

*Recently, Phase I of GP-DRASTI Program was introduced.*

- **GP-DRASTI** – Gujarat Police – Drone Response and Aerial Surveillance Tactical Interventions.
- Gujarat police have employed quadcopter drones in several districts for policing activities.
- **Objective** – To track fugitives and find missing children.
- **Usage** – Especially for crimes related to bodily harm and violence on the streets of major cities.

*The quadcopter drones will be flown at an operational flight ceiling of 120 metres above ground level.*

### **India Skills Accelerator**

*Recently, the India Skills Accelerator initiative was launched.*

- **Launched by** – Ministry of Skill Development and Entrepreneurship (MSDE) and World Economic Forum (WEF).
- **Aim** – To catalyze change across 3 critical levels
  - By improving awareness and shifting mindsets around future skills needs.
  - Increasing collaboration and knowledge sharing among stakeholders.
  - Committing to upgrade institutional structures and policy frameworks to support a more adaptive and responsive skilling ecosystem.
- **Governance structure** – It Includes key stakeholders from public and private sectors.
- It enables cross-sectoral efforts in unlocking innovative ideas and driving systemic progress on complex challenges that demand a multi-stakeholder approach.

### ***AadharFaceRD App***

Recently, a new Aadhaar App was launched in testing phase at Aadhaar Samvaad event in Delhi by Ministry of Electronics and Information Technology (MeitY).

- It is a facial recognition tool for verifying Aadhaar-holders' identity for use-cases like verification during a Know-Your-Customer (KYC).
- **Developed by** - Unique Identification Authority of India.
- **Working** - Facial recognition is triggered only through a KYC request by scanning a QR code.
- Then, the user is prompted to show their face to their smartphone camera and blink, after which their details are verified.
- **Role** – It secures the Aadhaar data while sharing with hotels and other “requesting” entities without the need to share a hard copy.
- It is used as an ID proof, instead of simply scan a QR code.

### ***Revamped Microdata Portal***

Recently, a revamped Microdata Portal was launched Ministry of Statistics and Programme Implementation (MOSPI) during a conference of State Government Ministers.

- **Developed by** – Data Informatics & Innovation Division of MOSPI.
- In collaboration with World Bank Technology Team, it has adopted a modern scalable technology stack.
- **Purpose** – A centralized repository for extensive statistical data collected from national surveys and economic census.
- It enhances data accessibility, user experience and the integration of advanced technologies in the Official Statistical System.
- It ensures compliance with the latest security standards but also supports a responsive design and data access mechanism.

### ***National Statistical System Training Academy***

The web site of National Statistical System Training Academy was recently launched by the Ministry of Statistics and Programme Implementation (MOSPI).

- **Developed by** – Data Informatics & Innovation Division of MOSPI.
- **Mandate** – It includes imparting training in the field of Official Statistics to the statistical personnel.
- It covers government personnel of the Central, State and UT's of India as well as for the developing countries in the Asia Pacific region.

### ***Booth Level Agents (BLAs)***

In a first, ECI trains Booth Level Agents (BLAs) to strengthen grassroot participation by political parties.

- **Appointed by** – Recognised political parties.
- **Role** – To ensure error-free electoral rolls as per the provisions of the RP act, 1950.
- **Training programme** – To familiarise them with various aspects of the election processes including the preparation, updation and revision of electoral rolls.
- They were also trained in the use of the provision of first and second appeals under,
  - Sections 24(a) and 24(b) of the Representation of People Acts, 1950 in case they are aggrieved of the final electoral rolls as published.



### Chief Justice of India (CJI)

Recently, Justice B.R. Gavai has been recommended as the next Chief Justice of India (CJI), following the established seniority practice.

- **Appointment by** – The President under Article 124(2) of the Constitution.
- **Recommended by** – The outgoing CJI recommends their successor based on seniority.
- The Union Law Minister forwards the recommendation to the Prime Minister, who then advises the President.
- **Related case** – As per the Second Judges Case (1993), the senior-most Supreme Court judge is appointed as the CJI.

### Justice Joseph Committee

Tamil Nadu recently formed a high-level committee, to study the constitutional and legal provisions that impact Centre-state relations.

- **Committee** – The three-member committee headed by former Supreme Court judge Kurian Joseph.
- **Objectives** – To recommend ways for "maximum state autonomy" without harming national unity and to address governance challenges and restore State List subjects.
- To suggest ways to restore subjects transferred from State list to the Concurrent one and look at measures needed to address the challenges states face in delivering good governance.
- **Significance** – The recent Supreme Court judgement that laid down timelines for governors and the president on granting assent to bills has reinforced the primacy of the role of elected state governments in framing laws and curtailed the discretion of nominal heads.
- **Historical Precedents** – It mirrors the Rajamannar Committee formed in 1969 to make recommendation on Centre – State Relations.

### Law Commission of India

Recently, Justice Dinesh Maheshwari, a former Supreme Court judge, was appointed as the Chairperson of the 23<sup>rd</sup> Law Commission of India in April 2025.

- **Established in** – 1834, under the Charter Act of 1833, with Lord Macaulay serving as its chairman.
- **Law Commission** – It is a non-statutory advisory body, established by a notification from the Ministry of Law and Justice for a specific tenure to conduct legal research for reforms.
- **23<sup>rd</sup> Law Commission** – It is primarily responsible for examining and recommending reforms in Indian law, with a notable emphasis on the contentious Uniform Civil Code (UCC).
- **Key Functions** – Reviewing and recommending the repeal of outdated laws.
  - Examining laws affecting the poor.
  - Proposing new legislation aligned with constitutional principles.
  - Reviewing judicial administration matters referred by the government.

### Central Consumer Protection Authority (CCPA)

CCPA has suo moto taken action against five Delhi restaurants for failing to refund mandatory service charges, defying a Delhi High Court ruling.

- **Protecting Consumer Rights** - This move underscores the CCPA's commitment to safeguarding consumer rights and preventing the forced payment of additional service charges.
- **Legality of Service Charges** - According to the law, hotels and restaurants cannot compel consumers to pay service charges, nor can these charges be levied under any other guise.
- **About the CCPA** - Established under the Consumer Protection Act, 2019, the CCPA, operational since July 20, 2020, replaced the 1986 Act. It operates under the Ministry of Consumer Affairs, Food & Public Distribution.

- **Key Functions and Powers** - The CCPA protects consumer rights as a class, prevents unfair trade practices and misleading ads, initiates class-action suits (including recalls and refunds), conducts investigations, and imposes penalties.
- **CCPA Structure** - The CCPA is headed by a Chief Commissioner and includes two other commissioners, one overseeing goods-related issues and the other handling service-related complaints.

#### 4. GOVERNMENT POLICIES AND INTERVENTIONS

##### 4.1 The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

*Ahead of the Supreme Court hearing (April 2, 2025) on the Forest Rights Act (FRA), 2006, Adivasi rights groups and environmental organizations have urged the Tribal Affairs Ministry to defend the law.*

- **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** – Also known as Forest Rights Act (FRA), 2006.
- The Act aims to legally recognize and protect the rights of tribal communities and other traditional forest dwellers over the forest land and resources they have traditionally used.
- **Key Provisions**
- **Individual Forest Rights (IFR)** – Land titles for cultivation/habitation.
- **Community Forest Rights (CFR)** – Rights over forest resources and management.
- **Gram Sabha's Role** – Primary authority to initiate and verify claims.
- **Legal challenges** – In 2008, Wildlife First, an NGO challenged the FRA in the Supreme Court, arguing that it led to forest encroachments.
- The court later ordered the eviction of people whose FRA claims were rejected (2019).
- After protests, the Tribal Affairs Ministry intervened, pointing out wrongful rejections due to procedural flaws.
- The SC stayed the eviction order and asked for a review of rejected claims.

##### Current Concerns

- **Improper Review of Rejected Claims** – States conducted arbitrary reviews, leading to repeated rejections.
- **Undermining Gram Sabhas** – Gram Sabhas (village councils), which are supposed to be key decision-makers under FRA, were side-lined in many cases.
- Higher authorities such as Sub-Divisional Level Committee (SDLC) overruled Gram Sabha approvals (e.g., Gujarat: 98% approved by Gram Sabhas, but only 62% accepted by SDLC).
- **Over-Reliance on Satellite Imagery** – States like Gujarat and Madhya Pradesh relied heavily on satellite images to verify claims without ground verification, leading to wrongful rejections.
- The Tribal Affairs Ministry had raised concerns about misuse of technology, as it bypasses the FRA's evidence requirements (e.g., community records, historical proof).

##### 4.2 Maintenance and Welfare of Parents and Senior Citizens Act, 2007

*Recently, the Supreme Court ruled on a case involving senior parents attempting to evict their son from their home under the Maintenance and Welfare of Parents and Senior Citizens Act, 2007.*

- **Purpose** - Enacted to ensure maintenance and welfare of parents and senior citizens **(60 years and above)**.
- Applies when the senior citizen is unable to maintain themselves from their own earnings or property.
- **Legal responsibility** - Places legal responsibility on children/relatives (legal heirs) to provide financial support, food, clothing, residence, and medical care.
- **Tribunals**
  - **Maintenance Tribunals** - To hear petitions from senior citizens.
  - **Appellate Tribunals** - To hear appeals against the tribunal orders.

- **Key Provisions**

- **Property Transfer and Maintenance - Section 23(1)** - If a senior citizen transfers property with a condition that the recipient will maintain them and this is not fulfilled, then the transfer is treated as done under fraud, coercion or undue influence and can be declared void by the tribunal.
  - **Section 23(2)** - A senior citizen can enforce their right to maintenance from the estate.
  - **Penalties for Abandonment** - Abandoning a senior citizen is a criminal offense, punishable with imprisonment for 3 months or fined up to 5,000 or with both.
  - **Powers of the Tribunal** - The Tribunal may impose fines and sentence the children or relatives who disobey its orders with all or a portion of the monthly allowance for the maintenance and expenses of the Senior Citizens.
  - It may also impose a jail sentence that lasts up to one month or until the money is paid.
  - The maximum maintenance allowance shall not exceed Rs.10,000 per month.
  - **No Legal Practitioners - Section 17** - Prohibits parties from being represented by legal practitioners in proceedings before a maintenance tribunal or appellate tribunal.
- **SC Interpretation of Senior Citizens Act, 2007** - The Act aims to protect vulnerable senior citizens, ensuring they live in dignity and security.
  - While the act does not explicitly mention eviction, the Supreme Court has clarified that eviction is legally permissible if it ensures the maintenance and safety of senior citizens.

#### 4.3 Government e-Marketplace

*Government e-Marketplace (GeM) aims to boost start-up participation through upcoming events like Startup Mahakumbh 2025*

- It is India's **public procurement portal** for purchasing goods and services by central and state government ministries, Departments, Public Sector Units (PSUs), and affiliated entities.
- **Launched in** – 2016
- **Aim** - To make the public procurement process transparent, efficient, and inclusive.
- **Developed by** - Directorate General of Supplies and Disposals (DGS&D) in collaboration with MeitY (Ministry of Electronics and Information Technology) and National e-Governance Division (NeGD).
- GeM is now managed by GeM SPV (Special Purpose Vehicle), a 100% government-owned company under the Ministry of Commerce & Industry.
- **Three Pillars of GeM**
  - **Efficiency** - Ensures cost and time savings
  - AI-driven procurement reduces process time.
  - **Transparency** - Digital footprint ensures no manipulation in transactions.
  - AI tools prevent fraudulent activities.
  - **Inclusion** - Focus on women-led MSMEs, artisans, Farmer Producer Organizations (FPOs).
  - 50% of businesses on GeM come from MSMEs.
- **Advantages of GeM**
  - **Centralized Platform** – Unified portal for government buyers & suppliers.
  - **Policy Reforms** – Modernized regulations ensure compliance & efficiency.
  - **MSME Boost** – Supports small businesses & startups in government contracts.
  - **Automation & Transparency** – Tech-driven system reduces delays & enhances accountability.
- **Achievements**
  - Business transactions increased from its first year to 2024.
  - Contributed to major government projects, including India's lunar mission (Chandrayaan 3).

#### 4.4 Protection of Interests in Aircraft Objects Bill, 2025

*Protection of Interests in Aircraft Objects Bill, 2025, was recently introduced in Rajya Sabha.*

- The Bill seeks to give **legal effect** to the following international agreements in their application to India
  - Convention on International Interests in Mobile Equipment (also known as Capetown Convention of 2001), and
  - Protocol to the Convention on International Interests in Mobile Equipment on Matters specific to Aircraft Equipment.
- India had acceded to these in **2008**.
- The Convention and the Protocol aim to bring uniformity in securing rights for high-value assets such as aircrafts, helicopters, and engines.
- They aim to ensure predictability for creditors in the event of a financial default in
  - A lease – use for a specified period
  - Conditional purchase – transfer of ownership upon completion of certain terms and conditions, or
  - Security agreement – asset given as collateral for borrowing.
- **Registry Authority** - The Bill designates Directorate General of Civil Aviation (DGCA) as the Registry Authority for the purposes of the Convention.
- The Registry Authority is responsible for registration and de-registration of aircrafts.
- **Obligations of debtors** - Debtors must submit records of dues to DGCA.
- **Remedies in case of default** - The Convention gives creditors certain remedies in case of default by a debtor.
- It includes the right to take back possession of the asset within a period of 2 calendar months or a mutually agreed upon period, whichever is earlier.
- The Bill states that before exercising any remedy, the creditor must notify DGCA about the occurrence of default.
- **Detention of assets by government agencies** - The following entities will continue to have the right to detain an asset if dues for services related to that asset remain unpaid
  - Central government,
  - Any other entity providing public services in India, or
  - An inter-governmental organization of which India is a member.
- **Overriding effect** - In case of any inconsistency between the Bill and any other law, the provisions of the Bill will prevail.
- **Jurisdiction of High Courts** - The High Courts will have jurisdiction over any claim under the Convention.
- **Power to make Rules** - The Bill empowers the central government to make Rules to implement the provisions of the Convention and the Protocol.

*A debtor is a person who has taken an aviation asset under a lease or, conditional purchase agreement, or pledged an asset under a security agreement.*

*A creditor is a person who has provided an aviation asset under a lease or conditional purchase agreement, or has lent under a security agreement.*

#### 4.5 PM-POSHAN Scheme

*The Union government recently increased the material cost for midday meals per day for those enrolled in kindergarten and primary schools and upper primary schools*

- The PM-POSHAN Scheme, previously referred to as the Mid-Day Meal Scheme.
- It is a **Centrally Sponsored initiative** overseen by the Ministry of Education.
- **Aim** - To provide a hot, cooked meal each school day to 11.20 crore children enrolled in Balvatikas (pre-primary) and Classes 1 to 8 across 10.36 lakh **government and government-aided schools**.
- This scheme serves two main purposes



- To enhance the nutritional status of children attending school.
- To boost enrollment, retention, and attendance rates, particularly among underprivileged children.
- The updated material cost per student per day is as follows
  - Rs. 6.78 for Balvatika and Primary students (an increase from Rs. 6.19).
  - Rs. 10.17 for Upper Primary students (up from Rs. 9.29).
- These amounts represent the minimum required contribution; however, States and Union Territories have the option to allocate additional funds from their budgets to offer meals with improved nutritional quality.
- **Nutritional standards**
  - For Balvatika and Primary classes - 20g of pulses, 50g of vegetables, and 5g of oil.
  - For Upper Primary classes - 30g of pulses, 75g of vegetables, and 7.5g of oil.
- The Labour Bureau, under the Ministry of Labour, provides inflation data for the items included in the PM-POSHAN meal basket, which is derived from the Consumer Price Index – Rural Labourers (CPI-RL) based on 600 sample villages across 20 States.
- The POSHAN Abhiyan, managed by the Ministry of Women and Child Development, focuses on improving nutrition for adolescent girls, pregnant women, lactating mothers, and children aged 0 to 6 years.
- **Mission POSHAN 2.0**, launched in 2021, combines the efforts of POSHAN Abhiyan and the Supplementary Nutrition Program into a single, cohesive framework.
- **Funding structure**
  - A 60:40 split between the Centre and States/UTs with a legislature.
  - A 90:10 split for Northeastern and Himalayan States.
  - Full central funding for Union Territories without a legislature.

#### 4.6 Waqf (Amendment) Bill, 2025

Parliament recently passed Waqf (Amendment) Bill, 2025.

- **Waqf** - A Waqf is a permanent endowment made by a Muslim for charitable/religious causes - like building mosques, schools, or hospitals.
- Once declared, the waqf property becomes inalienable - it can't be sold, gifted, inherited or mortgaged.
- Ownership is considered to be with God and the property is managed by Waqf Boards.
- **Waqf (Amendment) Bill, 2025** – It aims to update the Waqf Act, 1995 to fix issues in the management of Waqf properties.
- The proposed changes focus on
  - Overcoming the shortcomings of the previous act and enhancing the efficiency of Waqf boards
  - Updating the definitions of waqf
  - Improving the registration process
  - Increasing the role of technology in managing Waqf records.
- **Name of the Act** - Unified Waqf Management, Empowerment, Efficiency, and Development Act, 2025.
- **Key Provisions**

*Waqf Board is constituted under the Waqf Act, 1995 (amended in 2013) by state governments to register, maintain and oversee Waqf properties in the state.*

#### Formation of Waqf

- Removes waqf by user and allows formation only through declaration or endowment.
- Donors must be practicing Muslims for at least 5 years and must own the property.
- Waqf-alal-aulad **cannot deny** inheritance rights to female heirs.

	<i>Waqf-alal-aulad is a specific type of Waqf where income from the donated property is dedicated primarily for the benefit of the donor's family or descendants, recognized under Muslim law.</i>
<b>Government Property as Waqf</b>	<ul style="list-style-type: none"> <li>Any government property identified as Waqf will cease to be Waqf.</li> <li>Ownership disputes will be resolved by the Collector, who will submit a report to the state government.</li> </ul>
<b>Power to Determine Waqf Property</b>	<ul style="list-style-type: none"> <li>Waqf Board previously had the power to inquire and determine waqf property, so the provision has been removed.</li> </ul>
<b>Survey of Waqf</b>	<ul style="list-style-type: none"> <li>Empowers Collectors to conduct surveys and mandates pending surveys to be conducted as per state revenue laws.</li> </ul>
<b>Central Waqf Council Composition</b>	<p><b>Central Waqf Council</b> - A statutory body established in 1964 under the Ministry of Minority Affairs, to advise the Central Government and State Waqf Boards on Waqf matters.</p> <ul style="list-style-type: none"> <li>Two members must be non-Muslims.</li> <li>MPs, former judges, and eminent persons appointed to the Council as per the Act need not be Muslims.</li> <li>The following members must be Muslims - Representatives of Muslim organisations, Scholars in Islamic law, Chairpersons of Waqf Boards</li> <li>Of the Muslim members, <u>2 members must be women</u>.</li> </ul>
<b>Waqf Boards Composition</b>	<ul style="list-style-type: none"> <li>The Bill empowers the state government to nominate one person from each background to the Board. They need not be Muslims.</li> <li>It adds that the Board must have</li> <li>Two non-Muslim members</li> <li>At least one member each from Shias, Sunnis, and Backward classes of Muslims</li> <li>One member each from Bohra and Agakhani communities (if there is Waqf in the state)</li> <li>Two Muslim members must be women.</li> </ul>
<b>Waqf Tribunal Composition</b>	<p><i>Waqf Tribunal is a quasi-judicial body set up by state government under Waqf Act 1995 to adjudicate disputes concerning Waqf properties.</i></p> <ul style="list-style-type: none"> <li>A current or former <u>District Court judge</u> as chairman</li> <li>A current or former joint secretary to the state government</li> </ul>
<b>Appeal on Tribunal Orders</b>	<ul style="list-style-type: none"> <li>The Bill omits provisions deeming finality to Tribunal's decisions.</li> <li>Allows appeals to the High Court <u>within 90 days</u>.</li> </ul>
<b>Powers of Central Government</b>	<ul style="list-style-type: none"> <li>The Bill empowers the central government to make rules regarding registration, publication of accounts of waqf and publication of proceedings of Waqf Boards.</li> <li>The Bill empowers the central government to get these audited by the CAG (Comptroller and Auditor General) or a designated officer.</li> </ul>
<b>Separate Waqf Boards for Sects</b>	<ul style="list-style-type: none"> <li>Separate Waqf boards allowed for Bohra and Agakhani sects, along with Shia and Sunni sects.</li> </ul>

- The Bill promotes a secular, transparent and accountable system of waqf governance.
- It aims to protect public interest and ensure that waqf properties serve religious, social and charitable purposes effectively.

#### 4.7 PM E-DRIVE SCHEME

As of now, 10.27 lakh Electric Vehicles (EVs) have been sold under the PM E-DRIVE scheme, which has led to a reduction of 230K tonnes of CO<sub>2</sub> emission.

- **PM E-DRIVE Scheme** - PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme.
- **Launched by** - Ministry of Heavy Industry.
- **Aim** - To promote electric mobility in India by accelerating EV adoption, developing charging infrastructure, and fostering a robust EV manufacturing ecosystem.
- **Duration** - 2024 – 2026.
- **Eligible category of vehicles**
  - Buses (only electric buses) (e-bus),
  - Three-Wheelers (electric) including registered e-rickshaws & e-carts and L5 (e-3W),
  - Two wheelers (electric) – e-2W,
  - e-ambulances (electric, plug in hybrid & strong hybrid), and
  - e-trucks and other new emerging EV categories (to be notified subsequently).
  - Charging infrastructures
  - Testing agencies under MHI
- **Components**
  - **Subsidies** - Demand Incentives for e-2W, e-3W, e-ambulances, e-trucks and other new emerging EV categories.
  - **PM E-DRIVE e-Voucher** - The Ministry of Heavy Industry (MHI) is introducing e-Vouchers for EV customers to avail the demand incentive under the scheme.
- **Proposed Incentive** - Demand incentive of Rs.5,000 per kWh for e-2Ws/e-3Ws registered in FY 2024-25, and Rs.2,500 per kWh for FY 2025-26.
- **Grants for creation of capital assets** - e-buses, establishment of network of charging stations & upgradation of testing agencies of MHI.
- **Deployment of e-ambulances** - The scheme allocates funds for the deployment of e-ambulances.
- **Deployment of public charging stations** - The scheme promotes the installation of electric vehicle public charging stations (EVPCS).
- These EVPCS shall be installed in the selected cities with high EV penetration and also on selected highways.
- **Administration** – It includes IEC (Information, Education & Communication) activities and fee for project management agency (PMA).
- Benefits under the PM E-DRIVE scheme will not be provided to EVs purchased by any Central or State Government department or its agencies.

*Demand incentive is a financial (Subsidy) benefit offered to stimulate consumer demand to encourage the adoption of EV.*

#### 4.8 Tribhuvan Sahkari University Bill, 2025

The "Tribhuvan" Sahkari University Bill 2025 was passed by the parliament recently.

- The Bill seeks to establish the Institute of Rural Management Anand, Gujarat (IRMA) as the "Tribhuvan" Sahkari University. Currently, IRMA is registered as a society.
- **Objectives of the University** - Provide education, training, and capacity building in the cooperative sector and undertake research and development activities in related areas.
- It will offer degree programs, distance learning and e-learning courses, and develop centres of excellence in co-operative sector.
- It may establish outlying campuses or affiliate institutes in any other place in India or outside India.
- **Status of IRMA** - IRMA will become one of the schools of the University.
- Autonomous identity of IRMA will be preserved within the institutional framework of the University.

- IRMA's administrative and academic autonomy will be subject to the framework specified by the central government.
- IRMA will have its own **Executive Board and a Director.**
- Employees of IRMA will become the employees of the University, with no change in their terms and conditions of employment.
- Any modification in the ongoing academic programs and courses at IRMA may be made only with the concurrence of the Executive Board of IRMA.
- The Bill also declares IRMA as a **centre of excellence for rural management.**
- **Governance of the University** - The University will have a Vice-Chancellor, who will be the principal executive and academic officer of the University.
- The Vice-Chancellor will be appointed by the central government for a **term of 3 years**, and will be eligible for re-appointment for another 2 years.
- The Vice-Chancellor will head the Executive Council, principal executive body of the University.
- The **central government** will specify details for the constitution of the Council, its powers and functions, and terms of office of its members.
- The University will have a Governing Board whose key functions include
  - Reviewing broad policies and programs of the University, and
  - Nominating members to its various administrative councils.
- **Governing Board** - The Board will be headed by the **Chancellor**, who will be a person of eminence and will be appointed by the central government. The Chancellor will have a **term of 5 years.**
- **Other members**
  - Vice-Chancellor,
  - Secretary to the Cooperation Ministry,
  - Four Secretaries of the central ministries dealing with cooperative sector,
  - Heads of boards such as NABARD, National Dairy Development Board, and National Fisheries Development Board,
  - Four eminent persons in the field of cooperatives.
- **Board for Affiliation and Recognition** - The University will have a Board for Affiliation and Recognition for admitting or affiliating institutes. This Board will be headed by the **Vice-Chancellor.**

#### 4.9 Revamping of MGNREGS

The recent report by Parliamentary Standing Committee on rural development and Panchayati raj chaired by Congress MP Saptagiri Sankar recommended to revamp MGNREGS.

##### MGNREGA

- **MGNREGA** – The Mahatma Gandhi National Rural Employment (MGNREG) is the largest public employment program in the world.
- **Implementation** – By Ministry of Rural Development.
- **Legal provision** – The scheme is legally backed by **MGNREGA Act, 2005** which committed to *provide right to work.*
- **Aim** – To enhance livelihood security of people by guaranteeing *100 days of wage-employment* in a financial year to rural household.

To know more about this, click [here](#)

#### Key recommendations of the parliamentary panel

- **Increasing guaranteed workdays** – The panel recommended to increase the guaranteed working days from **100 to 150.**



- For climate mitigation and disaster relief, the panel recommended increasing *work limit from 150 to 200 days under the Drought Relief Provision*.
- The committee recommended *extending work limit for Scheduled Tribe households living in forest areas from 150 to 200 days under the Forest Rights Act*.
- Revision of wages** - The panel expressed concern over wage payments not keeping pace with inflation and stressed to raise wages to at **least Rs 400 per day**.
- Establish social audit Calendar** – More frequent social audits to ensure transparent and proper implementation of the scheme.
- Independent national survey** - To assess its effectiveness and determine whether it needs revamping in light of emerging challenges.
- Compensation for delayed wages** – The report noted *chronic delays in wage payments* and recommended increasing compensation for delayed wages.
- The committee recommended introducing a system for *manual verification and corrections to prevent eligible workers* from being removed from the program.
  - Approximately 5 million job cards were deleted in 2021-22 due to spelling errors or Aadhaar mismatches.

*The Drought Relief Provision under MGNREGA Act allows for an increase in guaranteed working days from the standard 100 to 150-200 days in drought-affected areas.*

*The provision of additional 50 days of wage employment (beyond the stipulated 100 days) to Scheduled Tribe Household was mandated by the Ministry of rural development from 2014.*

#### 4.10 Jal Jeevan Mission (JJM)

*Jal Shakti Ministry seeks Rs 2.79 lakh crore more for Jal Jeevan Mission.*

- Aim** - To provide **Functional Household Tap Connections (FHTC)** to provide 55 lpcd (litre per capita per day) drinking water to all rural households in the country by 2024.
  - 75% of the target achieved over 5 years, so extended till 2028.
- Launched in** - August 2019.
- Nodal Ministry** - Ministry of Jalshakti.
- Funding** - Centrally Sponsored Scheme.
- Pattern between Centre and State**
  - 90:10 - Himalayan (Uttarakhand, Himachal Pradesh) and North-Eastern States.
  - 100% - Union Territories.
  - 50:50 - rest of the States.
- Components**
- Objectives** - Prioritizing FHTC provision in quality-affected areas, drought-prone regions, desert areas, and Sansad Adarsh Gram Yojana (SAGY) villages.
- Ensuring functional tap connections in schools, Anganwadi centers, gram panchayat buildings, health and wellness centers, and community buildings.
- Monitoring the functionality of tap connections.
- Promoting voluntary ownership among the local community through contributions in cash, kind, or labor (shramdaan).
- Ensuring the sustainability of water supply systems, including water sources, infrastructure, and funding for regular operations and maintenance.
- Empowering and developing human resources in the water sector, covering construction, plumbing, electrical work, water quality management, water treatment, catchment protection, and more.
- Raising awareness about the significance of safe drinking water and involving stakeholders to make water everyone's responsibility.



#### 4.11 Tamil Nadu's ban on egg mayonnaise

The Tamil Nadu government has banned the manufacture, storage, distribution, and sale of mayonnaise made using raw eggs, citing public health risks.

- **Mayonnaise** – It is described as a semi-solid emulsion containing egg yolk, vegetable oil, vinegar, and other seasonings.
- Egg yolks (and some seasoning, if one wants) are stirred together with oil to create a thick pale-yellow sauce. In the end, a dash of acid is added.
- The protein in the egg acts as an emulsifier (a substance that binds two immiscible liquid to form a stable mixture) for the oil and water, also from the egg (some 50% of the yolk is water).

#### Health Risks associated with Mayonnaise

- Eggs are known to **carry innumerable pathogens**, which are usually neutralized in the cooking process (through the application of heat). But mayonnaise uses raw eggs.
- This is especially relevant in Indian conditions, where improper preparation and storage amid hot and humid weather creates additional risk of contamination by microorganisms, especially **Salmonella** and **E Coli**.
- **Salmonella** – These are bacteria that can cause severe illness if consumed.
- According to the Centers for Disease Control (CDC), they are a leading cause of foodborne illness, hospitalizations, and deaths worldwide.
- Warm, humid weather is the ideal condition for salmonella to grow. Symptoms of salmonella infection include watery diarrhoea, vomiting, and stomach cramps.
- **E coli** – These are bacteria which can cause infections in the gut, urinary tract, and other parts of the body.
- While most E Coli strains are harmless, they are in fact important to the digestive process certain kinds can cause severe illness.
- **High-risk groups** - While these bacteria can affect everyone, it poses more acute risks to certain groups such as immunocompromised individuals, children, and the elderly.
- **Significance of the ban** - It will likely force food businesses to switch to eggless or pasteurized-egg versions, at least until a comprehensive risk assessment is done.

States	Banned food items
Telangana	Egg-mayonnaise
Tamil Nadu	Gutka and Paan masala

Punjab	caffeinated energy drinks
Tamil Nadu, Karnataka, and Himachal Pradesh	Cotton candy and Gobi Manchurian contains Rhodamine B
Karnataka	Artificial food colors

#### 4.12 Entry Denial for transport vehicles in Delhi

*Starting July 1, all End-of-Life (EOL) vehicles will be denied fuel in Delhi, with similar restrictions extended five high vehicle density (HVD) districts from Nov 1, 2025.*

- **Areas of Restriction** - This ban will extend to five high vehicle density (HVD) districts like Gurugram, Faridabad, Ghaziabad, Gautam Buddha Nagar, and Sonipat and across the rest of NCR.
- **Purpose** - To curb the menace of polluting vehicles.
- **Banned vehicles** - All transport or commercial goods vehicles **not compliant with BS-VI, CNG, LNG, or EV (electrical vehicle) standards**, unless the vehicles are registered in the Capital.
- **End of Life Vehicles (EOL vehicles)** - Diesel vehicles, older than 10 years, and petrol vehicles, older than 15 years, are not allowed to ply in the Capital.
- **Directions from Centre** - Immediate legal action has been directed against EOL vehicles, including impoundment and disposal, except for exempted categories.
- The commission cited past directives from the National Green Tribunal (NGT) and the Supreme Court, which emphasized the role of overaged vehicles in worsening air quality.
- **Monitoring & Surveillance** - Delhi has been piloting a solution involving Automated Number Plate Recognition (ANPR) camera systems.
- These systems capture and display vehicle registration details in real-time.
- These are integrated with the **centralized VAHAN database**.
- It is to identify EoL vehicles and those lacking a valid Pollution Under Control Certificate (PUC), and relay audio alerts when a non-compliant vehicle is detected.
- All fuel stations in Delhi are required to install these systems, as per the Commission's latest directive.
- The identification of polluting vehicles at the border entry points will also be intensified.
- **Exceptions** - Only those carrying essential commodities and services will be allowed until Oct 31, 2026.

*VAHAN database provides a nationwide search over the digitized data of Registered Vehicles.*

#### 4.13 Regulatory Framework for Over-The-Counter (OTC) Drugs

*India may soon have a streamlined regulatory framework around OTC drugs as the Central Drugs Standard Control Organisation (CDSCO) has approved the recommendations made by a special OTC sub-committee.*

##### Over-the-counter (OTC) Drugs

- It is also known as nonprescription medicines, are pharmaceuticals that can be purchased without a prescription from a healthcare professional.
- These medications are generally considered safe and effective when used as directed on the label.
- This includes medications that are part of the National List of Essential Medicines (NLEM) and are approved for distribution by the CDSCO.
- Typically, drugs like analgesics, antiseptics, contraceptives, some vitamins, laxatives, cough syrups, etc. are dispensed as OTC.
- The duration for which these medicines can be used has been kept low to avoid misuse.
- **Recommendations** - The committee draw up a framework for OTC drugs, and also create a mechanism to determine which medicines can qualify as OTC.

- Around 27-30 drugs, primarily analgesics, topical ointments for pain, cough-and-cold medications, etc., could be part of India's first comprehensive OTC drugs list. More drugs can be added in future.
- The framework and guidelines can be formalized once it gets approval from the health ministry.
- **Health concerns** - Self-medication with drugs such as antibiotics, painkillers, and sedatives, commonly bought from chemists without a prescription, can lead to significant health risks and side effects.
- Antibiotics like amoxicillin, ciprofloxacin, and azithromycin are frequently used without medical guidance. Improper or incomplete use of antibiotics can lead to antibiotic resistance, making future infections harder to treat and spreading resistant bacteria in the community.
- Painkillers, especially Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) like ibuprofen, diclofenac, and naproxen are also commonly misused.
  - It can irritate the stomach lining, leading to ulcers and bleeding, and in some cases cause kidney damage or raise the risk of heart attack and stroke.
- **Advantage** - Experts have cautioned against self-medication across categories, and, therefore, having a clear list of OTC medications will help reduce misuse.
- **Disadvantage for pharma sector** - Clampdown on OTC drug sales could dent Indian Pharma Market (IPM) volume growth, especially in the acute therapy segment where self-medication is rampant in analgesics, antipyretics, and common cold medicines.

Prescription drugs are categorized into Schedules H, H1, and X of the Drugs Rules, 1945.

#### 4.14 Central Adoption Resource Authority (CARA)

In Financial Year 2024-25, India saw a record 4,515 adoptions, the highest in nearly a decade and of these, 4,155 were domestic, marking a powerful shift in societal attitudes.

- **CARA** – It acts as the nodal body for **adoption of orphan, abandoned and surrendered Indian children** through its associated /recognised adoption agencies.
- **Set up** – 1990
- **Legality** – It is a statutory body through Section 68 of the Juvenile Justice (Care and Protection of Children) Act, 2015.
- It is headed by Member Secretary & CEO
- **Nodal ministry** – Ministry of Women & Child Development.
- **Mission** – To ensure **no child is left behind**.
- **Mandate** – To monitor and regulate in-country and inter-country adoptions through Child Adoption Resource Information & Guidance System (CARINGS).
- **Functions** – To promote In-country adoptions and to facilitate Inter-state adoptions in coordination with State Agency.
  - To regulate Inter-country adoptions.
  - To carry out the functions of the Central Authority under the Hague Convention on protection of Children and Cooperation in respect of Inter-country Adoption, 1993, ratified by India in 2003.
  - To frame regulations on adoption and related matters from time to time as may be necessary.
- **Fundamental principle** – Preference shall be given to place the child in adoption with Indian citizens with due regard to the principle of placement of the child in their own socio-cultural environment, as far as possible.
- **Illegal adoption** – It amounts to child trafficking and is a punishable offense under The Juvenile Justice (Care and Protection of Children) Amendment Act, 2021.







### Recent Status of Child Adoption in India

- **In 2023-24** – Over 8,500 children were identified and added to the adoption pool—many of them from institutions where they had long waited to be seen, chosen, and loved.
- 245 new agencies were added to CARA's network, making adoption more accessible than ever.



#### 4.15 Indian Cybercrime Coordination Centre (I4C)

Recently, Union Ministry of Finance issued notification to include Indian Cyber Crime Coordination Centre (I4C) under the Section 66 of the Prevention of Money Laundering Act (PMLA).

- Indian Cyber Crime Coordination Centre (I4C) acts as a nodal point to **curb cybercrime** in the country.
- **Established on** – 2020.
- **Nodal ministry** – Ministry of Home Affairs.
- **Aim** – To provide a framework and eco-system for Law Enforcement Agencies (LEAs) for dealing with Cybercrime in a coordinated and comprehensive manner.
- **Functions** – It works to strengthen efforts against cybercrimes committed against women and children.
- It facilitates *easy filing of cybercrime-related complaints* and helps identify cybercrime trends and patterns.
- It also acts as an *early warning system* for law enforcement agencies to enable proactive cybercrime prevention and detection.
- It promotes *public awareness* about preventing cybercrimes.
- It assists States/UTs in building the *capacity of police officers*, public prosecutors, and judicial officers related to cyber-crime.

*Cybercrimes fall in State subjects as per the 7th Schedule of the Constitution of India.*

*Section 66 of PMLA empowers the head of the ED to share information to initiate action against violation of various laws.*

- States/UTs are primarily responsible for the prevention, detection, investigation, and prosecution of crimes, including cybercrime and digital arrest scams, through their law enforcement agencies (LEAs)
- **Data Sharing by Enforcement Directorate (ED)** – The Finance Ministry has included the I4C in the list of agencies with which the Enforcement Directorate is permitted to share information under the Prevention of Money Laundering Act (PMLA).
- **Reason** – The measure comes amid growing instances of cyber frauds, [Digital arrest](#) and most cyber frauds are *trans-national in nature*.
- I4C will be the 27<sup>th</sup> entity authorized for getting data from ED under Section 66 of [Prevention of Money Laundering Act \(PMLA\), 2002](#).
- Other entities authorized for such data sharing include SEBI, RBI, CCI, SFIO, GST Council and others.
- **Significance** – The data from the Enforcement Directorate and other law enforcement agencies could help I4C to strengthen the country's fight against cyber-enabled financial crimes.

*The 'Citizen Financial Cyber Fraud Reporting and Management System', under I4C, launched in 2021 to enable immediate reporting of financial frauds and prevent the siphoning off of funds by fraudsters.*

#### 4.16 Ayushman Vay Vandana scheme

The Delhi government launched the Ayushman Vay Vandana scheme recently.

- This initiative is a **senior healthcare-centric extension** of the [Ayushman Bharat Pradhan Mantri Jan Arogya Yojana](#) (AB PMJAY) scheme.
- It offers senior citizens a comprehensive health cover of up to Rs 10 lakh annually.
- **Age requirement** - 70 years or above.
- **Nodal Ministry** – Ministry of Health and Family Welfare.
- **Objectives** - Offer free healthcare services for elderly individuals.
- Provide access to a network of government and private hospitals for cashless treatments.
- Ensure financial assistance for costly treatments, medicines, and associated healthcare needs.
- **Free diagnostics** - All diagnostic tests and health check-ups are provided free of cost.
- **Vay Vandana Card** - Under the scheme, each registered senior citizen will be provided with a unique health card.
- This card will store their health records, health check-up information and emergency service details.
- The card provides access to a wide range of healthcare services at both government and private hospitals that are part of the ABPM-JAY network.
- **Eligibility** - Everyone will benefit from this scheme, regardless of their financial background.
- **Treatments covered** - Coronary angioplasty, hip fractures/replacement, gallbladder removal, cataract surgery, prostate resection, and stroke, among others.

#### Other Important Topics

##### National Council for Vocational Education and Training (NCVET)

Recently, NCVET part of the Ministry of Skill Development & Entrepreneurship (MSDE), has granted official recognition to the National Institute of Social Defence (NISD).

- **Status** – Autonomous Body under the Union Ministry of Social Justice and Empowerment.
- **Established On** – December 5, 2018
- **Objective** – To oversee, elevate, and standardize vocational education, training, and skill development throughout India.

- **Responsibilities** – Recognize, oversee, and revoke certifications for awarding bodies and assessment organizations.
  - Create regulations for approving and monitoring qualifications.
  - Guarantee quality assurance in the vocational training framework.
  - Resolve complaints via a systematic grievance mechanism.
  - Consolidate and optimize disjointed regulatory systems to boost employability.

### ***BioSaarthi: Nurturing India's Biotech Startups***

*Union Minister unveiled the Bio-Saarthi Mentorship Initiative at the 13th Foundation Day of BIRAC, highlighting India's rapid rise in the global bio-economy.*

- Bio-Saarthi is a structured global mentorship program designed to support India's emerging biotech startups through expert guidance and capacity building.
- **Initiated by** – Ministry of Science and Technology.
- **Implemented by** – Biotechnology Industry Research Assistance Council (BIRAC) under the Department of Biotechnology (DBT).
- **Program Objectives** – Aims to strengthen India's biotechnology ecosystem by fostering innovation, supporting start-ups, and enhancing global competitiveness through mentorship.
- **Key Program Features** – Bio-Saarthi employs a six-month cohort model, providing structured mentor-mentee engagements, access to a global mentor pool, and a start-up-centric approach addressing R&D, scaling, regulation, and funding challenges.
- **Ecosystem Linkage and Outreach** – It promotes collaboration between industry, academia, and government, complementing initiatives like BioE3 for inclusive sectoral growth and nationwide impact.

### ***Silk Samagra-2 Scheme***

*The government is implementing the Silk Samagra-2 scheme (2021-26).*

- **Objective** – To boost India's sericulture industry.
- **Financial assistance** – It provides financial aid to states for various interventions including, Nursery development, silkworm rearing, chawki rearing centers, and post-cocoon activities like reeling and weaving.
- **Beneficiary coverage** – Both pre and post-cocoon activities.
- **Regional support to** – Specifically, Andhra Pradesh & Telangana for beneficiary-oriented projects in the last 3 years.

### ***Sahkar Taxi***

*The Indian government will launch Sahkar Taxi.*

- **About** – It is a cooperative-based taxi service, to compete with existing ride-hailing platforms like Ola and Uber.
- **Aim** – To provide a viable, driver-centric alternative, fostering economic empowerment and addressing market gaps.
- **Vehicle types** – 2-wheeler, auto-rickshaw, and 4-wheeler taxis.
- **Direct driver benefits** – It will channel all profits directly to drivers.
- **Cooperative insurance for drivers** – It will include a cooperative insurance company, providing drivers with essential insurance coverage.

### ***Operation Brahma***

*India recently launched the Operation Brahma, to provide humanitarian aid to Myanmar.*

- **Objective** – To provide humanitarian aid after a devastating 7.7-magnitude earthquake struck Myanmar.

- **Earthquake impact & response** – It is caused widespread destruction and over 1,600 fatalities in Myanmar and neighboring Thailand, prompting India's swift response.
- **Naval support & aid delivery** – *INS Satpura* and *INS Savitri* were dispatched, carrying 40 tonnes of humanitarian aid to Yangon, ensuring the timely delivery of essential supplies.

### **Sahakar Pragya Scheme**

*Cooperatives are benefitted all over the country under Sahakar Pragya Scheme.*

- **Launched in** – 2020.
- **Launched by** – Ministry of Agriculture and Farmers' Welfare.
- **Nodal Ministry** – Ministry of Cooperation.
- **Objective** – To focuses on developing professionalism in primary cooperatives in agriculture and allied sectors.
- It designs and conducts need-based programmes for personnel of assisted cooperatives and its own officials.

### **Stray Dogs**

*The Animal Birth Control (ABC) Programme are being implemented by the local bodies.*

- **Nodal Ministry** – Ministry of Health and Family Welfare (MoHFW).
- **ABC Programme** – To regulate the population of stray dogs.
- It is the only rational and scientific solution to the overpopulation of the street dogs and controlling incidence of Rabies.
- **Article 246(3)** – It outlines the preservation, protection & improvement of livestock, as well as the prevention of animal diseases, veterinary training and practice, fall under the jurisdiction of State Governments.
- **Articles 243(W) & 246** – Local bodies are mandated to control the stray dog population.

### **AI & IoT (Internet of Things) in Indian Agriculture**

- **Kisan e-Mitra** – A voice-based AI chat bot providing support for the PM Kisan Samman Nidhi scheme in 11 regional languages, handling daily queries and assisting millions of farmers.
- **National Pest Surveillance System** – It utilizes AI and Machine Learning to detect pest infestations.
- **Crop mapping & monitoring** – AI-based analytics using field photographs and satellite data enables precise crop mapping and crop-weather matching.

### **Poshan Tracker app**

*Recently, over 10.12 crore beneficiaries registered on Poshan tracker app.*

- **Umbrella scheme** – Poshan Bhi Padhai Bhi (PBPB) Programme.
- **Nodal Ministry** – Ministry of Women and Child Development (MWCD).
- **Aim** – To enhance Anganwadi Worker's (AWWs) capacity to deliver optimal early childhood care and education services to all children.
- To empower Anganwadi Workers and provide them with continuous digital support and coaching.

### **Mining Surveillance System (MSS)**

*Recently, the government has begun to use geo-spatial technologies such as Mining Surveillance System (MSS), Geographic Information System (GIS) and Satellite imagery to prevent illegal mining.*

- **Launched in** – 2016.
- **Developed by:**
  - Indian Bureau of Mines (IBM).



- Ministry of Electronics and Information Technology (MeitY).
- Bhaskaracharya Institute for Space Applications and Geo-informatics (BISAG).
- **Aim** – To develop a system for detection of incidence of illegal mining by use of space technology.
- To survey an area up to 500m outside the lease boundary to check incidences of illegal mining.
- Since, the inception of MSS in 2016-17, the project was implemented in major mineral rich states including in Odisha.

### **DoT Action to Curb Spam/Fraud Call**

*Recently, the Department of Technology (DoT) has disconnected nearly 1.75 lakh unauthorized numbers.*

- **Spam calls** – DoT identified that large number of spam calls are being originated from telecom identifiers like numbers starting from 0731, 079,080 etc.
- **DoT Actions** – It urges enterprises to comply with telecom regulations to avoid strict penalties.
- It encourages citizens to continue reporting spam calls through the Chakshu module of Sanchar Saathi app.
- It remains dedicated to strict monitoring and prompt action against Unsolicited Commercial Communication (UCC) (spam/fraud call) violators to protect consumer interests.

### **Smugglers and Foreign Exchange Manipulators (Forfeiture of Property) Act (SAFEMA), 1976**

*Recently, a special court in Mumbai finally handed over 14 properties belonging to Tiger Memon to the central government of India. Tiger Memon is the key accused in the 1993 Bombay Blasts.*

- **Objectives of the Act** – To fight smuggling and illegal money activities.
- It allows the government to take away properties that were bought with illegal money.
- **Ambit of an act** – It applies not just to the accused person but also to their family members and associates.

### **Poshan Tracker**

*Recently, Poshan Tracker application has received the Prime Minister's Award for Excellence in Public Administration 2024 in the Innovation (Centre) category.*

- **Nodal Ministry** – Ministry of Women and Child Development (MWCD).
- **Objective** – To improve nutrition through technology and data-driven governance under Mission Saksham Anganwadi and POSHAN 2.0.
- **Focus areas** – It emphasizes grassroot implementation, inter-departmental convergence, tech-driven approaches via Poshan Tracker, and community empowerment through the Beneficiary Module.
- **Significance** – This award highlights Poshan Tracker's vital role in advancing national nutrition goals.

### **Bureau of Indian Standards (BIS)-Academia Interface**

*Recently, BIS will offer 500 internship opportunities in standardisation to students from its partner institutions.*

- It is an 8-week internship program, which will involve pre-standardisation work, QCO compliance surveys, and site visits, focusing on manufacturing, testing, and quality assessment.
- **Vision** – To integrate a culture of quality and standardisation within academia.
- **Focus on** – The Annual Convention promoted action-oriented collaborations, curriculum integration, standards formulation, and student engagement through Standards Clubs.
- **Significance** – It includes standardisation modules in 15 institutes, over 130 R&D projects, 50+ BIS Corners, 198 Standards Clubs, and 3,400+ students in national quizzes.

### **Rights of Persons with Disabilities Act, 2016 (RPwD Act)**

*Recently, the Delhi High Court asked Swiggy and Zepto, to respond to a plea claiming their apps were not accessible to people with visual impairment.*

- It was enacted to fulfill India's obligations under the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which India ratified in 2007.
- **Aim** – To ensure the rights and dignity of people with disabilities.
- **Replacement of** – Persons with Disabilities Act, 1995.
- **Feature** – It mandates for adoption of accessibility features by the platforms such as e-commerce.
- **Barriers to visually impaired persons** – The platforms violated the dignity of persons with impairment by denying them equal access to essential services such as food delivery, grocery shopping, and restaurant reservations.
- The absence of accessible search features and interactive elements for the visually impaired created severe barriers.

### **Price Support Scheme (PSS)**

Recently, the Government has approved the procurement of Tur, Urad and Masur under PSS equivalent to 100% of production for the procurement year 2024-25.

- **Umbrella scheme** – [Pradhan Mantri Annadata Aay Sanrakshan Abhiyan \(PM-AASHA\)](#).
- **Objectives** – To provide financial assistance to farmers when market prices for their crops fall below the Minimum Support Price (MSP).
- To protect farmers from losses due to price volatility and ensure they receive a fair return for their produce.
- **Crops covered** – Bajra, Jowar, Maize, Paddy, Cotton, Tur, Moong, Urad, Groundnut, Sesamum Wheat, Gram, Mustard, and Sugarcane etc.
- The procurement of oil seeds, pulses and cotton, through National Agricultural Cooperative Marketing Federation of India Ltd (NAFED), which is the Central nodal agency for the MSP.

### **Emissions Trading Scheme (ETS)**

Recently, Surat's ETS specifically designed to curb particulate air pollution, marking a significant step in environmental regulation.

- **Launched in** – 2019, it is the 1<sup>st</sup> unique scheme to focus on trading particulate pollution globally.
- **Target** – It initially targeted 342 high-emitting industries in Surat, predominantly within the textile sector, which commonly used solid fuels like coal and lignite, and liquid fuels such as diesel.
- **Functions** – A regulatory mechanism that uses economic incentives to lower air pollution.
- Establishes a limit (cap) on total allowable emissions, distributing tradable emission permits to industries.
- Enable companies to buy and sell pollution rights and industries with lower emissions can profit by selling surplus permits to those exceeding their limits.
- It also known as Cap-and-Trade System.

### **Multi Modal Logistics Parks (MMLPs)**

Out of 32 approved MMLPs 5 MMLPs at Jogighopa, Chennai, Bengaluru, Nagpur and Indore are under development and expected to be operational in FY 2025-27.

- **About** – It is a transportation hub that offers multiple modes of transportation and logistics services in one location.
- **Developed by** – Both public and private entities.
- It is a facility that integrates various transportation modes such as rail, road, sea, and air, as well as warehousing, storage, distribution, and value-added services.

### **New Website of Ministry of Jal Shakti**

A new website of Ministry of Jal Shakti (Department of Water Resources, River Development and Ganga Rejuvenation) was launched recently.

- **Objective** – To align to cohesive digital ecosystem across all Ministries/Department.
- It is in Digital Brand Identity Manual (DBIM) format.
- **DBIM** – It acts as a style guide and outlines the visual, textual, and experiential elements necessary to bring harmonization to the digital platforms of the Government of India.
- **Significance** – It is in full compliance with the latest DBIM and Guidelines for Indian Government Websites (GIGW) 3.0.
- **Features** – Unified interface, consistent branding, technology standardization, digital excellence and accessibility.

### ***National Waterways (Construction of Jetties/Terminals) Regulations, 2025***

Recently, National Waterways (Construction of Jetties/Terminals) Regulations, 2025 was introduced by the Ministry of Ports, Shipping and Waterways.

- **Regulations** – It lays out a framework for private players to invest in the construction and operation of jetties and terminals across India's national waterways network.
- Any entity can develop or operate an inland waterway terminal on a National Waterway by securing a 'No Objection Certificate' (NoC) which are issued through new digital portal by the Inland Waterways Authority of India (IWAI).
- **Significance** – It brings both existing & new terminals and permanent or temporary terminals under a unified framework.
  - **Permanent terminals** – Operates for a lifetime.
  - **Temporary terminals** – Operates initially for 5-year term.

### ***The Hindu Code Bill***

The Supreme Court recently recalled the first President's power struggle over Hindu Code Bill in the Tamil Nadu's Governor case.

- **Introduced in** – 1950, when Ambedkar was Law Minister.
- **Objectives** – To codify and modernize Hindu law, specifically focusing on granting enhanced rights to women.
- To equalize social laws between men and women within the Hindu community.
- **Significance** – It focused on issues like marriage, divorce, inheritance, and guardianship.
- It represents a crucial aspect of Ambedkar's vision for social reform.
- **Role of the President** – Dr. Rajendra Prasad had sought to assert his independent authority to withhold assent to the legislation.
- Jawaharlal Nehru government had referred the issue to the Attorney General of India, MC Setalvad, for an opinion.
- Mr. Setalvad clarified that the role of the President under the Indian Constitution was analogous to that of the British monarch and he was expected to serve as a constitutional figurehead.

### ***Verka's New Mascot: 'Veera' Unveiled***

Recently, Milkfed Punjab, a leading Indian dairy cooperative, has introduced 'Veera' as the new mascot for its flagship brand, Verka.

- This strategic move aims to boost Verka's national and international recognition, similar to the Amul Girl's success.
- **Introducing 'Veera': The Brand Ambassador** – Veera, meaning 'brother' in Punjabi, is depicted as a smiling young Sikh boy with folded hands. He embodies Punjab's warmth, tradition, and hospitality, set to promote Verka's brand image.
- **Milkfed Punjab's Initiative** – Milkfed (Punjab State Cooperative Milk Producers' Federation), currently India's 7th largest state milk cooperative, is behind this branding effort to enhance Verka's market reach.

- **Verka: A Dominant Dairy Brand** – Verka, Milkfed's popular dairy brand, offers a wide range of products including milk, lassi, butter, paneer, curd, and flavored milk, already holding a strong market share in Punjab.

### ***First Onboard ATM on Panchavati Express***

*The Mumbai-Manmad Panchavati Express has become the first train in India to feature an onboard ATM, installed in an air-conditioned coach. The trial run was successful, allowing passengers to withdraw cash during travel.*

- **Innovative Revenue Scheme** – This initiative is part of Indian Railways' Innovative and Non-Fare Revenue Ideas Scheme (INFRIS).
- **Aim** – To enhance passenger convenience and generate non-ticket revenue.
- **Collaboration and trial success** – The ATM is a result of collaboration between the Bhusawal division of Indian Railways and the Bank of Maharashtra.

### ***National Anti-Doping Agency (NADA)***

*Recently, the NADA India organized a conference on "Building Together a Clean Sport Ecosystem" in New Delhi as part of Play True Week 2025, uniting various stakeholders.*

- **Established in** – 2005, by the Indian Government as an independent anti-doping organization.
- **Aim** – To dope-free sports in India.
- **Functions** – To implement the Anti-Doping Code, coordinating dope testing programs with stakeholders, promoting anti-doping research and education, and adopting best practices for continuous program improvement.
- **Building Together a Clean Sport Ecosystem** – The event emphasized fostering a clean, fair, and values-based sporting environment in India.

### ***National Organ and Tissue Transplant Organisation (NOTTO)***

*Recently, NOTTO is urging states and UTs to implement swap organ transplantation.*

- **NOTTO's Role** – NOTTO is the national apex body for organ procurement and distribution in India.
- **Removal of Age Cap** – The previous upper age limit of 65 for organ transplant registration has been eliminated due to increased life expectancy.
- **No Domicile Restriction** – The requirement for organ recipients to register in their state of domicile has been removed under a 'One Nation, One Policy' initiative, allowing registration in any state.
- **No Registration Fees** – The central government has directed states to cease charging registration fees for organ transplantation.

### ***Kerala Pioneers Online Permanent Lok Adalat Services***

*Kerala has become the first state in India to launch online Permanent Lok Adalat (PLA) services.*

- **Established Under Law** – PLAs are organized under Section 22-B of the Legal Services Authorities Act, 1987.
- **Civil Court Powers** – Permanent Lok Adalats possess the same powers as a Civil Court under the Code of Civil Procedure, 1908.
- **Mandatory Pre-Litigation** – They serve as a compulsory mechanism for conciliation and settlement of disputes related to Public Utility Services (e.g., transport, postal, telegraph) before litigation.
- **Binding Judgments** – The judgments issued by Permanent Lok Adalats are final and legally binding on all involved parties.
- **Jurisdictional Limit** – The jurisdiction of Permanent Lok Adalats extends to cases with a value of up to Rs. 1 Crore.

### ***Maharashtra Mandates Hindi as Third Language***



Recently, Maharashtra school education department has announced a significant reform under the National Education Policy (NEP) 2020.

- **Aim** – To promote multilingualism and strengthen national integration.
- This move aligns with NEP 2020's 3-language formula.
- **3-language formula** – Hindi will become a mandatory third language for students in Classes 1 to 5 in English and Marathi-medium schools starting from the academic year 2025–26.
- **Shift from 2-Language system** – This new directive marks a departure from the existing two-language format prevalent in Marathi and English-medium schools.
- **New Education Structure** – This change is in accordance with NEP 2020's recommended 5+3+3+4 education structure, specifically impacting the Foundational and Preparatory stages.

## 5. INTERNATIONAL RELATIONS & ORGANISATIONS

### 5.1 Joint Crediting Mechanism (JCM) between India and Japan

India and Japan plan to sign a Memorandum of cooperation for setting up a Joint Crediting Mechanism (JCM) to share emission reduction credits under Article 6.2 of the Paris Agreement.

- **Initiated by** – Japan.
- **Objective** – To facilitate the transfer of low-carbon technologies and infrastructure through investment by Japanese corporations to developing nations in exchange for carbon credits.
- **Purpose** – Helps both India and Japan achieve their climate targets (NDCs) by implementing sustainable technologies and sharing the resulting emission reductions.
- **Tracking Mechanism** – Carbon credits will be tracked through a registry system, with joint committees managing projects and certifying credits.
- **Key Features of India-Japan JCM** - Japan will invest in India's decarbonization efforts by deploying advanced clean energy technologies.
- India will adopt new emission-reducing technologies in various industries, focusing on high-cost sectors that lack financing.
- Japan can use these credits to meet its NDC commitments, while India benefits from technology transfer and infrastructure development.
- **Sectors Covered Under the JCM Agreement** - The agreement covers 14 key sectors, including
  - Renewable energy with storage solutions
  - Solar thermal power plants
  - Green hydrogen production
  - Sustainable aviation fuel (SAF)
  - De-carbonization of hard-to-abate sectors

### 5.2 Ottawa Convention

The Baltic States and Poland recently announced their withdrawal from the Ottawa Treaty.

- It is an international agreement that prohibits the use, developing, acquiring, retaining, stockpiling, production, and transfer of anti-personnel landmines.
- It is also known as the Anti-Personnel Mine Ban Convention or Mine Ban Treaty.
- **Anti-personnel landmines definition** - Designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons.
- **Entered into force in** – 1999.
- The convention is open to all nations.
- It requires states-parties to destroy their stockpiled APLs within 4 years and eliminate all APL holdings, including mines currently planted in the soil, within 10 years.

- Countries may request a renewable extension, which can be up to 10 years long, to fulfill their destruction obligations.
- States-parties are also required annually to report their total APL stockpiles, the technical characteristics of their APLs, the location of all mined areas, and the status of APL destruction programs.
- **Member states – 164 States** that have formally agreed to be bound by the Convention till 2022.
- The US, Russia, China and **India** are not party to the convention.
- **Significant producers and users of anti-personnel mines** - The United States, China, India, Pakistan, and Russia.

*Landmines come predominantly in two varieties - Anti-personnel and anti-vehicle mines. Both types have caused harm to civilian populations and continue to kill and injure long after conflicts end.*

### 5.3 Arctic Council

*International observers have recently raised concerns about escalating tensions in the Arctic.*

- It is an intergovernmental forum for cooperation and coordination on Arctic issues, including scientific research.
- **Formed in** - 1996 through the Ottawa Declaration.
- It promotes cooperation, coordination and interaction among the Arctic States, Arctic Indigenous peoples and other Arctic inhabitants on common Arctic issues.
- **Members (8)** – Canada, Denmark, Finland, Norway, Iceland, Russia, Sweden and the USA.
- These nations exercise sovereignty over the Arctic land and can also exploit resources within their Exclusive Economic Zones (EEZs).
- **Permanent Participants** - 6 organizations representing the indigenous people of the Arctic region.
- **Observer states (38)** - Other countries or national groups.
- **India** is currently an Observer member on the Arctic Council.
- All decision-making happens through consensus between the 6 members, and in consultation with the permanent participants.
- The 6 Working Groups carry out the Council's activities
  1. Arctic Contaminants Action Program
  2. Arctic Monitoring and Assessment Programme
  3. Conservation of Arctic Flora and Fauna
  4. Emergency Prevention, Preparedness and Response
  5. Protection of the Arctic Marine
  6. Environment Sustainable Development Working Group
- **Northeast Passage** – It is a maritime route through the Arctic along the northern coast of Eurasia, connecting the Atlantic and Pacific Oceans, primarily off the coast of northern Siberia (Russia).
- It's also known as the Northern Sea Route.
- **Strategic importance of Arctic Region – Natural Resources** - The region holds 13% of the world's undiscovered oil reserves and 30% of its untapped natural gas reserves.
- Beneath the frozen landscape lie untapped reserves of natural resources such as fossil fuels, rare earth elements, phosphates, and copper as well as lucrative fishing grounds.

- **Alternative sea routes** - The melting of Arctic sea ice has also prompted interest into the alternate trade routes like Northeast Passage and Northwest Passage by passing Suez Canal.
- **Geopolitical interests** - Unlike Antarctic, Russia, the United States (Alaska), Canada, Denmark (Greenland), Norway, Iceland, Finland, and Sweden have their military bases in the Arctic.
- **Lacks legal safeguards** - Unlike the Antarctic, which is environmentally protected by a dedicated international treaty, the Arctic lacks similar legal safeguards and is primarily governed by the UN Convention on the Law of the Sea (UNCLOS).

#### 5.4 China Suspends Rare Earth Exports

Recently, China has suspended the export of key rare earth metals and magnets as a part of China's retaliation for US tariff increase.

- **Rare Earth Elements (REEs)** – They are a set of **17 silvery-white soft heavy metals**.
- It is also called **rare earth oxides**.
- The 17 rare earth elements are:

Atomic Number	Element	Symbol
21	Scandium**	Sc
39	Yttrium	Y
57	Lanthanum	La
58	Cerium	Ce
59	Praseodymium	Pr
60	Neodymium	Nd
61	Promethium*	Pm
62	Samarium	Sm
63	Europium	Eu
64	Gadolinium	Gd
65	Terbium	Tb
66	Dysprosium	Dy
67	Holmium	Ho
68	Erbium	Er
69	Thulium	Tm
70	Ytterbium	Yb
71	Lutetium	Lu

- Scandium and yttrium are not part of the lanthanide family, but they are included because they *occur in the same mineral deposits* as the lanthanides and *have similar chemical properties*.
- All Rare earth elements are **considered metals**.
- **Properties** – Malleable with *high melting and boiling points*.
- They exhibit both *strong magnetic and luminescent properties* due to their unique electronic structure.

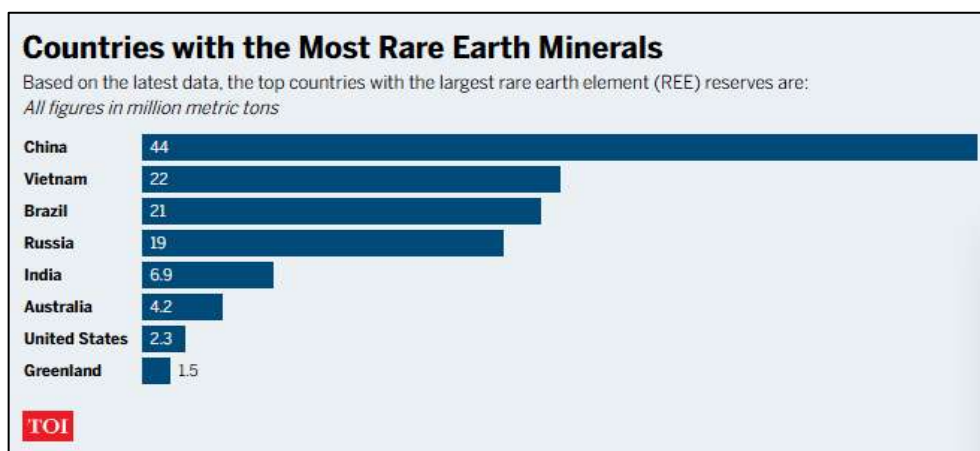
- **Significance** – Rare earth metals are vital in advanced electronics, defence and medical equipment's and renewable energy.

- They are critical in green technologies, *to support net zero carbon emissions goals.*

- **Resource distribution** – China has the largest reserves and production, followed by countries like Brazil, Vietnam, and Russia.

- China *account for 90% of global production* and it also controls refining technologies related to rare earth elements.

- **Suspension on export** – The Chinese government ordered



restrictions on the export of key rare earth metals, *which are refined entirely in China*, as well as rare earth magnets.

- Key heavy rare earth metals which that are covered under restriction are samarium, gadolinium, terbium, dysprosium, lutetium, scandium and yttrium.
- **Retaliation on US** – This suspension was in response to [reciprocal tariffs](#) imposed by US which led to trade war between the world's two largest economies.
- It is primarily aimed to prevent supplies from reaching certain companies, including American military contractors.
- **New regulatory system** – The metals, and special magnets made with them, can now be shipped out of China only with special export licenses.
- The licensing regime for other countries is yet to set up by China which, effectively halts shipments.
- **Impact of Rare earth element export suspension** –It is likely to *trigger a global supply crunch* especially affecting major REE-consuming countries like the US, Japan, Vietnam, and Germany.
- It could affect the production of Electric vehicles, defence equipment and advanced electronics.
- India has limited impact due to relatively low domestic consumption but it still relies heavily on China for Rare Earth metals with 65% of imports are from China.

## 5.5 India–Middle East–Europe Economic Corridor

*India and Italy have decided to expand cooperation jointly in implementing the ambitious India-Middle-East-Europe-Economic Corridor (IMEEC).*

- It is an initiative to **enhance India's maritime security** and facilitate quicker transportation of goods between Europe and Asia.
- **Launched on** - G20 Summit in Delhi in September 2023.
- **Aim** - To integrate India, Europe, and the Middle-East through UAE, Saudi Arabia, Jordan, Israel and the European Union.
- **Memorandum of Understanding (MoU) signed countries** - India, United States, United Arab Emirates, Saudi Arabia, France, Germany, Italy and the European Union.



- **Corridors**
  - **East corridor** - Connects India to the Gulf and
  - **Northern corridor** - Connects the Gulf to Europe.
- **Ports to be Linked**

<b>India</b>	Mundra (Gujarat), Kandla (Gujarat), and Jawaharlal Nehru Port Trust (Navi Mumbai).
<b>Middle East</b>	Fujairah, Jebel Ali, and Abu Dhabi in the UAE, along with Dammam and Ras Al Khair ports in Saudi Arabia.
A railway line will connect Fujairah port (UAE) to Haifa port (Israel) through Saudi Arabia (Ghuwaifat and Haradh) and Jordan.	
<b>Israel</b>	Haifa port.
<b>Europe</b>	Piraeus port in Greece, Messina in Southern Italy, and Marseille in France.

- The main elements of the Framework include development and management of a logistics platform, including a digital ecosystem, and provision of supply chain services to handle all types of general cargo, bulk, containers and liquid bulk in order to enable IMEEC.
- **Advantages** - The corridor intends to enhance connectivity, increase efficiency, reduce costs, secure regional supply chains, increase trade accessibility, generate jobs and lower greenhouse gas emissions.

### Significance for India

- Strengthening Maritime Security and also acts as a strategic countermeasure to China's Belt and Road Initiative.
- IMEEC will contribute to regional stability and peace by aligning with the European Nations' Global Gateway program.
- A stabilized trade corridor under the IMEEC framework will streamline logistics and ensure the continuous, dependable flow of products, renewable energy, and information.
- The corridor will also drive a significant increase in trade demand and supply across the region, reducing transaction costs and creating new job opportunities.
- IMEEC offers a vital platform for cultural and political exchange.
- It extends into the energy and technology sectors, incorporating initiatives such as integrated electricity grids, clean hydrogen pipelines, and secure high-speed data connectivity.



## 5.6 PM Modi awarded Sri Lanka's Mitra Vibhushana

*Shri Narendra Modi (1st Indian) was honored with the Sri Lanka Mitra Vibhushana Award.*

- Sri Lanka Mitra Vibhushana is the highest honour bestowed on foreign leaders.
- It honours **Heads of State and government heads** with whom Sri Lanka has cordial relations.
- It appreciates their friendship towards and solidarity with the people of Sri Lanka.
- **Instituted in** – 2008.
- **Instituted by** - Mahinda Rajapaksa (former President of Sri Lanka).
- This award ranks **higher than the national honours granted by Sri Lanka**, including the Sri Lanka Rathna (equivalent to the Bharat Ratna).
- The award consists of a **citation and a silver medal** studded with Navarathna, or 9 Sri Lankan gems.
- The Navarathna surrounds a globe encircled by lotus petals.
- At its centre is a Pun Kalasa, a ceremonial pot with rice sheaves, akin to the kalasa used during Sankranti. It signifies prosperity and renewal.
- The top of the medal bears symbols of the Sun and the Moon. It also features a Dharma Chakra, representing the shared **Buddhist heritage of both countries**.
- The medal is worn around the neck with a 6.5 cm wide ribbon.
- The award is granted at the **President's discretion**.



#### Other foreign country awards received by PM Modi

<b>Saudi Arabia's</b> Order of King Abdul Aziz	<b>Mauritius'</b> Grand Commander of the Order of the Star and Key of the Indian Ocean	<b>United States'</b> Legion of Merit
Order of the State of <b>Palestine</b>	<b>Russia's</b> Order of St Andrew	<b>Papua New Guinea's</b> Order of Logohu
<b>United Arab Emirates'</b> Order of Zayed	State Order of Ghazi Amir Amanullah Khan of <b>Afghanistan</b>	<b>Egypt's</b> Order of the Nile
Order of <b>Fiji</b>	Order of the Distinguished Rule of Nishan Izzuddin of <b>Maldives</b>	Legion of Honour of <b>France</b>
<b>Egypt's</b> Order of the Nile	King Hamad Order of the Renaissance of <b>Bahrain</b>	Order of Honour of <b>Greece</b>
<b>Bhutan's</b> Order of the Dragon King		

#### 5.7 India- Portugal Relationship

*President Droupadi Murmu recently held extensive discussions with President Marcelo Rebelo de Sousa of Portugal and deliberated on various aspects of India-Portugal relations.*

- Both sides agreed to further strengthen the ties in several areas, including trade and investment, IT, renewable energy and connectivity.
- Commemorative postage stamps** - Both sides launched commemorative postage stamps marking **50 years of diplomatic relations** between India and Portugal.
- The stamps reflect the rich artistic and cultural heritage of India and Portugal, and feature vibrant folk attire from both countries
  - Rajasthan's distinctive Kalbeliya costume, and
  - The traditional Viana do Castelo dress from Portugal.
- President of India visited the Church of Santa Maria and laid wreath at the tomb of Luis Vaz de Camoes, the national poet of Portugal.
- She toured the Monastery of Jeronimos, a masterpiece of 16<sup>th</sup>-century architecture in Portugal.
- President receives "Key of Honour" of Lisbon City in Portugal.
- Significance** - The relationship between India and Portugal enhances the overall strength of the India-European Union partnership.
- Currently, trade between the two nations stands at \$1.5 billion and has been experiencing consistent growth.
- Portugal was also the first country in Europe with whom India had signed a Migration and Mobility Agreement.
- It was during the Portuguese presidency of the EU in 2000 that the first India-EU summit was hosted by Portugal.



## 5.8 Indus Water Treaty Suspension

India has declared the Indus Water Treaty (IWT) of 1960 with Pakistan "in abeyance" with immediate effect in response to terror strike in Pahalgam.

- Held in abeyance** – India has temporarily suspended the enforcement of the treaty until Pakistan credibly and irrevocably abjures its support for cross-border terrorism.
- Scope of suspension** – There is no explicit provision for treaty suspension in the original water treaty agreement.
- Article 62 of the Vienna Convention on Law of Treaties** - Provide grounds for rejecting a treaty due to fundamental change of circumstances.

*The Vienna Convention on the Law of Treaties (VCLT) adopted on 1969 is an international agreement that regulates treaties among sovereign states.*

### Implications of Suspension

- India is no longer obligated to follow restrictions on reservoir flushing of the Kishanganga and other projects on western rivers (Indus, Jhelum, and Chenab) in Jammu and Kashmir.

- Reservoir filling can now be done anytime instead of only during August (peak monsoon).
- There are no operational restrictions on how reservoirs are to be filled and operated.
- There will be no restrictions on designing building structures like dams on western rivers.
  - In the past almost every project has been objected to by Pakistan over the designs.
- India can stop sharing flood data on the rivers with Pakistan.
- India can take flood control measures to mitigate floods in the Valley.

*Reservoir flushing is a technique used to remove accumulated sediment from a reservoir by releasing water at a high flow rate to wipe out the sediment.*

### Indus Water Treaty

- The Indus Water Treaty (IWT) is a water-distribution treaty between **India and Pakistan**.
- **Negotiated by** - The World Bank.
- **Signed in** - 1960.
- The treaty covers the Indus system of rivers which includes:
  - The main Indus River
  - Five left bank tributaries - Ravi, Beas, Sutlej, Jhelum, and Chenab



### Water Allocation Under Treaty

- **Eastern rivers** (Sutlej, Beas, and Ravi)
  - Allocated to India for unrestricted use
- **Western rivers** (Indus, Jhelum, and Chenab)
  - Allocated largely to Pakistan.
- India can use western rivers for domestic use, agriculture, and hydroelectric power.

## 5.9 Artemis Accords

Bangladesh recently became the 54<sup>th</sup> nation to sign the Artemis Accords.

- **Aim** – To provide a *non-binding framework of principles* to guide peaceful and cooperative civil space exploration, supporting NASA's Artemis Program.
- **Established** – In 2020 by the United States, led by NASA and the U.S. Department of State and 7 other initial signatory nations.
- **Scope** – Applies to civil space activities on the Moon, Mars, asteroids, comets, their orbits, Lagrangian points and transit paths.
- **Signatories** – There are *54 countries* including Bangladesh.
- **India** – *Signed the Accords in 2023* to boost the cooperation between the two nations and explore the domain beyond the boundaries of Earth.

*NASA's Artemis Program aims to return humans to the Moon and Mars.*

### Core Principles of the Accord

- **Peaceful Exploration** – All activities exclusively for peaceful purposes.
- **Transparency** – Commitment to sharing space policies, plans, and scientific findings by the nations.
- **Implementation** – Through memoranda, government agreements and agency arrangements.



- **Compatibility** – Aligns with the [1967 Outer Space Treaty](#) and other international space law.
- **Safety Zones** – Provides for establishment of safety zones to prevent harmful interference.
- **Space Resources** – Affirms the right to extract and utilize space resources sustainably.
- **Registration** – Requires registration of space objects for identification.
- **Interoperability** – Promotes compatible systems and standards.
- **Space Debris** – Commits signatories to debris mitigation planning.
- **Emergency Assistance** – Provides framework for supporting astronauts in distress.

### Significance

- Represents largest international coalition for space exploration governance.
- Creates practical framework for sustainable lunar presence.
- Facilitates international cooperation while respecting sovereignty.
- Positions signatories for future space economy participation.

### 5.10 Optional Practical Training program

*A Bill was introduced in the US recently to end the Optional Practical Training program for those no longer engaged in full-time study in the United States.*

- The OPT program allows students (who are in the US on F1 visas) to work for **up to 12 months** in a field related to their area of study.
- **Types**
  - **Pre-completion OPT** - International students are required to be enrolled in a full-time program in the United States for a minimum of one academic year before they can finish their studies.
  - **Post-completion OPT** - It allows the student to work after graduating.
- **Eligibility** - To be eligible for the OPT program, students are required to be enrolled full-time for a minimum of one academic year.
- They must submit their application through their educational institution, which has the authority to endorse them for OPT.
- The application process is managed by the United States Citizenship and Immigration Services (USCIS).
- Students who hold F-1 status are permitted to stay in the United States while participating in OPT employment.
- **Extension for STEM students** - Students in STEM (Science, Technology, Engineering, and Mathematics) fields can extend their OPTs by another 24 months.
- This effectively means that a student in a STEM field can work in the US for **3 years after graduation**.

*The F-1 Visa (Academic Student) allows you to enter the US as a full-time student at an accredited college, university, seminary, conservatory, academic high school, elementary school, or other academic institution or in a language training program.*

*Of the 3,31,602 Indian students in the US, around 29% or 97,556 students were on OPT in 2023-24.*

### 5.11 UN Security Council

*Intergovernmental negotiations Chair Tareq AlBanai said India will surely be a contender if the UN Security Council is expanded.*

- It is one of the **6 main organs** of the United Nations.
- **Aim** - It has the primary responsibility of maintaining international peace and security.
- **Headquarters** - New York, United States.
- **Founded in** - 1945.
- **Membership** - It is composed of 15 members.
  - **Permanent Members** - China, France, Russia, the United Kingdom, and the United States, all have veto powers.
  - **Non-Permanent Members** - 10 members elected for **2-year terms by the General Assembly**.
- It is the only UN organ that has the power to make **binding decisions** on member states.
- **Legal Basis** - UNSC operates under the authority of the UN Charter, which outlines its role and responsibilities.
- **Presidency** - The presidency of the Security Council rotates alphabetically among 15 members every month.
- **Voting Rights** - Each member of the Security Council shall have one vote, while permanent members have veto powers.
- **Powers** - It can investigate and resolve disputes, impose sanctions, authorize the use of force, and establish peacekeeping missions.
- **India & UNSC** - India is **not a member to UNSC**, India has served as a non-permanent member on the Council 8 times, including its recent term for 2021-2022.
- **G4 Nations** - 4 countries bids for permanent seats in UNSC.
- They are Brazil, Germany, India, and Japan.

Other 5 main organs of UN are UN General Assembly, UN Economic & Social Council, Secretariat, International Court of Justice, Trusteeship Council

## 5.12 SAARC Visa Exemption Scheme

*In the aftermath of the terror strike in Pahalgam, the Indian government has announced that Pakistan nationals will not be permitted to travel to India under the SAARC Visa Exemption Scheme (SVES).*

- **Launched in** - 1992.
- **Launched by** - The 4<sup>th</sup> Summit of SAARC launching the SAARC Visa Exemption Scheme (SVES) in 1992, allowing select individuals to **travel within the region without visas**.
- **Visa Exemption Sticker** - This travel document is known as the SAARC Visa Exemption Sticker.
- **Eligibility** - It is given to individuals falling under 24 specific categories, such as dignitaries, judges, parliamentarians, senior officials, business persons, journalists, and sports personalities.
- The Visa Stickers are issued by the **respective Member states** to the entitled categories of that particular country.
- **Validity** - 1 year.
- **Administered by** - **Immigration Authorities of respective Member states**.
- It was to ensure that their travel is not limited to any specific cities and would save them from the hassles like police reporting and filling of extra forms on entry in any of the 8 SAARC countries.

## Other Visas

- In 2015, India decided that citizens of SAARC countries are eligible for a Business Visa to India for a period of up to 5 years, or for a shorter duration based on specific requirements.
  - However, this does not apply to nationals of **Nepal, Bhutan, and Pakistan.**
- **Citizens of Nepal and Bhutan** did not require a visa to visit India.
- In the case of Pakistani nationals, only certain categories were eligible for a multiple-entry Business Visa, limited to a **maximum duration of one year** and restricted to 10 places within India.
- Later, India issued revised instructions allowing a multiple-entry Business Visa for up to 3 years for special category Pakistani businessmen with verified financial standing and business credentials.
- These visas are restricted to **15 designated places** in India.
- Among SAARC countries, Sri Lankan nationals were eligible for the **e-Tourist Visa** facility.
- Indian nationals, in turn, do not require a visa to travel to Nepal and Bhutan, while all other SAARC member states provide Business Visa facilities to Indian citizens.

### South Asian Association for Regional Cooperation (SAARC)

- It is an **economic and political regional organization** of countries in South Asia.
- **Secretariat** - Kathmandu, Nepal,
- **Established with** - The signing of the SAARC Charter in Dhaka on December 8, 1985.
- **Members (8)** - Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.
- **Areas of Cooperation** - SAARC focuses on various areas like trade, education, health, and infrastructure development.
- **Objectives** - To promote the welfare of the peoples of South Asia and to improve their quality of life.
- To accelerate economic growth, social progress and cultural development in the region and to provide all individuals the opportunity to live in dignity and to realize their full potentials.
- SAARC also aims to strengthen cooperation with other developing countries and to cooperate with international and regional organizations with similar aims and purposes.

### 5.13 11th BRICS Labour & Employment Ministers' Meeting 2025

Recently, Union Minister of State for Labour & Employment led the Indian delegation at the BRICS Labour & Employment Ministers' Meeting held under Brazil's Presidency in Brasília, Brazil.

- **Aim** – To **deliberate upon core labour and employment issues** with the aim to attain the sustainable goals of poverty alleviation and employment generation.
- **1st Meeting** – **At Ufa, Russia in 2016** which laid the foundation of **BRICS Employment Working Group (BEWG)**.
- **2025 meeting** – Slogan of “Strengthening the Cooperation of the Global South for More Inclusive and Sustainable Governance”.
- **India in 2025 meet** – It showcased the **National Career Service (NCS) platform**, powered by AI, as a model for bridging skill gaps and connecting millions to employment opportunities.

- The Sector Skill Council for Green Jobs (SSCGJ) and Mission LiFE (Lifestyle for Environment) were highlighted as transformative initiatives driving skilling and sustainable practices.
- **Adopted declarations** – It is in line with 2 pivotal themes
  - Artificial Intelligence (AI and the Future of Work)
  - The Impacts of Climate Change on the World of Work and a Just Transition.
- **Key Outcomes** – The declaration commits BRICS nations to
  - Promote inclusive AI policies that balance innovation with worker protection.
  - Advance social dialogue to ensure fair climate transitions.
  - Strengthen South-South cooperation on labour governance, digital inclusion, and green job creation.
- **Significance** – It reaffirmed BRICS' collective resolve to build a future where **no worker is left behind in the face of AI-driven disruption or climate challenges.**

*The BRICS Labour & Employment Ministers' meeting under the Indian Presidency has been convened in 2016 at New Delhi.*

### Quick Facts

- **Skill Council for Green Jobs (SCGJ)** – Established as a not-for-profit, autonomous, industry-led society, was incorporated under the Societies Registration Act XXI, 1860 in 2015.
- It is promoted by the Ministry of New and Renewable Energy (MNRE) and Confederation of Indian Industry (CII).
- It is aligned to the National Skill Development Mission.

### Other Important Topics

#### Exercise Tiger Triumph IV

*Exercise Tiger Triumph IV will occur on the Eastern Seaboard from April 2025.*

- It is the 4<sup>th</sup> edition of bilateral India-US humanitarian and disaster relief exercise, will take place in Visakhapatnam.
- **Aim** – To enhance interoperability and develop Standard Operating Procedures (SOPs) for joint HADR operations, establishing a Combined Coordination Center (CCC).

#### India-UK Economic and Financial Dialogue (EFD)

*Recently, an India-UK EFD was held at London.*

- It is the 13<sup>th</sup> Ministerial meeting of the India-UK Economic and Financial Dialogue (13<sup>th</sup> EFD).
- **Proposal** – UK announced 400 million euros in export and investment deals with India.
- **Commitment** – To continue collaboration in financial services sector, FinTech and Digital economy.
- Collaboration at bilateral and multilateral fora to address mutual and global economic issues.
- They welcomed the recent announcement of UK universities establishing campus in India and the recent release of the India-UK Financial Partnership (IUKFP) report on direct listing in IFSC GIFT City.



### India-US Extradition Treaty, 1997

Recently, Tahawwur Rana, a co-conspirator in the 26/11 Mumbai terror attacks was extradited to India from the U.S. through India-US Extradition Treaty 1997.

- **Treaty** – It enables extradition for crimes punishable by over a year's imprisonment in both nations.
- **Conditions for India** – The extradited person cannot be detained, tried, or punished in India for an offence other than the one for which extradition was granted.
- Exceptions include offences based on the same facts as the extraditable offence, offences committed after extradition, or if a waiver is granted by the US authorities.
- India cannot extradite the person to a third country for offences committed before the extradition without US consent.
- India must comply with its own legal procedures for handling extradited individuals, including those outlined in the Extradition Act, 1962.

### India-Japan Joint Working Group (JWG) Meeting

Recently, the 4<sup>th</sup> JWG Meeting on Tourism Cooperation between India and Japan was held in New Delhi.

- It focused on finding new ways to work together and enhance tourism ties between the two nations.
- It concluded with mutual assurances of ongoing dialogue, further collaborations and a reinforced commitment to leveraging tourism as a bridge for enhancing bilateral relations and mutual prosperity.
- **Key discussion points** – Promoting Buddhist sites in India to Japanese tourists, improving air connectivity and encouraging Japanese student visits to the country.
- It also explored increased private sector involvement and strategies to harness media and influencer engagements for boosting tourist flow.

### Country Partnership Framework (CPF)

Recently, Mauritius has signed a Country Partnership Framework (CPF) with the International Solar Alliance (ISA).

- **CPF** – It is a strategic document designed to facilitate medium- and long-term cooperation with ISA member countries to achieve their solar energy goals.
- **Aim** – To promote the deployment of solar-based applications, capacity-building on technical, regulatory, and financing needs to the country.
- To establish the Solar Technology Application Resource Centre (STAR-C), scaling of solar rooftop, projects, agrivoltaics, water pumping systems and solar Green Hydrogen.

**Solar Technology Application Resource Centre (STAR-C)** is a program initiated by ISA, to build a skilled solar workforce through specialized training, tools, and learning modules.

- **Mauritius** – It has become the 1<sup>st</sup> African nation and 4<sup>th</sup> globally to enter into this partnership with ISA.
- **Duration** – 3 years and renewed based on mutual consent.

### Safeguard American Voter Eligibility (SAVE) Act

The United States (US) House of Representatives recently approved the SAVE Act.

- It is a Republican-backed bill, mandates that individuals provide proof of U.S. citizenship when registering to vote and to update the name or address changes.

- **Objective** – To enhance election integrity by preventing non-citizens from voting in U.S. elections.
- **Existing federal law** – It *prohibits non-citizens from voting*, with significant penalties in case of violations.
- **Impact** – It will affect *new voter registrations*.

### ***Sudan's Humanitarian Crisis***

*The United Nations stated that Sudan is currently facing worst humanitarian crisis, marked by extreme hunger affecting nearly half of its population.*

- It is the *world's largest humanitarian emergency*, over 25 million people require urgent assistance.
- **Causes** – The ongoing *civil war*, is the primary cause of widespread suffering and immense humanitarian needs across the nation.
- **Impacts** – It has triggered *mass displacement*, over 8 million people to flee their homes within Sudan and an additional 4 million have sought refuge in neighbouring countries.
- Women and girls are disproportionately affected, facing heightened risks of *gender-based violence and severe food insecurity*.

### ***Harare Declaration***

*Recently, Climate and Health Africa Conference (CHAC) 2024 in Zimbabwe concluded with the adoption of the Harare Declaration.*

- It is a collective African commitment to tackle the health impacts of climate change.
- **Aim** – To recognize climate change as a health emergency and strengthen Africa's role in climate and health responses.
- **Fostering Collaboration** – It promotes collaboration among governments, researchers, civil society, and communities.
- **Features** – Upgrading infrastructure, training health workers, and improving healthcare delivery.
- It emphasizes investing in research, surveillance, and the inclusion of local and traditional knowledge.

### ***US Airstrikes Near Hodeidah Port***

*Recently, UN Special Envoy for Yemen, Hans Grundberg, has voiced serious concern regarding US airstrikes in the vicinity of the Houthi-controlled Ras Isa fuel port near Hodeidah.*

- **Ras Isa** – It is a Key Oil Export Hub, primarily known for its facilities dedicated to oil exports.
- **Located in** – Yemen's Red Sea coast.
- **Role** – It plays a significant role in Yemen's maritime trade and crucial for the country's energy export sector.
- **Hodeidah** – A key port city situated on Yemen's western coast.
- **Features** – It serves as a critical hub for importing essential goods and humanitarian aid into Yemen.
- Its strategic importance lies in controlling access to the Red Sea, making it a major focus in the ongoing conflict.

### ***Africa India Key Maritime Engagement (AIKEYME), 2025***

*Recently, Indian Navy ships INS Chennai and INS Kesari participated in the sea phase of AIKEYME 2025, conducting joint manoeuvring exercises and Visit, Board, Search & Seizure (VBSS) drills.*

- It is a joint naval exercises, to maritime security and interoperability with partner nations in the African region.
- **INS Chennai** – It is the final Kolkata-class stealth-guided missile destroyer (Project 15A), was built by

Mazagon Dock Limited (MDL) in Mumbai and commissioned in 2016.

- Operating under the Western Naval Command, this 164-meter, 7,500-tonne vessel boasts a top speed of over 30 knots.
- **Features** – Powered by 4 gas turbines, indigenous defence systems 'Kavach' and 'Mareech' against missiles and torpedoes, can operate 2 helicopters, equipped for NBC warfare and armed with BrahMos & Barak-8 missiles.
- **INS Kesari** – It is a Shardul Class Landing Ship Tank (LST), built by Garden Reach Shipbuilders and Engineers (GRSE), Kolkata, and commissioned in 2008.
- **Features** – To transport troops, tanks, armored vehicles, and military equipment, primarily supporting amphibious operations and Humanitarian Assistance and Disaster Relief (HADR) missions.

### International Telecommunication Union (ITU)

Recently, India nominated Ms M. Revathi as its candidate for the Director of the Radiocommunication Bureau position at ITU.

- **Established in** – 1865, is the oldest United Nations (UN) specialized agency for digital technologies (ICTs).
- **Headquarters** – Geneva, Switzerland.
- **Membership** – 194 member states and more than 1000 companies, universities and international and regional organizations.
- **3 sectors** – ITU-T (Standardization), ITU-D (Development), and ITU-R (Radiocommunication).
- **Radiocommunication Bureau** – It manages the global radio-frequency spectrum and satellite orbit resources, ensuring countries and technologies (like 5G, aviation, space missions, etc.) don't interfere with one another.

### Simla Agreement, 1972

Following India's actions post the Pahalgam attack, Pakistan has dramatically escalated tensions by suspending the 1972 Simla Agreement, citing alleged Indian terrorism and Kashmir violations.

- It arose directly from the 1971 Indo-Pakistani War and the creation of Bangladesh, a conflict where India's military played a decisive role, reshaping South Asian geopolitics.
- **Aim** – To establish peace and normalize relations after intense hostilities.
- **Objectives** – India sought a bilateral resolution to the Kashmir issue, improved relations based on the new power balance, and strategically avoided pushing for a permanent border at the ceasefire line to prevent Pakistani resentment.
- **Core Principle** – It emphasized peaceful, bilateral negotiations as the primary means to resolve all issues between India and Pakistan, aiming to end ongoing conflict and confrontation.
- **Key Negotiators** - PM Indira Gandhi and Pakistani President Zulfikar Ali Bhutto.
- **Status of the Line of Control** - A central provision addressed the Line of Control (LoC) in Kashmir, established after the 1971 war. Both nations agreed to respect the LoC without prejudice to their claims and to avoid unilateral changes.
- **Agreement mandated** – The withdrawal of forces to their respective borders and outlined plans for future high-level meetings and discussions to build lasting peace, normalize relations, and address humanitarian concerns.

## 6. ECONOMY

### 6.1 India Bio-Economy Report

- **Bio-economy** – Refers to the industrial use of biological resources (plants, animals, and microorganisms), and the replication of natural biological processes in the production of goods and services.
- **Released by** – Department of Biotechnology.

- **Key findings** – The report shows that the value of India's bio-economy nearly doubled in the last 5 years, from 2020 to 2024.
- The number of companies operating in the bio-economy has gone up by almost 90% in the last 3 years, from 2021 to 2024.
- This number is projected to double again by 2030, by which time such companies would employ close to 35 million people.
- Nearly half the value of the bio-economy was generated in the industrial sector, for the development and use of biofuels and bioplastics, among other things.
- The pharma sector accounted for another 35% of the total value, with vaccines the major contributor.
- But the fastest growing segment in 2024 was research and IT, which includes biotech software development, clinical trials, and bioinformatics that helps in areas such as drug research.
- The report showed that only 5 states – Maharashtra, Karnataka, Telangana, Gujarat and Andhra Pradesh, accounted for more than two-thirds of the value generated in the bio-economy.
- The entire eastern and north-eastern region generated less than 6% of the total value.
- **Achievements in Bio-economy** – India is among the top producers of vaccines globally and developed the world's first DNA COVID-19 vaccine.
- Ethanol blending largely increased from 2014 to 2024, with a target of 20% by 2025.
- The sector contributes **4.25%** to GDP with a compound annual growth rate (CAGR) of **17.9%** over the past four years.
- While the 4.2% share in the overall GDP was comparable to figures in the United States and China, the bio-economy of countries like Spain and Italy accounts for more than 20% of their GDP.

### Government Initiatives and Key Programmes

- **BioE3 policy (Biotechnology for Economy, Environment and Employment)** – Aims to establish India as a global hub for bio-manufacturing, and a major centre for research and development in biotechnology.
- The idea is to incentivise and promote the setting-up of a network of universities, research institutions, start-ups and industries to facilitate bio-manufacturing.
- **National Biopharma Mission (NBM)** – Innovate in India (i3), is a government-approved initiative led by the Department of Biotechnology (DBT) and implemented by BIRAC.
- It aims to boost India's capabilities in biopharmaceuticals, vaccines, biosimilars, medical devices, and diagnostics by fostering collaboration between industry and academia.
- **Biotech-KISAN** – It is a scientist-farmer partnership programme launched to empower farmers, especially women and those in rural and tribal areas, through agricultural innovation and scientific interventions.
- It follows a hub-and-spoke model and is active across **115 Aspirational Districts** in India.

## 6.2 Gold Monetization Scheme (GMS)

Recently, the Ministry of Finance has decided to discontinue the Gold Monetization Scheme (GMS).

- **Launched in** – 2015.
- **Objective** – To mobilise idle gold held by households, trusts and various institutions of the country.
- To facilitate its use for productive purposes, and in the long run to reduce country's reliance on the import of gold.
- It is revamped version of Gold Deposit Scheme (GDS).
- Deposit features



Types of deposits	Duration	Minimum Lock-in Period	Interest Rate
Short Term Bank Deposit (STBD)	1-3 years	Determined by banks	Determined by banks
Medium Term Government Deposit (MTGD)	5-7 years	3 years	2.25% p.a.
Long Term Government Deposit (LTGD)	12-15 years	5 years	2.50% p.a.

- **Interest rate**

- For MTGD & LTGD – They are decided by the government, in consultation with the RBI and borne by the Central government.

- **Minimum deposit** – 10 grams of raw gold (bars, coins, jewellery excluding stones and other metals).

- **Maximum deposit** – No limit for maximum deposit.

- **Eligibility**

- Resident Indians – Individuals, Hindu Undivided Family (HUF), Proprietorship & Partnership firms.
- Trusts – Mutual Funds/Exchange Traded Funds registered under Securities and Exchange Board of India (SEBI).
- Companies, charitable institutions, Central & State Government or any other entity owned by Central or State Government.

### Proposed changes for closure

- Reason for closure – Evolving market conditions and performance of the scheme.
- **Changes** – Discontinuation of MTGD and LTGD, including renewal of existing deposits.
- Existing deposits of MTGD and LTGD will continue till maturity.
- Since short-Term Deposits (STBD) are under the ambit of banks in the scheme, it can continue at the discretion of individual banks based on the commercial viability as assessed by them.

*Gold Monetisation Scheme (GMS) is the 2nd gold scheme to face closure by the government after sovereign gold bonds.*

## 6.3 Childhood Mortality and Stillbirth

The United Nations Inter-Agency Group for Child Mortality Estimation (UNIGME) in its recent report has lauded India for its effort in mitigating childhood mortality and stillbirth.

- The United Nations Inter-Agency Group for Child Mortality Estimation (UNIGME) recently published its "Levels and Trends in Child Mortality" report.
- It is an annual report that provides data for 195 countries.
- **Child mortality** – It is also known as under-five mortality rate.
- It is the number of children who die by the age of 5 years, per 1000 live births.
- **Stillbirth** – A baby who dies after 28 weeks of pregnancy, but before or during birth, is classified as a stillbirth.

### Key findings of the report

- While the world has made progress in reducing child mortality, the rate of improvement is slowing down.
- Millions of children still die from preventable causes, often due to unequal access to healthcare, nutrition, and protection, especially in vulnerable areas.
- **India** – India is on 7<sup>th</sup> position among the top 10 countries in highest reduction of stillbirths in the range of 60-70%.

- Between 2000 and 2023, India achieved a 70% decline in the under-five mortality rate and 61% decline in the neonatal mortality rate.
- Stillbirth in India is reduced 60.4% in between 2000-2023 in comparison to 37% global reduction.

#### United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME)

- UN IGME was formed in 2004 to share data on child mortality, improve methods for child mortality estimation.
- It also reports on progress towards child survival goals and enhance country capacity to produce timely and properly assessed estimates of child mortality.
- UNIGME is a collaborative effort led by:
  - United Nations Children's Fund (UNICEF),
  - World Health Organization (WHO),
  - The World Bank Group and
  - The United Nations Population Division of the Department of Economic and Social Affairs.
- UN IGME updates its child mortality estimates annually after reviewing newly available data and assessing data quality.
- The web portal contains the latest UN IGME estimates of child mortality at the country, regional and global levels and the data used to derive them.

#### 6.4 Banking Laws (Amendment) act, 2024

Recently, Parliament passed the Banking Laws (Amendment) Bill, 2024.

- The Banking Laws (Amendment) Bill, 2024 was introduced in Lok Sabha on August 9, 2024.
- The bill was passed in Rajya sabha on March 26, 2025.
- It amends five acts including:
  - Reserve Bank of India (RBI) Act, 1934.
  - Banking Regulation Act, 1949.
  - State Bank of India Act, 1955.
  - Banking Companies (Acquisition and Transfer of Undertakings) Act, 1970.
  - Banking Companies (Acquisition and Transfer of Undertakings) Act, 1980.

##### Key features of the act:

- Definition of Fortnight for Cash Reserves** – Currently, banks maintain cash reserves based on a 14-day period (Saturday to the second Friday).
- The Bill changes the definition of fortnight to 1<sup>st</sup> day to 15<sup>th</sup> day of each month or 16<sup>th</sup> day to the last day of each month.
- Tenure of Directors in Co-operative Banks** – Directors (except chairman/whole-time director) can serve 10 years instead of 8 years.
- Common Directors in Co-operative Banks** – Directors of central co-operative banks can also serve on the board of state co-operative banks.
- Change Substantial Interest in a Company** – Substantial interest in a company refers to holding shares of over five lakh rupees or 10% of the paid-up capital of the company, whichever is less.
- This may be held by an individual, his spouse, or minor child, either individually or collectively.
  - New rule** – The threshold in the substantial interest in a company has been increased from five lakh rupees to 2 crore rupees.

- **Nomination Rules** – The Current Rule allows single nominee for bank deposits/lockers.
- The Amendment allows up to 4 nominees successive/simultaneous).
- Nominations can be simultaneous (divided in a set proportion) or successive (priority-based).
- **Unclaimed Amounts & Investor Education Fund** – Money unclaimed for **7 years** will be transferred to the Investor Education and Protection Fund (IEPF).
- **Remuneration of Bank Auditors** – Instead of RBI fixing auditor salaries, banks will now decide their auditors' remuneration.

## 6.5 Disclosure of Assets

Recently, the Supreme Court (SC) decided in a full court meeting that its judges will soon make their assets public to enhance transparency within the judiciary.

- Unlike government officials and politicians, judges are currently not bound to make this information public.
- **Supreme Court Judges** – In 1997, a resolution was adopted for the Judges of the SC to disclose their assets only to the Chief Justice.
- The disclosure includes all assets in the form of real estate or investments held in their names, in the name of their spouses, or any dependent person.
- In 2009, the full Bench of the SC resolved to declare the assets of judges on the court's website "purely on a voluntary basis."
- The apex court itself held in 2019 that the assets and liabilities of judges are not "personal information."
- In its latest resolution, the SC has collectively decided to make asset disclosures publicly accessible, reinforcing its commitment to accountability.
- **High Court Judges** – Out of the 770 judges in all High Courts, only 97 (13%) of these judges have publicly declared their assets and liabilities.
- Most High Courts in the country have been against the public disclosure of their judges' assets and liabilities.
- In 2012, the Uttarakhand High Court passed a resolution stating that it "strongly objects to bring disclosure of assets by Judges under the purview of Right to Information Act".
- **Challenges** – Declarations by current judges are not available.
- The website only gives a list of 28 judges of the court (out of 33) "who have submitted their declarations of assets" to the CJI.
- Declarations by former judges have also been removed from the website.

*In 2023, Parliament's Committee on Personnel, Public Grievances, and Law and Justice stated that legislation would be introduced to ensure mandatory disclosure of assets and liabilities by judges of the SC and High Courts.*

### Measures taken for disclosure of Assets

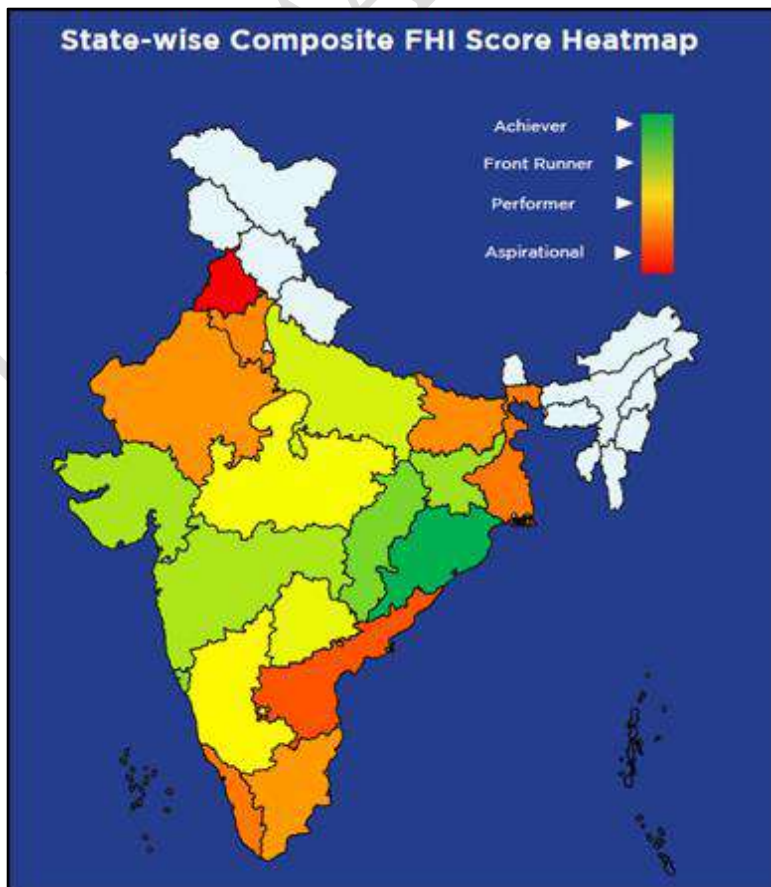
- **For Public servants** – Are often mandated to declare their assets, and this information is often easily accessible to ordinary citizens.
- Right to Information Act, 2005 requires government officials to annually declare their assets to their respective cadre-controlling authorities.
- **For state Bureaucrats** – Several states such as Gujarat, Kerala, and Madhya Pradesh, have provisions to ensure state-level bureaucrats declare their assets.
- **For Ministers** – Since UPA-2 government (2009-14), it has become a norm for Union Ministers, including the Prime Minister to submit their declarations to the PM's Office.
  - Many state governments have followed this suit.
- **For elected members** – Members of Parliament submit their declarations of Assets to the Speaker (for Lok Sabha MPs) and the Chairperson of the House (for Rajya Sabha MPs).

- They can generally be accessed through RTI applications and this is similar for most states.
- **For election contestants** – Anyone contesting an election to Parliament or any state Assembly or Council must publicly declare their assets and liabilities as a part of the nomination process.
- This provision was mandated by the Supreme Court in 2002.

## 6.6 Fiscal Health Index (FHI)

Niti Aayog's Fiscal Health Index (FHI) 2025 has ranked Odisha as the top-performing state in terms of fiscal stability.

- **Initiative by** - NITI Aayog.
- **Aim** - To evolve an understanding of the fiscal health of states in India.
- The FHI analysis covers **18 major states** that drive the Indian economy in terms of their contribution to India's GDP, demography, total public expenditure, revenues, and overall fiscal stability.
- **Objectives** - To provide a comparative analysis of fiscal health across Indian states through standardized metrics.
- To identify areas of strength and concern in states' fiscal management practices.
- To promote transparency, accountability, and prudent fiscal management through empirical assessment.
- To assist policymakers in making informed decisions aimed at enhancing fiscal sustainability and resilience.
- **Indicators - Revenue Generation and Mobilization** - Assessment of states' own revenue receipts, tax buoyancy, and non-tax revenue generation.
- **Expenditure Management and Prioritization** - Evaluation of efficiency in expenditure allocation, prioritization of capital expenditure, and adherence to fiscal discipline.
- **Debt Management** - Analysis of states' debt-to-GSDP ratios, interest payment burdens, and overall sustainability of debt portfolios.
- **Fiscal Deficit Management** - Measurement of states' fiscal deficit as a percentage of Gross State Domestic Product (GSDP) and adherence to statutory limits.
- **Overall Fiscal Sustainability** - Composite analysis of revenue, expenditure, deficit, and debt indicators to gauge long-term fiscal health



### Key Findings

- **Top Performers** - Odisha, Chhattisgarh, and Goa excel in Debt Index, Debt Sustainability, and Revenue Mobilization.
- **Revenue Mobilization** - Odisha, Jharkhand, Goa, and Chhattisgarh effectively mobilize non-tax revenue (average 21% of Total Revenue).
- **Aspirational States** - Punjab, Andhra Pradesh, West Bengal, and Kerala face fiscal challenges like poor debt sustainability and high deficits.



- **Capital Expenditure**

- High allocation (27%) by Odisha, Goa, Madhya Pradesh, Karnataka, Uttar Pradesh; Low allocation (10%) by West Bengal, Andhra Pradesh, Punjab, Rajasthan.

Achiever	Front Runner	Performer	Aspirational
Odisha (1)	Maharashtra (6)	Tamil Nadu (11)	Kerala (15)
Chhattisgarh (2)	Uttar Pradesh (7)	Rajasthan (12)	West Bengal (16)
Goa (3)	Telangana (8)	Bihar (13)	Andhra Pradesh (17)
Jharkhand (4)	Madhya Pradesh (9)	Haryana (14)	Punjab (18)
Gujarat (5)	Karnataka (10)		

- **Debt Concerns** - West Bengal and Punjab face growing debt burdens and increasing debt-to-GSDP ratios.

### Quick Facts

- **Tax Buoyancy** – It is a ratio of change in tax revenue in relation to change in gross state domestic product or GSDP of a state. It measures how responsive a taxation policy is to growth in economic activities.
- **Debt-to-GSDP** – It is a metric that compares a state's total public debt to its gross state domestic product (GSDP), indicating its ability to repay its debts, and is often expressed as a percentage.
- **Sustainability of Debt Portfolios** - It refers to state's ability to meet its current and future debt obligations without defaulting or requiring exceptional financial assistance, focusing on both solvency and liquidity.
- **Debt Index** - The ratio of Interest Payments to Revenue Receipts (IP/RR) indicating the percentage of Revenue Receipts used for interest payment on account of outstanding debt.

## 6.7 Past Risk and Return Verification Agency (PaRRVA)

Securities and Exchange Board of India (SEBI) issued the operational framework for Past Risk and Return Verification Agency (PaRRVA).

- **Purpose** - It is the main verification agency that will validate past performance claims made by investment advisors, research analysts, and algo providers.
- **Investment advisors** – They are SEBI-registered professionals offering **personalized financial advice** to clients.
- **Research analysts** – They are also SEBI-registered research and provide recommendations on financial instruments such as stocks and mutual funds.
- **Algo providers** – They provide trading services through computerized trading using proprietary algorithm.
- **Need for verification** – It prevents misleading performance claims and ensures transparency for investors.
- It also standardizes risk-return calculations and protects against cherry-picking or exaggeration.
- **Eligibility:**
  - Must be a Credit Rating Agency (CRA).
  - Minimum **15 years** of existence.
  - Minimum Rs.100 crore net worth.
  - Must have rated at least 250 issuers of debt securities.
  - Must have an investor grievance redressal system, including online dispute resolution.
  - Must enter an agreement with the PaRRVA Data Centre (PDC).
  - Following approval from SEBI, the CRA would have to develop the infrastructure within 3 months.

- The number of PaRRVA isn't fixed any eligible Credit Rating Agency can become a PaRRVA on approval of SEBI.
- **Responsibilities - Creates Rules for Fair Comparison** - PaRRVA will set the standard method for how risk and return are calculated.
- **No Cherry-Picking Allowed** - Investment advisors and algo providers can't pick the best time periods to show their results.
- They must present a full, fair picture not just the "good parts".
- **No Highlighting Only One Product** - They also can't only show the best-performing product or service and hide the rest. All data must be transparent.
- **All Claims Must Link to Verified Data** - Every claim whether in a PDF, email, brochure, or website must include a link or QR code.
- That code will take investors to PaRRVA's website, where they can see the full summary of how the performance numbers were verified.
- **PaRRVA Data Centre (PDC)** - This will be the data repository and infrastructure provider that supplies all required data for verification.
- **Eligibility** - A stock exchange will be designated by SEBI as the PDC.
- Responsible for providing secure and verified market data to PaRRVA.
- Must maintain infrastructure for data sharing, grievance handling, and QR code generation for performance summaries.

## 6.8 New Pamban Bridge

PM Modi to inaugurate New Pamban Rail Bridge on Ram Navami.

### Old Bridge

- Pamban Bridge was a **railway bridge** that connected the town of Rameswaram on Pamban Island with Mandapam in mainland India.
- **Built in** – 1914 by British government.
- It is **India's first sea bridge**, built for trade.
- It remained India's longest sea link until the Bandra-Worli sea link opened in 2010.
- **Bascule Mechanism** - It had a double-leaf bascule section with a Scherzer rolling-type lift span that used to be raised to let ships pass.
- It is considered a technical marvel as the bridge was constructed with lesser availability and the corrosive environment it withstood.
- **Life span** – 108 years until 2022.

### New Bridge

- **Built by** - Rail Vikas Nigam Limited (RVNL).
- The new bridge is **India's first vertical lift sea bridge**, which will replace the century-old original Pamban Bridge.
- It is a state-of-the-art infrastructure project, ensuring faster rail movement and seamless maritime navigation.
- **Expected lifespan** - 58 years.
- **Key Features**
  - The bridge features a vertical lift span that can be raised in just 5 minutes to allow ships to pass.
  - Built with stainless steel reinforcements and Polysiloxane Paint, the bridge is designed to withstand harsh marine conditions.

- Trains can now travel at speeds of up to 75 kmph, a much higher speed from the previous 10 kmph limit.
- With a clearance of 22 meters above sea level, surpasses the old bridge's 1.5-meter clearance, allowing larger vessels to pass.
- Designed to support future railway electrification, the bridge ensures seamless upgrades to modern rail systems.

## 6.9 Bridge Inventory and Condition Rating System (BICRS)

- **Launched by** – National Highways Authority of India (NHAI).
- It is a ranking mechanism **to rate NHAI's infrastructure assets** to determine their structural safety and look for remedial measures for their upkeep and regular monitoring.
- **Aim** – To prepare a unified repository of all its structures, and each property will be assigned a union assessment identification number.
- **Development** – Based on input from its design division to ensure the systematic management and safety of infrastructure assets.
- **Mandate** – Comprehensive documentation, assessment, and inspection of bridges twice a year.
- **Key features** – Systematic evaluation of health based on predetermined rating parameters.
- Identification of structures that require immediate remedial measures, including the imposition of traffic restrictions or suspension of heavy vehicle traffic.
- **Functions** – It will record comprehensive structural specifications, geographical coordinates, AS-IS drawings, and other related documentation.
- This data is used in the context of renovation.
- **Implementation** – The engineers will record structural specifications and details of all projects, and the first inspection of structures must be completed before the monsoon.
- The project director will cross-check the data prepared by the engineers during their monthly inspections and make observations if discrepancies are found in records and the physical state.
- **Importance** – It ensures systematic management and safety of infrastructure assets.

*National Highway Authority of India was set up NHAI Act, 1988 to provide for the constitution of an Authority for the development, maintenance and management of national highways and for matter connected therewith.*

*AS-IS is documentation of the measurements and elements of an existing building.*

## 6.10 Rishikesh-Karnaprayag Rail Link Project

*Recently, the Railway Minister observed the completion of India's longest rail tunnel, Tunnel No. 8, located between Devprayag and Janasu, part of the Rishikesh-Karnaprayag Rail Link Project in Uttarakhand.*

- It is set to become the India's **longest transport tunnel**, surpassing existing rail and road tunnels in **Jammu and Kashmir and Himachal Pradesh**.
- **Completion expected by** - 2026-27.
- **Agency** - Rail Vikas Nigam Limited (RVNL), a public sector undertaking under the Ministry of Railways.
  - Achieved breakthrough using a German-made tunnel boring machine (TBM) named '**Shakti**'.
- This initiative aims to enhance access to the Char Dham pilgrimage sites of **Yamunotri, Gangotri, Badrinath, and Kedarnath**, located in the Garhwal region of the Himalayas in Uttarakhand.
- The railway line spans approximately 125.20 kilometers and will feature 12 stations, 35 bridges, and 17 tunnels.
- Notably, it includes a significant 15.1-kilometer tunnel connecting **Devprayag and Lachmoli**.
- Additionally, this rail project is part of a broader Indian geostrategic effort to develop infrastructure along the India-China border.

- The progress of the project is being tracked through the Government of India's **PRAGATI (Pro-Active Governance and Timely Implementation)** portal.

### 6.11 Credit Guarantee under e-NWR

Union finance ministry has asked public, private, regional rural, and cooperative banks to sign up for the National Credit Guarantee Trustee Company (NCGTC) and the e-Kisan Upaj Nidhi (e-KUN) portal.

- These platforms support lending against electronic negotiable warehouse receipts (e-NWRs), which allow farmers to use **stored produce as collateral** for loans.
- To improve farmers and agri-businesses access to credit.
- Eligible credit facilities include loans provided by eligible lending institutions (ELIs) against e-NWRs under agricultural credit.
- Banks have been encouraged to promote pledge-based financing against e-NWRs through a branch-level outreach and social media campaigns.
- The credit guarantee scheme for e-NWR provides coverage for both credit risk and warehouseman risk.
- The Reserve Bank of India (RBI) recently increased
  - e-NWR-backed loans under priority-sector lending from Rs.75 lakh to Rs.90 lakh for individual farmers, and
  - For farmer producer organizations, corporate farmers, and cooperatives engaged in agricultural activities from Rs.75 lakh to Rs.4 crore.
- Under the scheme, credit-guarantee coverage varies in accordance with the loan amount and category of the borrower.
- For loans up to Rs.3 lakh, small and marginal farmers, women, Scheduled Castes (SCs), Scheduled Tribes (STs), and farmers who are specially abled are eligible for 85% guarantee coverage while for other borrowers and beneficiaries it is 75%.
- For loans above Rs.3 lakh and up to Rs.75 lakh, guarantee coverage is 80% for all eligible borrowers.
- For loans above Rs.75 lakh and up to Rs. 2 crore, the scheme currently does not provide coverage.

*So far, 8 banks have joined the NCGTC while 26 have signed up for the e-KUN portal, which is part of the Jansamarth portal.*

### 6.12 Reasons behind the recent spike in gold prices in India

In the domestic market, gold breached the psychological level of Rs 1 lakh per 10 grams, while gold prices hit a fresh record high of 3,500 dollars per ounce in the international market recently.

- **Tariffs imposed by U.S.** - Experts attribute the global economic uncertainty caused by the tariffs imposed by US as the primary reason behind the recent spike in gold prices.
- US investors are also importing large quantities of gold from the international markets China, London, and other countries like to hedge against a potentially higher tariff regime.
- **Fluctuations in Major currencies** - Recent fluctuations in the values of major currencies, including the **US dollar and the euro**, have prompted businesses to invest in gold to hedge their currency assets.
- **Surge in demand** - The ongoing global tariff and trade war has led to a surge in demand for gold by investors, fund managers, and central banks alike.
- There is also a surge in demand for gold through **Gold Exchange-Traded Funds, or ETFs**, as these funds are attracting higher investments.

*India is the 2nd-largest gold market in the world, after China. According to a World Gold Council report, the value of total gold demand in India increased by 31% in 2024, compared to 2023.*



- **Domestic reason** – Gold prices have also risen in the domestic market due to the ongoing marriage season, which typically leads to a spurt in gold demand.

### Quick facts

- **Gold Exchange Traded Funds (ETFs)** – These are investment vehicles that allow individuals to gain exposure to gold without needing to physically store or handle the precious metal.
- They are traded on stock exchanges like any other share, and their value fluctuates based on the market price of gold.
- Each unit of a gold ETF typically represents a specific amount of gold, often one gram.
- **Exchange-Traded Fund** – It is a type of investment fund that can be bought and sold on a stock exchange throughout the day, like a stock.
- ETFs hold a basket of underlying assets, such as stocks or bonds, and are designed to track a specific market index, sector, or commodity.
- They offer a diversified investment in a single trade and are often more cost-effective than buying individual securities.

### Other Important Topics

#### India's Tea Export Triumph

*India has surged to become the world's second-largest tea exporter in 2024, surpassing Sri Lanka, according to the Tea Board of India.*

- **India's Export Growth** – India exported 254 million kilograms (Mkg) of tea in 2024, a notable increase from 231 Mkg in 2023, propelling it past Sri Lanka.
- **Kenya's Continued Dominance** – Kenya remains the global leader, exporting over 500 Mkg of tea in 2024, maintaining its top position.
- **Historical Highs and Current Performance** – India's 2024 exports are the second highest in its history, only slightly behind the 256 Mkg exported in 2018.
- **Ambitious Future Targets** – The Indian tea industry aims to achieve 300 Mkg in exports by 2030, building on its recent export success.

#### SEBI's Revised FPI Disclosure Norms

*The Securities and Exchange Board of India (SEBI) has increased the disclosure threshold for Foreign Portfolio Investors (FPIs) from Rs25,000 crore to Rs50,000 crore.*

- **Original Mandate for FPI Disclosures (2023)** – SEBI initially mandated comprehensive disclosures for FPIs holding over RS25,000 crore in Indian equity assets.
- This measure was implemented to prevent stock manipulation and reduce market disruption risks from large FPIs.
- **Rationale for Threshold Increase** – The decision to raise the threshold is attributed to the substantial growth in cash equity market trading volumes, which have more than doubled between FY 2022–23 and FY 2024–25.
- This adjustment reflects the expanding scale of the Indian equity markets.

- **New Disclosure Requirements** – FPIs with equity Assets under Management (AUM) exceeding Rs50,000 crore are now required to disclose full ownership and control details, tracing back to the ultimate natural person.
- This aims to provide greater transparency regarding the entities behind significant FPI investments.
- **Objectives of the Revised Norms** – SEBI's primary objective is to maintain market integrity while adapting to the evolving dynamics and increased volumes of the Indian equity market.
- This adjustment balances the need for regulatory oversight with the market's growth.

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- This adjustment balances the need for regulatory oversight with the market's growth.

### Gold Monetisation Scheme: Changes Announced

*The Ministry of Finance will discontinue Medium– and Long–Term Gold Deposits under the Gold Monetization Scheme (GMS) from March 26, 2025.*

- **Launched in** – November 2015.
- **Aim** – To mobilize idle household and institutional gold, making it productive and reducing gold imports.
- **GMS Components and Structure** – The scheme comprised gold deposits of :
  - Short–Term (1–3 years)
  - Medium–Term (5–7 years)
  - Long–Term (12–15 years)
- **Deposit Parameters** – A minimum deposit of 10 grams of raw gold was required, with no maximum limit imposed.
- **Current Revision and Continuation** – Banks can continue offering Short–Term Gold Deposits at their discretion, while Medium– and Long–Term options will be discontinued.

### Tamil Nadu's Economic Growth

*According to recent data by Union Ministry of Statistics and Programme Implementation, Tamil Nadu sets a real economic growth rate of 9.69% for 2024–25.*

- **Real Growth Rate** – It measures the percentage change in output (goods and services) after adjusting for inflation.
- **Tamil Nadu's Sector's contribution to Gross State Value Added (GSVA):**
  - Primary sector – 10%.
  - Secondary sector – 37%.
  - Tertiary sector – 53%.

### Quick Commerce (Q-Commerce)

Recently, Competition Commission of India has sought additional information on a complaint against quick commerce companies.

- **Q-Commerce** – It refers to ultra-fast delivery services, typically within 10-30 minutes.
- It is facilitated by an elaborate network of dark stores and/or distribution centres.
- It focusses on small, high-demand FMCG (Fast Moving Consumer Goods) products like groceries, snacks, and daily essentials.
- **For example** – Zepto, Swiggy Instamart, Blinkit among others.

**Dark stores** refer to warehouses used by the platforms solely to fulfil online orders, with no in-person shopping.

### Ready Reckoner (RR) Rates

A team of scientists from the University of Western Australia recently discovered 2 new species of trapdoor spiders.

- **Discovered in** – Kimberley region, marking the 1<sup>st</sup> recorded discovery of this spider group in northern Australia.
- **2 new species** – Kwonkan fluctellus and Kwonkan nemoralis.
- **Unique features** – Highly specialized burrow construction, which creates elaborate burrow entrances.
- **Burrows constructed by Kwonkan nemoralis** – It had a little collapsible silken collar around the entrance, which had grains of sand embedded in it.
- When it was disturbed, the collar around the burrow's entrance collapses & seals the entrance, which blends with the surrounding landscape, making it virtually invisible to predators.

### Amalgamation of Regional Rural banks (RRBs)

Recently, the Department of Financial Services (DFS) has notified the amalgamation of 26 RRBs.

- It is the 4<sup>th</sup> phase of amalgamation; 1<sup>st</sup> phase started in 2024.
- **Nodal Ministry** – Ministry of Finance.
- **Principle of amalgamation** – One State One RRB.
- **Purpose** – This amalgamation of 26 RRBs in 10 States and 1 UT have been carried out with for improvement in scale efficiency and cost rationalization.
- At present, 43 RRBs are functioning in 26 States and 2 UTs.

### Multiples GIFT Fund

Recently, the Competition Commission of India has approved the proposed acquisition of shareholding by Multiples Plenty Private Equity GIFT Fund.

- It is a newly incorporated trust, formed under the Indian Trusts Act, 1882.

- It is registered with International Financial Services Centres Authority as a Restricted Scheme.
- **Managed by** – Multiples Asset Management IFSC LLP.

**IFSC LLP**, a limited liability partnership incorporated under the Limited Liability Partnership Act, 2008 and operating within an International Financial Services Centre (IFSC).

### Co-lending Arrangement (CLA) in India

Recently, the Reserve Bank of India (RBI) proposed a draft framework for co-lending arrangements between all regulated entities.

- **CLA in India**– It involves the act of 2 financial institutions that are eligible under the RBI directions, issuing loans based on a pre-determined proportion of lending.
- Banks that co-lend to priority sector can claim priority sector status.
- **Current regulation** – It deals only with co-lending between banks and non-banking financial companies and they are restricted to priority sector loans.
- **Proposed changes** – CLA will now be applicable for all commercial banks, NBFCs and will exclude RRBs, SFBs and Local Area Banks.
- Credit policy of the banks that indulge in co-lending will have to disclose customer segment targetted, terms and conditions of loan, internal limit on borrower portfolio among others.

### International Monetary Fund (IMF)-World Bank Report on Financial Regulators Authority in India

IMF and World Bank reports suggested changes to the Indian financial system based on a recent assessment.

- **Current laws** – It allow government to control senior managements and boards of financial regulators.
- Ministry of Finance (MoF) is the appellate authority for the RBI and has the power to overturn the latter's supervisory decisions.
  - In 2019, the government overturned the RBI's decision to revoke the licence of a small urban cooperative bank.
- **Report recommendations** – The power and independence of financial regulators needs to be strengthened with legislative and institutional changes.
- It recommended transferring the appellate authority power from MoF to an independent agency.
- Insurance Regulatory and Development Authority of India (IRDAI) should have power to take critical supervisory actions against the dominant State-owned life insurer.

### Zirakpur Bypass

Recently, cabinet approved the construction of 6 lane access control of Zirakpur bypass with length of 19.2 km worth in Punjab and Haryana on Hybrid Annuity Mode (HAM).

- It starts from the junction with NH-7 and terminates at the junction with NH-5 covering Punjab and Haryana.
- **Aim** – To reduce the travel time and ensure hassle-free traffic movement in the congested urban section of,
  - **NH-7** – Chandigarh-Bathinda in Zirakpur (Punjab).
  - **NH-5** – Zirakpur-Parwanoo in Panchkula (Haryana).
  - **NH-152** – Narwana to Panchkula (Haryana).
- To avoid the highly urbanized and congested stretch of Zirakpur in Punjab and Panchkula in Haryana.

*Hybrid Annuity Model (HAM) is a public-private partnership (PPP) approach for road infrastructure in India, combining elements of Engineering, Procurement, and Construction (EPC) and Build, Operate, Transfer (BOT) models.*



## Registrar General of India (RGI)

*Recently, the RGI warns hospitals on reporting delays of birth & death.*

- RGI holds the office of the Registrar General and Census Commissioner of India (ORGI & CCI).
- **Nodal Ministry** – Ministry of Home Affairs.
- **Role** – To ensure a systematic collection of statistics related to India's population size, growth, and distribution.
- **Key responsibilities** – To conduct the Housing & Population Census under the Census Act, 1948.
- To manage the Civil Registration System (CRS) as per the Registration of Births & Deaths (RBD) Act, 1969.
- To oversee the National Population Register (NPR) under the Citizenship Act, 1955.

## RBI Maintains Accommodative Stance

*Recently, the Reserve Bank of India (RBI) has decided to continue its accommodative stance in the latest Monetary Policy Committee (MPC) meeting. This aims to bolster economic recovery amidst easing inflation and weak growth indicators.*

- **Defining Accommodative Monetary Policy** – An accommodative stance is a monetary policy approach where the central bank aims to stimulate economic activity. This typically involves maintaining low interest rates and ensuring sufficient liquidity within the financial system.
- **Conditions for Adoption** – This policy is generally implemented when economic growth is slow, inflation is under control, and there is a need to encourage consumption, investment, and job creation. It can also be used to counter financial shocks.
- **Key Objectives of the Stance** – The primary goals of an accommodative stance are to facilitate credit flow, encourage private investment, reduce borrowing costs to boost spending, revive overall demand in the economy, and provide liquidity support to struggling sectors.
- **RBI's Current Rationale** – The RBI's decision reflects its ongoing commitment to supporting economic recovery in the face of moderating inflation and signals of sluggish growth within the current economic landscape.

## Punjab Bans Hybrid Paddy Seeds

*Recently, Punjab government has prohibited the sale of hybrid paddy seeds in anticipation of the 2025 Kharif season. This decision comes after rice millers expressed their unwillingness to process hybrid rice due to concerns over milling efficiency and grain quality.*

- **Understanding Hybrid Paddy** – Its varieties are crossbred rice developed from distinct parent lines. The aim is to enhance yield, improve water efficiency, and promote earlier maturity. These non-Basmati varieties are primarily cultivated for large-scale commercial farming.
- **Key Characteristics** – Hybrid paddy offers several advantages, including higher yields (35-40 quintals per acre, exceeding regular varieties), a shorter growth cycle (125-130 days, saving water), and reduced stubble production, which can help mitigate stubble burning issues.
- **Reasons for Government Ban** – The primary reasons behind the ban are the low milling efficiency (Out Turn Ratio of 60-63% compared to the FCI's 67% minimum) reported by millers and the high percentage of broken grains during processing. This leads to financial losses for millers.
- **Impact on Farmers and Millers** – The lower milling efficiency and increased broken grains result in lower procurement prices for farmers due to quality discrepancies. The ban aims to address these concerns and protect the interests of both farmers and rice millers in the state.

## Bombay Stock Exchange (BSE)

*The Bombay Stock Exchange (BSE), recently commemorated its 150<sup>th</sup> anniversary on April 17, 2025, in Mumbai.*

- **BSE Ltd** – It is the Asia's oldest stock exchange, stands as a primary Indian platform for trading equities, debt instruments, mutual funds, derivatives, and commodities.
- **Evolution** – In 1874, trading operations moved to Dalal Street, leading to the formal establishment of the exchange.
- **Established in** – 1875, by cotton merchant Premchand Roychand.
- It was initially known as the Native Share & Stock Brokers' Association.
- BSE holds the distinction of being the 1<sup>st</sup> exchange recognized under the Securities Contract Regulation Act, 1956.

### ***Double Tax Avoidance Agreement (DTAA)***

*Recently, India and the UK countries are actively negotiating the Free Trade Agreement, a bilateral investment treaty (BIT), and a Double Taxation Avoidance Agreement.*

- **DTAA** – It is an agreement signed between two countries to prevent individuals or businesses from being subject to double taxation on their income.
- It is also known as a tax treaty.
- **Purpose** – To allocate taxing rights between the countries involved.

### ***Central Asian Republics (CARs) Program***

*Recently, Department of Revenue (DoR), in collaboration with MEA and NSCS, organized a first-of-its-kind capacity-building program for Central Asian Republics (CARs).*

- It is a 2-day program addressed to Countering the Financing of Terrorism (CFT) through cryptocurrencies, crowdfunding, and non-profit organizations.
- **Aim** – To enhance the technical skills and understanding of emerging terrorism financing risks specific to the Central Asian region through interactive discussions and best practice sharing.
- **Regional collaboration** – Uzbekistan, Turkmenistan, Kazakhstan, Tajikistan, and Kyrgyzstan participated, engaging with Indian authorities and an expert from the Eurasian Group (EAG).
- **Significance** – This initiative signifies a crucial step in bolstering regional cooperation and resilience against terrorism financing, underscoring India's dedication to global counterterrorism endeavors.

### ***India's Manufacturing Push***

*Recently, Finance Minister outlined India's ambitious plan to elevate the manufacturing sector's contribution to GDP from 12% to 23% within the next 2 decades.*

- **Sunrise Industries** – They are emerging sectors experiencing rapid expansion, characterized by high growth rates, numerous startups, and substantial investment.
- **Characteristics** – These industries are not static and mature over time.
- It potentially transitioning into maturity and eventually the sunset phase, as exemplified by the compact disc industry.
- These industries often exhibit significant innovation and their swift growth can pose a threat to established, declining "sunset" industries.
- **Role** – The targeted growth in India's manufacturing sector is expected to be significantly propelled by the dynamism and potential of these burgeoning sunrise industries.
- **Examples** – Alternative energy, social media, cloud computing, blockchain technology, information technology, and clean energy.

### DigiLocker

Recently, at Indira Gandhi Stadium in New Delhi, the Union Minister of Youth Affairs & Sports and Labour & Employment inaugurated the digital issuance of sports certificates through DigiLocker.

#### Key points about DigiLocker

- Launched in 2015 under the Digital India program, it's a flagship initiative of the Ministry of Electronics & IT (MeitY).
- It's a government-approved application maintained with strict security protocols.
- The DigiLocker app allows users to securely store their digital records.
- It facilitates various processes like passport applications, marksheet verification, and identity proof during travel.
- As part of India's paper-free initiative, it enables users to access, verify, and store essential documents digitally for easy retrieval and presentation.
- Digitally issued documents in DigiLocker are legally equivalent to original physical documents, as per IT Rules, 2016.
- It employs robust security measures, including 2048 Bit RSA SSL encryption, multi-factor authentication (OTP), consent mechanisms, timed logouts, and regular security audits.

### National Industrial Corridor Development Corporation (NICDC)

Recently, NICDC was honoured with the Udyog Vikas Award during the Udyog Vikas event organised by Janmabhumi Daily, a leading news daily in the state of Kerala.

- **NICDC began with** - launch of Delhi-Mumbai Industrial Corridor (DMIC) in 2007.
- **Objective to Create Industrial Cities** - Focuses on creating new "Smart City" industrial hubs.
- **Technology Integration** - It integrates next-generation technologies across infrastructure sectors for efficient urban development.
- **Investment Catalyst** - NICDP aims to attract significant investments from large industries and MSMEs.
- **Export Growth Driver** - It serves as a key catalyst in achieving India's \$2 trillion export target by 2030.
- **Under the NICDP, new industrial areas have been sanctioned in** - Uttarakhand (Khurpia), Punjab (Rajpura-Patiala), Maharashtra (Dighi), Kerala (Palakkad), Uttar Pradesh (Agra, Prayagraj), Bihar (Gaya), Telangana (Zaheerabad), Andhra Pradesh (Orvakal, Kopparthy), and Rajasthan (Jodhpur-Pali).

## 7. AGRICULTURE

### 7.1 Global Strategy for Resilient Drylands (GSRD) 2030

Recently, the Consultative Group on International Agricultural Research (CGIAR) has launched the CGIAR 2030 Global Strategy for Resilient Drylands (GSRD) at COP16 summit in Riyadh, Saudi Arabia.

- **Drylands** – Are areas with a scarcity of water that cover more than 40% of the Earth's land surface.
- **Global drylands** – It makes up 46% of the world's land area.
- It supports nearly half of the livestock and 44% of food systems are present in this region.
- It is home to some of the world's poorest and most climate vulnerable communities.
- It warms at a rate of 20-40% higher than other regions.
- The factors leading to dryness in this region are:
  - Rising temperatures,

- Soil degradation,
- Unpredictable rainfall patterns and
- Exacerbate food insecurity.
- **Global Strategy for Resilient Drylands (GSRD)** – Aims to revolutionize dryland agriculture and nurture resilient livelihoods in dryland communities globally.
- It provides a roadmap to enhance food security, conserve biodiversity and build resilient livelihoods for the 2.7 billion people inhabiting drylands, particularly in Asia and Africa.
- It commits to a thriving and resilient future for the millions of people who depend on drylands for their food and livelihoods.
- **Launched by** – Consultative Group on International Agricultural Research (CGIAR).
- **Spearheaded by** – International Center for Agricultural Research in the Dry Areas (ICARDA) of CGIAR and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).
- The 5 key areas of focus by the strategy are:
  1. Adapting agro-food systems to climate change
  2. conserving biodiversity
  3. sustainably managing soil and water resources
  4. promoting healthy diets
  5. fostering inclusive development

#### Consultative Group on International Agricultural Research (CGIAR)

- It is a global research partnership for a food-secure future dedicated to transforming food, land, and water systems in a climate crisis.
- It is the world's largest public global agricultural innovation network.
- **Founded** – 1971.
- **Headquarters** – France.
- It works with partners in 6 major regions.
- It is dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources.

#### 7.2 Comprehensive Remote Sensing Observation on Crop Progress (CROP)

Recently ISRO has estimated the total wheat production from eight major wheat-growing states using Comprehensive Remote Sensing Observation on Crop Progress (CROP).

- **CROP** – It is a *semi-automated and scalable framework* developed by ISRO's National Remote Sensing Centre (NRSC).
- **Function** – It enables near real-time monitoring of crop sowing and harvesting during the **Rabi season** across India.
- **Data sources** – The framework uses remote sensing datasets of *Optical sensors and Synthetic Aperture Radar (SAR)* from multiple satellites,
  - EOS-04 (RISAT-1A)
  - EOS-06 ([Oceansat-3](#))
  - Resourcesat-2A
- Optical sensors capture visible and near-infrared light, SAR uses microwaves to create images, offering all-weather information.

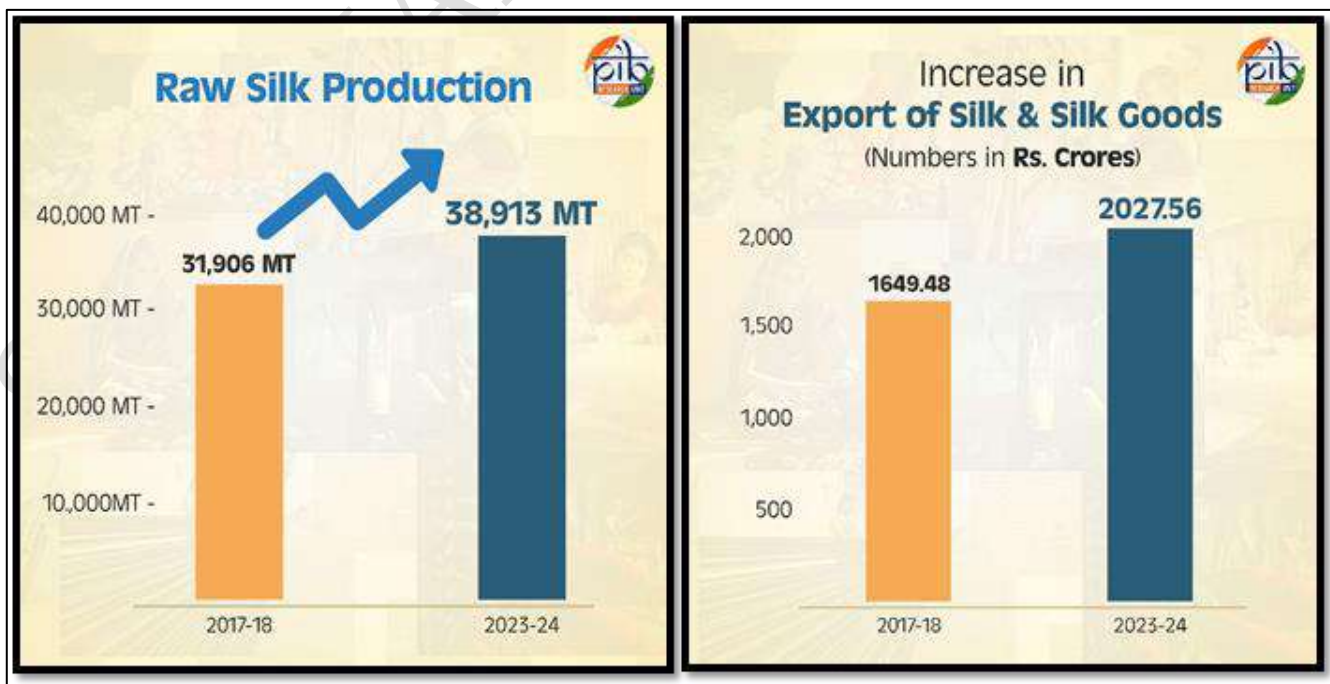


- **Methodology** – The system assimilates several satellite-derived parameters into a process-based crop growth simulation model using,
    - Crop area measurements
    - Sowing date information
    - In-season crop condition data by assessing the health and development of crops during their growth cycle.
  - It uses these inputs along with *additional parameters like weather data, soil conditions, and crop-specific growth characteristics* to imitate how the crops develop over time and predict yield and production.
  - A remote sensing-based *Vegetation Health Index (VHI)* has been employed to monitor crop conditions and drought stress.
- A process-based crop growth simulation model is a tool that imitate the growth and development of crops by modelling the fundamental processes that govern plant growth and development.*
- **Major wheat producing states in India** – The 8 major wheat-growing states covered in the assessment are Uttar Pradesh, Madhya Pradesh, Rajasthan, Punjab, Haryana, Bihar, Gujarat and Maharashtra.
  - **Significance - Enhances Agricultural Policy Development**- Assists the Ministry of Agriculture with real-time monitoring of agricultural activities.
  - **Strengthens Food Security** - Timely yield predictions facilitate effective food stock management and procurement strategies.
  - **Supports Disaster Response** - Contributes to assessments of the impacts of droughts, floods, and pest infestations.
  - **Fosters Technological Advancement** - Encourages the adoption of space-based precision agriculture and the integration of remote sensing in farm management.

### 7.3 Magic of Indian Silk

According to the recent data of Ministry of Textiles, India's silk production and exports have been raised from 2017-18 to 2023-24.

- **Silk** – It is a thread made from **pure mulberry silk**, which is woven by skilled artisans.
- **Silk from silkworms** – **Sericulture** is the process of farming silkworms, which eat mulberry leaves to make silk.



- **Global production** – It has accounting for only 0.2 % of world's total textile production.

- **India's production** – It is the **2<sup>nd</sup> largest producer and consumer** of silk globally.
- **State wise production**
  - **Mulberry silk** – Karnataka, Andhra Pradesh, Tamil Nadu, Jammu & Kashmir and West Bengal.
  - **Non-mulberry silk** – Jharkhand, Chattisgarh, Orissa and north-eastern states.

### Initiatives to Silk Development

- **Silk Samagra Scheme** – To scale up production by improving the quality and productivity of sericulture in the country.
- **Silk Samagra-2** – To improve the entire silk production process, from raising silkworms to producing quality silk fabrics.
- **Raw Material Supply Scheme (RMSS)** – To make available quality yarn & their blends to the eligible Handloom weavers at subsidized rates.
- **National Handloom Development Programme (NHDP)** – To support weavers in the handloom sector, including silk fabric producers.
- **Scheme for Capacity Building in Textile Sector Scheme (SAMARTH)** – To focus on entry-level training, upskilling and reskilling in Apparel & Garmenting, handloom, handicraft, silk, and jute.

*India's total raw silk production increased during the period 2017-24 and Exports of silk and silk goods rose during the period 2017-24.*

### Types of Silk in India

- **Mulberry silk** – It comes from silkworms that eat only mulberry leaves.
- **Feature** – It is soft, smooth, and shiny with a bright glow, making it perfect for luxury sarees and high-end fabrics.
- **92%** of the country's total raw silk production comes from mulberry.
- **Non-mulberry silk** – It comes from wild silkworms that feed on leaves from trees like oak, castor and arjun.
- **Feature** – It is a natural silk with less shine but is strong, durable, and eco-friendly.
- **Silk waste** – It's repurposed to create lower-quality products like silk yarn or fabric, or even recycled into new silk items.

### Other Important Topics

#### AQUASTAT

Recently, the Food and Agriculture Organization (FAO) marked the 30<sup>th</sup> anniversary of AQUASTAT and the celebration included the launch of the enhanced AQUASTAT Dissemination Platform.

- **Launched in** – 1990s by Food and Agriculture Organization of the United Nations (FAO)'s Land and Water Division.
- It is a FAO's comprehensive global database on water resources and agricultural water management and offers open access to over 180 variables across numerous countries.
- **Objectives** – To monitor global water use and irrigation practices.
- It plays a vital role in tracking Sustainable Development Goal (SDG) 6.4, focusing on water use efficiency and water stress levels.
- **AQUASTAT Dissemination Platform** – Aimed at improving access to crucial global water information in line with SDG 6.
- **Features** – To offer extensive data coverage on water resources, irrigation infrastructure, and efficiency indicators.

- To boast interactive maps, multilingual options, CSV/Excel download capabilities, and sophisticated search functionalities.

### ***IISR Surya***

*Recently, Indian Institute of Spices Research (IISR), Kozhikode, has unveiled IISR Surya, to addresses the requirements of the modern turmeric powdering industry.*

- It is a new light-coloured turmeric variety tailored for the masala industry's specific needs.
- **High yield** – It is a high-yielding variety, offering a 20% to 30% increase in yield compared to existing local light-coloured varieties, potentially reaching up to 41 tonnes per hectare.
- **Curcumin content** – It ranges from 2% to 3%, which is comparable to other light-coloured turmeric varieties currently available.
- It directly addresses the requirements of the modern turmeric powdering industry, which often prefers a lighter hue.
- **Significance** – It benefits farmers specializing in high-quality turmeric powder production and help alleviate the shortage in both domestic and export markets.

### ***ISRO Forecasts Wheat Production***

*Recently, ISRO's CROP framework has projected India's wheat production for the Rabi season 2024-25 at 122.724 million tonnes across eight key wheat-growing states.*

- **CROP Framework** – Comprehensive Remote Sensing Observation on Crop Progress (CROP) is a semi-automated, scalable system for near real-time monitoring of crop stages.
- **Developed by** – ISRO's National Remote Sensing Centre (NRSC).
- **Aim** – To provide systematic, timely, and scalable agricultural crop monitoring using satellite data for accurate condition assessments and improved planning.
- **Features** – CROP utilizes optical and SAR data from satellites like EOS-04, EOS-06, and Resourcesat-2A. It maps wheat distribution over 8 lakh hectares and integrates crop simulation models with multi-source data fusion for enhanced precision.
- **Significance** – It supports the Ministry of Agriculture in real-time agricultural monitoring, aiding in informed agri-policy making and strategic interventions.
- It assists in disaster assessment and promotes the integration of space-based precision agriculture.

### ***Root Rot***

*Recently, farmers cultivating the prized 'pichi poo' (red jasmine), are facing substantial losses due to a devastating fungal infection causing root decay in their crops.*

- It is a soilborne disease attacking plant roots trunks and stems, leading to wilting and potentially plant death.
- **Caused by** – Pathogens like numerous fungi, including Armillaria mellea, Clitocybe tabescens, and Fusarium, along with oomycetes like Pythium, Phytophthora, and Aphanomyces.
- **Impact** – These pathogens spread through soil water and infect weakened plants.
- Overwatering, which depletes soil oxygen and suffocates roots, and the presence of fungal-like pathogens that thrive in such conditions.
- **Preventive measures** – Planting in well-drained soils or raised beds, using resistant plant varieties, and selecting plants suited for wet conditions.
- Affected plants should be removed, and some fungal treatments can be applied to the soil.

### ***Water Resource Census Application***

*Water Resource Census application was launched recently.*

- **Launched by** – Ministry of Jal Shakti.
- **Objective** – To build a comprehensive and reliable database in the irrigation sector for effective planning and policymaking including water use efficiency, water budgeting etc.
- To enhance data accuracy and reducing the time required for conduct of census.
- **Census schemes**
  - The 7th Minor Irrigation Census
  - 2nd Census of Water Bodies
  - 1st Census of Springs
  - 1st Census of Major and Medium Irrigation Projects.

## 8. ENVIRONMENT

### 8.1 Girnar Wildlife Sanctuary

*As per the Centre for Environmental Planning and Technology (CEPT) data the vegetation of Girnar Wildlife Sanctuary had declined from 2000 to 2020.*

- Girnar National Park and wildlife sanctuary is located in **Junagadh, Gujarat.**
- It is also known as **Sasan Gir.**
- **Established in** –1965.
- The sanctuary was established to conserve the endangered Asiatic lion, which was once wiped out from other parts of Asia due to indiscriminate hunting.
- The Gujarat government declared 180 square km of the sacred Girnar forests as a Wildlife Sanctuary in 2008.
- It spans the rugged terrain of the **Girnar hills,** which are a part of the Saurashtra region and also a part of the Khathiar-Gir dry deciduous forests ecoregion.
- It is home to **Asiatic Lions** and the only place in the world after Africa where these species live in the hilly and forested area of the park.
- **Vegetation** - Mostly consists of
  - **Deciduous** – It sheds their leaves seasonally, usually in the dry season.
  - **Thorny scrubland** – It is found in areas with low water availability and these plants have fewer leaves.
- This vegetation are classified **under open forest.**
- **Flora** – Includes variety of plant species, avian species, insect species, animal species and reptile species.
- It also filled with several trees, climbers, twiners, creepers, parasite and many other varieties of flower plants.
- **Fauna** – Includes Asiatic lions, spotted deer, Sambar, Chousinghas, Chinkaras, leopards, and Indian golden jackals.
- 179 Birds Species, 33 Reptiles species, 30 Mammals species are available.

#### Recent Findings

- The study revealed that 94% vegetation of the total area in 2000, has dipped to 83% in 2020 over 2 decades.
- It revealed that settlements were increased from 2000 to 2020 near the dense forest which was converted to open forest during the same period of time.

### Asiatic Lions



- **Scientific name** - Panthera leo persica.
- **Habitat** - Gir National Park and Wildlife Sanctuary is the only abode of the Asiatic lion.
- **Distribution** – Once, distributed in the State of West Bengal in east and Rewa in Madhya Pradesh, in central India.
- **Conservation status**
  - Wildlife (Protection) Act 1972 - Schedule I.
  - CITES - Appendix I.
  - IUCN – Endangered.
- **World Wide Fund for Nature India (WWF)** strengthen the efforts of Gir towards managing the conflict and poaching.



## 8.2 2nd WHO Conference on Air Pollution and Health

Recently, the second World Health Organisation (WHO) conference on air pollution and health was concluded.

- **Conference location** - Colombian city of Cartagena
- **Organizers** - Jointly organized by WHO and the Government of Colombia
- **Participants** - Over 700 participants including government representatives, U.N. agencies, civil society, scientists, and health societies.
- **Goal** - A shared goal to **reduce the health impacts by 50% by 2040** was agreed upon to save millions of lives every year.
- **Impact of Air Pollution** - Air pollution claims more victims than violence itself and poisoning our air costs lives in silence.
- **Participant's commitments** - More than 50 countries, cities and organisations announced major commitments to tackle air pollution and safeguard health.
- **India's commitment** - India has committed to supporting the health sector with actions in alignment with the National Clean Air Programme to reduce the health impacts of air pollution by 2040.
- It also committed to strengthen air pollution and noncommunicable disease surveillance, promote cleaner cooking energy, particularly for vulnerable populations, and support clinicians in protecting at-risk patients.
- **Spain's carbon-neutral health-care system** - Spain assured that they are "committed to achieve" a carbon-neutral health-care system by 2050 through emission reduction, multi-sectoral collaboration and promoting innovation.
- **Forum for International Cooperation on Air Pollution (FICAP)** - The United Kingdom of Great Britain and Northern Ireland reaffirmed its commitment to tackling air pollution by chairing the Forum and publishing an Air Quality Strategy.
- **C40 cities commitment** - On behalf of the co-chairs of C40 cities, representing almost 100 of the world's biggest cities, the Deputy Mayor of London assured supporting WHO's 2040 target and roadmap.

*National Clean Air Programme aims at 40% reduction in particulate matter by 2026. The acceptable annual standard for PM<sub>2.5</sub> is 40 micrograms per cubic metre and PM<sub>10</sub> is 60 microgram per cubic metre.*

*Forum for International Cooperation on Air Pollution (FICAP) aims to promote international collaboration towards preventing and reducing air pollution globally. It is co-lead by Sweden and the United Kingdom and open to participation from all regions, countries.*

*C40 is a global network of mayors of the world's leading cities that are united in action to confront the climate crisis. (Indian Cities – Chennai, Bengaluru, Mumbai, Ahmedabad, Delhi)*

*The Clean Air Fund is a philanthropic initiative with a mission to tackle air pollution around the world and brings together funders, researchers, policy makers and campaigners to find and scale solutions that will provide clean air for all.*



- **Clean Air Fund (CAF)** - It committed to continuing to support WHO in demonstrating the benefits of life-saving clean air actions.
- It also committed to allocate an additional US\$ 90 million over the next two years for climate and health efforts.

### 8.3 International Treaty on Plant Genetic Resources for Food and Agriculture

*The 13<sup>th</sup> meeting of the Ad Hoc Working Group under the International Treaty on Plant Genetic Resources for Food and Agriculture is discussing controversial amendments that could dilute benefit-sharing provisions.*

- International Treaty on Plant Genetic Resources for Food and Agriculture, also called as Plant Treaty.
- **Objective** – Conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use.
- It is in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.
- It is signed by many countries including India.
- **Multilateral System (MLS)** – It is *administered by the ITPGRFA*.
- It is a global system facilitating access to plant genetic resources for food and agriculture (PGRFA) and ensuring fair and equitable benefit-sharing among countries.
- It is the International Treaty's truly innovative solution to access and benefit-sharing, which includes 64 of the world's most important crops.

#### Proposed Amendments & Concerns

- The Proposed Change Allow all plant species to be included if they have traits useful for food/forage breeding.

#### Implications on Developing Countries

- **Loss of Sovereignty** – Developing countries, rich in biodiversity, fear losing sovereign rights over their plants.
- The proposal could force them to share everything under a Standard Material Transfer Agreement, reducing their say.
- **Unfair Benefits** – The current system ensures benefits return to providers. Expanding access might dilute this, favouring richer nations or corporations.
- **Bio piracy Risk** – Free access could lead to exploitation, including “digital bio piracy,” where genetic data is used without permission.
- **Food Security Threat** – Instead of protecting food crops for global hunger, this might weaken local farmers and seed systems.

### 8.4 Frankincense

*The International Union for Conservation of Nature (IUCN) has recently issued a warning, highlighting the extinction risk faced by Frankincense-producing trees (Boswellia species).*

- **Frankincense** – Is a fragrant resin obtained from various species of trees belonging to the Boswellia genus.
- The five main species of Boswellia are:
  1. Boswellia carterii
  2. Boswellia serrata (Indian Frankincense)
  3. Boswellia sacra
  4. Boswellia frereana
  5. Boswellia papyrifera

#### Significance

- Historically famous as one of the three gifts (along with gold and myrrh) brought to the infant Jesus.
- Used for centuries in perfumes and incense.
- Research suggests potential medicinal benefits due to its anti-inflammatory properties (for conditions like ulcerative colitis, IBS, bronchitis, sinusitis) and possible use in reducing asthma risk.

- Frankincense was once considered more valuable than gold and was reserved for royalty.
- Frankincense remains deeply embedded in Dhofari culture, symbolizing warmth, respect, and hospitality.
- It played a significant role in cultural exchange between Oman and India.
- **IUCN Red List Update** – Multiple Boswellia species on Yemen's Socotra Island have recently been moved to more threatened conservation status categories (Endangered/Critically Endangered).

*Dhofari culture, found in the Dhofar region of Oman, is a rich tapestry woven from influences of the Arabian Peninsula, East Africa, and the Indian subcontinent.*

### Causes of Decline

- **Overgrazing** – Goats graze on saplings, exacerbated by the decline of traditional rotational grazing and larger herd sizes.
- **Climate Change Impacts** – Prolonged droughts hinder sapling survival, while more frequent and intense cyclones, floods, and landslides damage or uproot mature trees.

### Way forward

- Building fences to protect young trees from goats.
- Promoting frankincense honey production for alternative income.
- Emphasizing the need for local action to combat extreme weather impacts.

## 8.5 Active Mobility

Active mobility in India has gained attention due to increasing traffic congestion, pollution, health concerns and rising pedestrian deaths.

- **Active mobility** – Refers to modes of transportation that use human power instead of a motorised form of mobility.
- Active modes of transport include walking, cycling, skateboarding, and other non-motorised modes that are used for travel and not recreational activities.

*In 2020, Karnataka recorded the highest number of pedestrian deaths in the country at 13% and in 2024, Karnataka saw a decrease in pedestrian deaths, with 233 fatalities reported in Bengaluru.*

### Measures taken by the states across India

- **Karnataka Active Mobility Bill, 2022** – It aims to promote urban mobility through the protection of the rights of pedestrians and cyclists.
- The inherent goal of this bill is to provide a legal structure protecting and promoting active mobility, and ensuring equal access to public space.
- **Delhi** – Is expanding cycling tracks and pedestrian-friendly streets under its Delhi EV policy.
- **Others** – **Pune** has implemented a Comprehensive Bicycle Plan and developed over 300 km of cycling lanes.
- **Chennai** is redesigning roads under the Smart Cities Mission (SCM) to improve pedestrian safety.
- **Kochi** has introduced a Public Bicycle Sharing (PBS) system to enhance last-mile connectivity.

### Status of other countries

- With more than 35,000 km of dedicated cycling lanes, The Netherlands is a global leader in promoting active mobility through cycling.
- The European Union's Mobility and Transport department prioritises promoting walking and cycling as a means of transport to enable more sustainable mobility.
- Germany's Berlin Mobility Act mandates wider sidewalks and dedicated cycling lanes, reduced speed limits for motorised vehicles within city limits, and prioritises pedestrians/cyclists in urban planning.

*Vision Zero, an initiative of Vision Zero Network that aims to reduce the number of incidents between pedestrians, cyclists, and motor vehicles.*

### Benefits of Active mobility

- **Economic benefits** – It include reduced household expenditure on fuel and transportation and lower healthcare costs due to enhanced public health.

- It also boosts local businesses since pedestrian-friendly infrastructure attracts higher foot traffic.
- **Environment** – Walking and cycling are sustainable modes of transport as compared to motorised vehicles due to their *marginal carbon emissions*.
- They enhance energy security and significantly reduce India's 12% carbon emissions from road transportation.
- Cities with well-developed infrastructure for active transport report cleaner air and reduced traffic congestion.
- **Health** – Active modes of transport are known to reduce the risk of chronic diseases, improve cardiovascular health, promote mental well-being, and enhance public health among citizens.

### Challenges

- Active mobility remains severely underutilised because urban infrastructure actively discourages it.
- The lack of adequate pedestrian and cyclist-friendly infrastructure hinders active mobility as a primary mode of transport.
- Extreme weather conditions and long distances of travel discourage people from adopting active modes of transport.
- Since in many regions, cars and bikes are associated with a higher social status, social perceptions act as significant barriers.
- High traffic congestion, along with weak enforcement of traffic regulations, makes walking and cycling unsafe.

## 8.6 Naini Lake's water crisis

Naini Lake has recorded a water level of 4.7 feet, marking a five-year low that sparked concerns over drinking water scarcity ahead of the summer season.

- It is a natural kidney-shaped lake in Nainital, Uttarakhand surrounded by seven hills.
- **Discovered by** – P. Baron, a british businessman in 1839.
- The third largest lake in Uttarakhand by surface area.
- **Topology** – It is connected by a bridge between Mallital (north) and Tallital (south), and this bridge houses the world's only post office on a lake bridge.
- **Reasons for the water crisis** - Decrease in snowfall and rainfall in the winter months.
- A report from the Uttarakhand State Council for Science and Technology found that compared to other Kumaon lakes, Naini Lake is subjected to the greatest man-made manipulations.
- It cited unplanned construction, encroachment, and degradation of recharge zones as key factors.
- The construction of concrete structures nearby further causes low rainwater infiltration, worsened by the low rainfall in some years.
- Enhancing siltation, dumping debris in Sukhatal Lake, which is a major aquifer recharge area for Naini Lake, causing the lake to shrink.
- Pollution from the discharge of untreated wastewater, improper disposal of solid waste, and inadequate sewer systems causing sewage to overflow into storm water drains, discharge into the Lake.

76% of the city's water demand was met by the Naini Lake in 2024.

## 8.7 Efficient Air Conditioners (ACs)

Intense summers and economic growth are driving rapid AC adoption, straining India's power grid, especially during peak hours, making AC efficiency a critical issue.

### Challenges faced due to Air Conditioners (ACs)

- **Rapid Growth** – India is adding 10-15 million AC units annually, with projections indicating an additional 150 million units over the next decade.
- **Peak Load Crisis** – ACs significantly contribute to peak electricity demand, especially during evening and night-time hours when solar power generation diminishes, but heat persists.
- **Supply-Demand Gap** – Potential shortfall in firm power capacity (reliable 24/7 power) projected as early as 2026, despite overall capacity additions.

In May 2024, India's evening peak demand hit a record 240 GW, largely driven by cooling needs.

## The issues with Current Standards

- **Outdated MEPS** – India's Minimum Energy Performance Standards (MEPS) for ACs, represented by the star rating system, are lagging behind global benchmarks.
- **Inverter AC Gap** – The widely sold inverter (variable-speed) ACs at India's 1-star minimum rating are nearly 50% less efficient than the minimum standards in countries like China and Japan.
- **Lagging International Benchmarks** – China's minimum standard is roughly equivalent to India's highest 5-star rating, meaning a large portion of ACs sold in India would not meet basic requirements in the Chinese market.

## Strategic Importance

- Enhancing AC efficiency acts as a power system reliability safeguard.
- It offers a consumer savings strategy through lower electricity bills.
- Provides an industrial competitiveness lever, potentially positioning India as a leader in efficient cooling technology.

Proposed Roadmap for Higher Efficiency		
Year	Proposed Minimum Efficiency (Indian Seasonal Energy Efficiency Ratio)	Relevance
2027	5.0 (current 5-star)	India's top-rated models now
2030	6.3	Premium models in Indian market
2033	7.4	Global best-in-class

*The Indian Seasonal Energy Efficiency Ratio (ISEER) is a metric used to assess the energy efficiency of air conditioners, considering seasonal variations in temperature and operating conditions and is a key factor in the BEE (Bureau of Energy Efficiency) star rating system for room air conditioners.*

## Benefits of Efficiency Upgrade

- **Peak Demand Reduction** – Projected to contribute up to 120 GW by 2030 and 180 GW by 2035 to peak demand.
- **Consumer Savings** – Cumulative savings by 2035 projected between ₹66,000 crore to ₹2.25 lakh crore (\$8–\$26 billion) due to reduced electricity bills."
- **Infrastructure Cost Savings** – Avoided investments potentially reaching ₹7.5 lakh crore by 2035 in new power generation and grid infrastructure.
- **Energy Savings** – 120 terawatt hours (TWh) per year by 2035, which is equivalent to 60 GW of solar capacity.
- **Environmental Gains** – Reduced carbon footprint.

## Challenges to Efficiency Adoption

- Higher upfront cost of efficient ACs.
- Low consumer awareness about ISEER ratings.
- Retailer preference for low-efficiency models (higher margins).
- Tenant-owner disconnect (buyers don't pay the electricity bills).
- Absence of strong regulatory push.

## 8.8 International Big Cat Alliance (IBCA)

The Ministry of External Affairs recently announced that Indian Government and the International Big Cat Alliance (IBCA) signed 'Headquarters Agreement' to establish the alliance's headquarters and secretariat in India.

- It is a **multi-country, multi-agency** coalition.
- **Launched on** - April 9, 2023 by India during the 50<sup>th</sup> anniversary celebration of 'Project Tiger'.



- **Aim** - To conserve 7 big cats tigers, lions, leopards, snow leopards, cheetahs, jaguars and pumas worldwide.
- **Partnership** - The IBCA aims to bring together 97 range countries (where these big cats live), non-range countries interested in big cat conservation, conservation partners, and scientific organizations.
- **Headquarters & Secretariat** - India.
- **Objective** – To ensure cooperation for the conservation of 7 big cats by arresting decline in population and reverse the trend.
- To establish a central repository for knowledge sharing, capacity building, networking, advocacy, finance and support research.



*Project Tiger was launched in 1973 by National Tiger Conservation Authority (NTCA) to protect the India's tiger population.*

*The Indian subcontinent has been historically home to the Bengal tiger, Asiatic lion, Indian leopard, Indian/Asiatic cheetah as well as Snow leopard.*

## Big Cats

- **Big Cat** – A term that is used in informal speech to apply to any large species of the family Felidae.
- Usually, it applies to the members of the genus Panthera but 2 other cats Puma (Puma concolor) and Cheetah (Acinonyx jubatus) are also usually included in listings of 'big cats'.
- **7 Big cats** – Lion, tiger, leopard, cheetah, snow leopard, jaguar, and puma.
- **In India** – 5 out of 7 cats except jaguar and puma are found here.
- While cheetah was declared extinct in 1952, it is now reintroduced as a part of Cheetah reintroduction project.

*Cheetah reintroduction project involves translocating cheetahs from Africa to Kuno National Park in Madhya Pradesh and other suitable habitats.*

TYPES OF BIG CATS & THEIR LOCATIONS		IUCN STATUS
 <b>LION</b> AFRICA AND EURASIA	 <b>TIGER</b> ASIA	Lion - Vulnerable
 <b>JAGUAR</b> AMERICAS	 <b>CHEETAH</b> AFRICA	Jaguar - Near Threatened
 <b>LEOPARD</b> AFRICA, ASIA, AND MIDDLE EAST	 <b>SNOW LEOPARD</b> ALPINE REGION OF SOUTH-CENTRAL ASIA	Leopard - Vulnerable
 <b>COUGAR</b> NORTH AMERICA		Cougar - Least Concern
		Tiger - Endangered
		Cheetah - Vulnerable
		Snow Leopard - Vulnerable

## 8.9 Ramsar Sites in India

Secretary General of the Ramsar Convention on Wetlands, Dr. Musonda Mumba, recently said that India (89) has more Ramsar sites compared to China (82).

- Ramsar sites are wetlands of international importance designated under the Ramsar Convention.

*Ramsar Convention is an international treaty that promotes the conservation and wise use of wetlands came into force in 1975.*

- They are crucial for biodiversity conservation, water quality, and climate regulation.
- The wetland sites range from mountains to the sea.
- Wetlands are referred to as the **“Kidneys of the Earth”**.

## In India

- At Present, India has 89 Ramsar sites, covering 8% of total wetlands area in India.

### Newly Added Ramsar Sites, 2025

Udhwa Lake	Jharkhand
Theerthangal	Tamil Nadu
Sakkarakottai	Tamil Nadu
Khecheopalri	Sikkim

- **Significance** - Wetlands represent the largest carbon reservoirs on the planet.
- They play a crucial role in purifying and filtering contaminated water.
- The availability of food is closely linked to the health of wetlands.
- Additionally, wetlands help to reduce the impact of extreme weather events.
- They also create employment opportunities and support sustainable livelihoods.
- Nearly half of all animal species rely on wetlands for their habitat and reproduction.

## Wetland Conservation in India

- **Wetlands of India Portal**- Launched on October 2, 2021, by the Ministry of Environment, Forest, and Climate Change (MoEFCC), this portal provides comprehensive information on India's wetlands.
- **National Wetland Decadal Change Atlas** - Prepared by the Space Applications Centre (SAC), Ahmedabad, this atlas highlights the changes in wetlands across the country over the past decade.
- **Centre for Wetland Conservation and Management (CWCM)** - Established in 2021, this center focuses on addressing research needs and knowledge gaps in wetland conservation.
- **Wetlands Rejuvenation Program** - Initiated by MoEFCC in 2020, this program aims to rejuvenate wetlands across India.
- **Integration with River Basin Management** - The Namami Gange program integrates wetland conservation with river basin management, serving as a model framework for the entire country.
- **National Plan for Conservation of Aquatic Ecosystems** - In 2013, the National Wetlands Conservation Program and the National Lake Conservation Plan were combined to create the National Plan for Conservation of Aquatic Ecosystems.
- **Amrit Dharohar Scheme** - Key initiative aimed at optimizing wetland utilization.
- **MoEFCC's Wetlands Rejuvenation Program** - Launched in 2020, the Ministry of Environment, Forest & Climate Change (MoEFCC) initiated the Wetlands Rejuvenation Program.
- **National Wildlife Action Plan** - The National Wildlife Action Plan (2017-2031) emphasizes the conservation of inland aquatic ecosystems, including wetlands.
- It advocates for a national wetlands mission to preserve these habitats, recognizing their importance for biodiversity and ecosystem services.
- **Integration with Namami Gange** - On World Wetlands Day 2021, the Ministry of Jal Shakti highlighted the integration of wetland conservation with the Namami Gange program.
- The National Mission for Clean Ganga (NMCG) has pioneered initiatives that serve as models for wetland conservation nationwide.
- This includes developing health cards and management plans for 10 wetlands in each of the 50-plus Ganga districts, blending scientific expertise with community involvement.

## 8.10 Kinshasa Floods & Democratic Republic of Congo

*The flooding disaster in Kinshasa was a symptom of recent land use change, which has occurred rapidly in the city, turning it into a sprawling urban settlement without the necessary drainage infrastructure.*

- **Kinshasa** – It is the capital of Democratic Republic of Congo (DRC).
- The city is the most densely populated city in the DRC, the most populous city and 3<sup>rd</sup>-largest metropolitan area in Africa.
- The **Ndjili River** and its tributary (Lukaya) flows through the city.
- At least 2% of the population live in areas prone to flooding. Urban infrastructure, especially flood-related, is non-existent or inadequate.
- Local rains combined with runoff from torrential rains coming from neighboring Congo Central Province overwhelmed the city's small urban tributaries.

### Democratic Republic of Congo

- It is a country located in **Central Africa**.
- **Nomenclature** - Refers to the **Congo River**, which drains a large basin that lies mostly in the republic.
- It has a coastline on the **Atlantic Ocean** but is otherwise landlocked.
- By land area, it is the 2<sup>nd</sup>-largest country in Africa and the 11<sup>th</sup>-largest in the world.
- **Bordered countries** - Congo is bounded to the
  - North by the Central African Republic and South Sudan
  - East by Uganda, Rwanda, Burundi, and Tanzania
  - Southeast by Zambia; and to the southwest by Angola
  - West are the country's short Atlantic coastline, the Angolan enclave of Cabinda, and Congo (Brazzaville).
- **Geographical features** - The lowest point occurs at Lake Mai-Ndombe and the highest point is reached in the hills of **Mobayi-Mbongo and Zongo** in the north.
- The volcanic **Virunga Mountains** stretch across the Western Rift Valley north of **Lake Kivu**.
- The **Mitumba Mountains** stretch along the Western Rift Valley
- **Important Lakes** - Albert, Edward, Kivu, Tanganyika, and Mweru.
- **Natural Resources** - Boasts vast deposits of industrial diamonds, cobalt, and copper; one of the largest forest reserves in Africa; and significant hydroelectric potential.
- **Economy** - It is one of the poorest countries in the world.
- **Society** - DRC ranks **164** out of 174 countries on the 2020 Human Capital Index.
- DRC has one of the highest stunting rates (42% of children under age five), and malnutrition is the underlying cause of almost half of the deaths of children under the age of five. It has very high fertility rate.

## 8.11 Emission Reduction Compliance Mechanism

*The environment ministry has issued a draft notification proposing GHG emission intensity (GEI) reduction target under Carbon Credit Trading Scheme (CCTS), 2023.*

- All traditionally high-emission industries in India such as aluminum, cement and pulp & paper are obligated to reduce their greenhouse gas (GHG) emissions to meet specific targets.
- **Compliance mechanism under** - Carbon Credit Trading Scheme, 2023.
- **Notification** - Industries have to reduce GEI within a specified time-period.
- If industries do not meet their GEI targets by reducing emissions for the respective compliance year, they will have to purchase **carbon credit certificates** from the Indian carbon market.
- In case an obligated entity **fails to comply with the GEI target or fails to submit the carbon credit certificates** equivalent to the shortfall for compliance, the Central Pollution Control Board (CPCB) will impose 'environmental compensation' (penalty) for the shortfall.

- The penalty will be equal to twice of the average price at which the carbon credit certificate is traded during the trading cycle of that compliance year.
- The average price will be determined by the **Bureau of Energy Efficiency (BEE)**, which has finalized detailed procedures to fix GEI targets (in tonnes of carbon dioxide equivalent) for each of the high emission sectors from the 2023-24 baseline year.
- Environmental Compensation shall be paid within the 90 days from the day of such imposition.
- The targets are in sync with the country's 'net zero' emission goal of 2070 and will contribute to meet its Nationally Determined Contribution (NDCs) climate action targets.
- It is expected that the move may also make these industries ready to face the European Union's proposed **Carbon Border Adjustment Mechanism (CBAM)**, which is to be implemented from next year.
- The CBAM is a tool to put a price through imposing border tax on carbon intensive goods, like iron & steel, aluminium and cement.
- India has, however, strongly opposed the EU's move as it will put a tariff burden on such products of developing countries and impact their trade.

### Carbon Credit Trading Scheme (CCTS), 2023

- It is a **market-based mechanism** for reducing greenhouse gas emissions.
- It aims to establish the **Indian Carbon Market (ICM)** and supports the country's climate goals.
- The scheme operates through a compliance mechanism and an offset mechanism, allowing entities to reduce emissions through various projects and **trade carbon credits**.
- **Compliance Mechanism** - Mandatory for specific sectors, such as power, cement, steel, and others, with specific emission intensity targets.
- Entities are required to meet these targets or purchase carbon credits from the ICM.
- **Offset Mechanism** - Incentivizes voluntary emission reduction projects from entities not under the compliance mechanism.

## 8.12 National Environmental Engineering Research Institute (NEERI)

*The Supreme Court has recently directed the NEERI, to conduct a detailed assessment of the glass industries operating near the Taj Mahal in Agra, Uttar Pradesh, to evaluate their potential impact on the monument.*

- **Established in** – 1958 in Nagpur, under the Ministry of Science and Technology.
- It is a pioneering research institute in environmental science and engineering, funded by the Government of India and a constituent laboratory of Council of Scientific & Industrial Research (CSIR).
- The Central Public Health Engineering Research Institute (CPHERI), was renamed as National Environmental Engineering Research Institute (NEERI) in 1974.
- **Mission** – To undertake research and development in environmental management, pollution control, and sustainable development.
- **Focus on** – Water supply, sewage disposal, communicable diseases, and industrial pollution.
- **Areas of Expertise** – In climate/environment, health, lab and field testing, monitoring and evaluation, policy development, research, standards, technology, and fuel R&D.

## 8.13 Fourth Global Coral Bleaching

*Recently, scientists have confirmed that the world is experiencing its fourth global coral bleaching event, which has affected nearly 84% (83.7%) of the planet's coral reef area.*

- **Coral reefs** – A coral reef is **an underwater ecosystem** formed of colonies of coral polyps.
- They are referred to as **Rainforests of the sea** and it supports 1/3<sup>rd</sup> of global marine species.



- **Symbiotic Relationship** – Corals rely on microscopic algae (zooxanthellae) living in their tissues, which provide food and energy through photosynthesis.
- **Global Distribution** – Coral reefs exist in the Pacific, Atlantic, and Indian oceans.
- **Australia's Great Barrier Reef** is the largest in the world.
- **Coral bleaching** – It is caused when the when reef water remains too hot for too long, putting corals under stress.
- The stress compels corals to expel marine algae (zooxanthellae) residing inside their tissues.
- These algae provide food and energy from the sun through photosynthesis.
- Once the algae are expelled, corals turn white (bleaching), exposing their skeleton and makes corals vulnerable to diseases.
- Prolonged and extreme heat exposure leads to coral mortality.
- Corals can recover from bleaching in conducive environments, but recovery can take years or even decades.
- **Global bleaching events** – It is the widespread mass bleaching of Coral reefs that affects coral reefs area globally.
  - **1<sup>st</sup> global coral bleaching event (1998)** - 21%
  - **2<sup>nd</sup> global coral bleaching event (2010)** - 37%
  - **3<sup>rd</sup> global coral bleaching event (2014-2017)** - 68%
  - **4<sup>th</sup> global coral bleaching event (2023-2025)** - 83.7%
- Mass coral bleaching has been recorded in at least 83 countries and territories.
- This is the most widespread global bleaching event surpassing the previous global bleaching event.
- **Causes** – Record high ocean temperatures that remains elevated over a period of time across the Pacific, Atlantic, and Indian oceans.
- Climate models predicts that nearly every coral reef on the planet will experience annual bleaching events between 2040 and 2050.
- The Great Barrier Reef is currently undergoing its 6<sup>th</sup> mass bleaching event, with its 1<sup>st</sup> mass bleaching occurred in 1998.
- This is the 2<sup>nd</sup> time the Great Barrier Reef has experienced consecutive bleaching events, with the first being in 2016-17.

#### 8.14 Community led initiatives for Marine Protected Areas (MPAs)

A new global initiative called 'Revive Our Ocean' was launched recently.

- **Marine Protected Areas (MPAs)** – MPAs are designated areas within the ocean where human activities are regulated to protect marine life and ecosystems.
- They are similar to land-based parks, but in the ocean, these areas offer special protection for natural or historic marine resources.
- MPAs restrict human activities like fishing or mining to conserve biodiversity and other natural resources.
- They are governed in different ways. Some are managed by national governments, others by local authorities, NGOs or through co-management with communities.
- **Community management initiatives – In Spain** - Medes Island in Spain is a small no-fishing zone which is just one square kilometre in size but brings in 16 million Euro every year from diving tourism.
- It is 25 times more than what fishing earns in the same area.
- **In Scotland** - Similarly, creating a no-fishing zone on Scotland's Isle of Arran helped marine life come back.
- The number of plants and animals on the seabed has more than doubled, and nearby waters are also seeing more life.
- **In Philippines - RARE's Fish Forever program** has helped communities set up no-fishing zones. In 5 years, the amount of fish in those areas doubled.

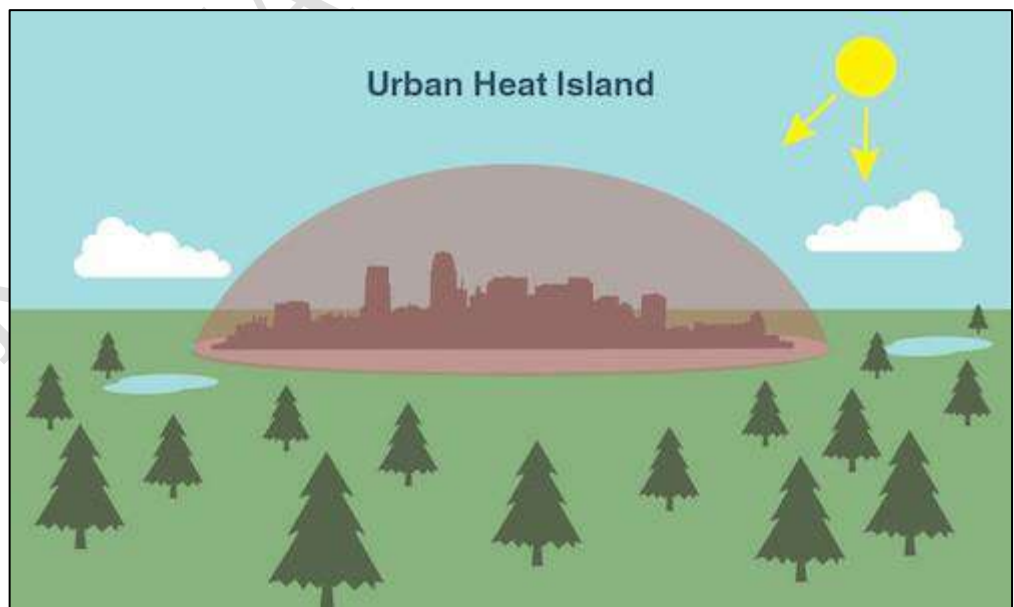


- **Global Initiative - Coastal 500** - It includes global network of mayors and local government leaders who share knowledge and push for better policies, like banning industrial fishing near their shores.
- **Revive Our Ocean Initiative - Aim** – To scale up effective, community-led marine protected areas (MPAs) through local action.
- It hopes to **remove key barriers** that prevent coastal communities from protecting and managing their ocean spaces.
- **Pillars**
  - Inspire
  - Enable and
  - Equip
- It is rooted in successful models from across the world and will initially focus on 7 countries - The **UK, Portugal, Greece, Turkey, the Philippines, Indonesia and Mexico.**
- **30X30 Target** – It is the target of the Kunming-Montreal Global Biodiversity Framework (KMGBF) that aims to protect 30% of the oceans by 2030.
- **Challenges in protecting MPAs** - Though more than 16,000 MPAs have been established globally, amounting 8% of the world's oceans, only 3% are currently under full protection.
- Most of these MPAs are either poorly managed or allow damaging activities like bottom trawling.

### 8.15 Urban Heat Island (UHI)

A recent study published in *Nature Climate Change* provides a global perspective on how UHI impacts both heat and cold related mortality.

- **Urban heat island (UHI)** – A phenomenon that occurs when a city experiences much warmer ambient temperatures than nearby rural areas.
- **Causes** – Existence of Concrete buildings, asphalt roads and reduced vegetation in cities that lead to trap and absorb heat, limiting dissipation of heat.
- Lack of green spaces and high energy use (e.g., air conditioning), that further elevate temperatures.
- **Temperature variation** – Urban areas can be 3–5°C warmer than rural surroundings, sometimes more during heatwaves.
- **Impacts** – Increased energy consumption, air pollution, heat-related health issues and stress on nearby ecosystems.



#### Implications of UHI

- **Dual impact of UHI on mortality** – While heat islands increase heat-related deaths *in hot seasons*, they can reduce cold-related deaths in cooler conditions
- **Heat-related mortality** – UHI *increases temperatures in hotter* seasons, leading to higher heat exposure and subsequent deaths, particularly in summer.
- **Cold-related mortality** – In cooler seasons, the warmer urban temperatures *reduce cold-related deaths* by mitigating extreme cold exposure.

- Globally, in 2018, the reduction in cold-related mortality was 4.4 times greater than the increase in heat-related mortality due to UHI.
- **Regional and seasonal variations** – Cities at high latitudes experience a greater reduction in cold-related deaths.
- For instance, Moscow saw an 11.5 times greater reduction in cold-related mortality compared to heat-related mortality.
- **Poor air and water quality** – Urban heat islands can have worse air and water quality than their rural neighbours.

### Way forward

- The Common strategies such as urban forests, green roofs and reflective buildings that mitigate the urban heat island could be avoided, since they potentially **increase cold-related deaths** more than they decrease the heat-related deaths.
- Cities need region and season specific strategies to balance UHI mitigation with health outcomes, avoiding unintended increases in cold-related deaths.
- Take a seasonal approach to heat island mitigation is crucial for effective urban planning in the context of climate change and urbanization.
- Using lighter-coloured materials on buildings helps to reduce the heat of the surrounding areas.

### Other Important Topics

#### Siberian Tiger/Amur Tigers

A recent study in *Oryx* highlights the increasing incidents of tigers killed in road, posing a significant threat to Amur Tiger survival.

- **Scientific name** – *Panthera tigris altaica*.
- They're the largest tiger subspecies, adapted to cold climates with thick fur and a light coat.
- **Habitat and Distribution** – They primarily inhabit eastern Russia's birch forests, with limited presence in China and potentially North Korea.
- **Population** – Estimates place their population at 265-486 in Russia (2022).
- **Threats** – Poaching and human-wildlife conflict.
- **Conservation status in IUCN** – Endangered.

#### India's Decarbonisation in Steel Sector

Recent measures of Indian Government to decarbonise the steel sector.

- **Green Steel Taxonomy** – The Ministry of Steel has established a Taxonomy for Green Steel, defining standards for low-emission steel production.
- **National Green Hydrogen Mission** – It is a pilot projects using hydrogen in steel production.
- **National Solar Mission** – It promotes solar energy use and reducing carbon emissions.
- **Vehicle Scrapping Policy** – It is associated with rules that facilitate the dismantling and recycling of End-of-Life Vehicles (ELVs) and recovering valuable materials.
- **Carbon Credit Trading Scheme (CCTS)** – It provides a market-based mechanism for carbon emissions reduction.

**End-of-Life Vehicles (ELVs) Rules, 2025**, mandates Extended Producer Responsibility (EPR) for vehicle producers.

### Reservoir Storage Monitoring System (RSMS) Portal

Web based Reservoir Storage Monitoring System (RSMS) Portal was launched recently.

- **Launched by** – Ministry of Jal Shakti.
- **Aim** – To monitor the live storage Capacity data of 161 important reservoirs of country.
- **Features** – All required data analysis and generating maps, tables, graphs etc. including issuing the final bulletin shall be done automatically once the data is entered in the portal.
- If required, general public can get information about the storage status of any reservoir and download the bulletin from the portal.

### Global Lake Deoxygenation Crisis

Recent, studies show that 83% of over 15,000 lakes are losing dissolved oxygen (DO), threatening aquatic ecosystems.

- **The Necessity of Dissolved Oxygen** – Dissolved oxygen (DO) is vital for aerobic aquatic life, low levels cause hypoxia, endangering fish and biodiversity.
- **Climate Change** – A Major Oxygen Depletion Factor accounting for 55% of global surface DO decline.
- **Eutrophication's Contribution to DO Loss** – Nutrient runoff causes eutrophication, contributing 10% to DO loss via algal bloom decomposition.
- **Combined Impact and Ecological Consequences** – Climate change and eutrophication synergistically reduce DO, impacting aquatic health and ecosystem stability.

### Kasungu National Park

Kasungu National Park, located in Malawi's Central Region, is facing legal action due to increased human–elephant conflicts following a large–scale elephant relocation.

- **Location** – West of Kasungu town in Malawi (African country) and bordering Zambia.
- **Managed by** – The Department of National Parks and Wildlife (DNPW).
- **Features** – The Park features the Dwangwa, Lingadzi, and Lifupa rivers, supporting diverse wildlife and is predominantly inhabited by the Chewa people.
- **Flora and Fauna Diversity** – Kasungu primarily consists of Miombo woodland and grassy wetlands, home to elephants, various antelope species, zebras, and buffaloes.
- It is also a designated Lion Conservation Unit.
- **Elephant Relocation and Resulting Conflicts** – In 2022, 263 elephants were relocated from Liwonde National Park to Kasungu by the DNPW, African Parks, and the International Fund for Animal Welfare (IFAW).
- **Legal Action and Community Impact** – The relocation has led to increased elephant incursions into villages, resulting in at least 12 deaths and extensive crop damage affecting over 11,000 villagers, prompting legal action against IFAW.

### Cyphoderus Bihariensis

Scientists from Kolkata Zoological Survey of India (ZSI) discovered a new species of Collembola in Bihar.

- **Collembola** – It is a soil-dwelling micro-arthropod.

- **Scientific name** – Cyphoderus Bihariensis (named after the state ‘Bihar’ where it was found)
- It belongs to the multidentati species group, marking the **1st record** of this group in the country.
- **Morphology** – It has minute body size, lack of eyes, and the presence of a furcula (a jumping organ).

### Joint Nilgiri Tahr Census

The synchronised survey of Nilgiri Tahr is set to be conducted to commemorate the 50th anniversary of Eravikulam National Park.

- **Survey by** - Kerala and Tamil Nadu, spanning
  - 89 blocks in – Kerala.
  - 176 blocks in – Tamil Nadu.
- **Coverage** – Across the contiguous Nilgiri Tahr habitats, covering areas both inside and outside protected forest zones.
- **Methodology** – Camera traps would be deployed and pellet samples collected from selected blocks for scientific analysis, including studies on genetic variation.

### Nilgiri Tahr

Kerala and Tamil Nadu is set to conduct a joint Nilgiri Tahr census from April 24-27.

- It is the only mountain ungulate (large mammals with hooves) in southern India amongst the 12 species present in India.
- **Endemic to** – Western Ghats, is primarily found in the highlands of southern India.
- Eravikulam National Park is in Kerala which hosts the largest population of this species.
- **State animal of Tamil Nadu** – The State celebrates October 7 as Nilgiri Tahr Day.
- **Conservation status**
  - IUCN – Endangered.
  - Wildlife (Protection) Act of India, 1972 – Schedule I.

### Future Conservationist Award

Recently, a team of researchers from Kerala has been awarded the Future Conservationist Award for the project of conservation of Malabar Grey Hornbill.

- **Awarded by** – Conservation Leadership Programme (CLP).
- **Partnership by** – Fauna & Flora International, BirdLife International and the Wildlife Conservation Society.
- **Role** – It supports promising young conservationists with less than 5 years of professional experience, offering funding and tailored mentoring to lead impactful projects.

### Vembur Sheep

Vembur sheep in Tamil Nadu faces threat from industrial plan.

- **Vembur Sheep** - It is one of 5 the indigenous hair sheep breeds in Tamil Nadu and locally called as Pottu aadu.
- **Characteristics** – It has medium-sized drooping ears, short thin tails, and tall lean bodies.
- It doesn't require shearing and well-suited to the Tamil Nadu climate.



- **Unique coating pattern** – White fur adorned with irregular reddish brown patches, and in rare cases black fawn patches.
- It does not rely on commercial cattle fodder, but entirely on natural grazing grounds.
- Recognising its uniqueness, the National Bureau of Animal Genetic Resources officially registered the breed in 2007.
- **Climate resilient** - The breed's natural resilience and adaptability to dry climate makes it ideal for the rain-fed agricultural regions.
- **Conservation status** – IUCN – Not listed.



### Green Crypto Initiative

*Recently, Bhutan is venturing into mining green cryptocurrency using its abundant hydropower resources to stimulate its economy and address youth emigration.*

- **Green Cryptocurrencies** – They are digital currencies mined using renewable energy sources, such as hydropower, wind, or solar, ensuring a lower environmental impact than traditional mining.
- **Aim** – To provide environmentally friendly digital assets for companies striving to meet their Environmental, Social, and Governance (ESG) objectives.
- The adoption of green cryptocurrency mining aligns with Bhutan's Gross National Happiness (GNH) philosophy, which prioritizes sustainable development and environmental preservation.
- **Key attributes** – Bhutan's green cryptocurrency mining leverages 100% hydropower, resulting in carbon-neutral operations and supporting blockchain technology with a minimal ecological footprint.
- **Economic impact** – This move positions Bhutan as a potential global leader in green digital finance, allowing it to capitalize on its existing hydropower infrastructure for economic diversification and growth.

### New World Screwworm (NWS) Myiasis

*NWS myiasis, recently detected in Mexico which is a parasitic infection caused by Cochliomyia hominivorax larvae, primarily affecting livestock but occasionally humans.*

- **Development of infection** – It occurs when screwworm fly larvae infest warm-blooded animals. Female flies lay eggs in open wounds, which hatch into larvae that burrow into living tissue, causing significant damage.
- **Symptoms** – Presence of maggots in wounds, unhealing and painful lesions with bleeding, a foul odour, and potential secondary infections leading to fever or chills.
- **Higher risk** – Those travelling to endemic regions (South America, Caribbean), individuals with open wounds, weakened immune systems, or those around livestock are at increased risk of infection.
- **Transmission** – It spreads when female screwworm flies are attracted to open wounds and lay eggs. Hatched larvae then burrow into the tissue, establishing an infestation.
- **Prevention** – Keeping wounds clean and covered, using insect repellents, wearing protective clothing, and sleeping in screened areas.
- **Treatment** – It requires professional medical intervention for the physical removal of larvae, often surgically.

### World Earth Day, 2025

*World Earth Day was recently celebrated to create environmental awareness and action for a sustainable planet.*

- **Celebrated on** – 22<sup>nd</sup> April, every year.
- **Theme** – Our Power, Our Planet.
- **Objective** – To drive positive environmental change through renewable energy, sustainable practices, and supportive policies.
- **Historical roots** – Initiated by Senator Gaylord Nelson in response to environmental crises, the 1<sup>st</sup> Earth Day in 1970 mobilized 20 million Americans.
- **Global evolution** – Earth Day has grown into a global movement, engaging over 1 billion people in 192 countries in environmental protection efforts.

### *Urban Munnar Effect*

*Recently, the Technology Development Board (TDB) extending a financial support to Urban Air Labs Private Limited, Gurugram.*

- It is a novel technology developed by Urban Air Labs and used in their uBreathe Life air purifier.
- **Process** – It enhances the natural air-purifying abilities of leafy indoor plants by amplifying the airflow around them and directing it to the root zone, where the majority of purification happens.
- **Features** – It is a combination of,
  - **Falcon Effect** – Create a low-pressure area that draws the more air, then is purified.
  - **Magneto Effect** – Bends the airflow, further increasing airflow and accelerating the purification process.
- **Phytoremediation** – It enhances the natural air-purifying abilities of plants.

### *Similipal National Park*

*Recently, the ecologically significant Similipal in Odisha has been officially declared a national park by the state government. This makes it India's 107th national park and the second in Odisha, following Bhitarkanika's designation.*

#### **Key facts about Similipal National Park:**

- **Located** - In the Mayurbhanj District of northern Odisha, it spans 2750 sq. km and features scenic waterfalls like Joranda and Barehipani.
- **Initially designated** - As tiger reserve in 1973 and a wildlife sanctuary in 1979, a 303 sq. km area was proposed as a National Park in 1980.
- **UNESCO recognized** - It as a Biosphere Reserve in May 2009, and it falls under the Mayurbhanj Elephant Reserve, including nearby wildlife sanctuaries.
- **Physical Features**- Characterized by high plateaus, hills (with Khairiburu and Meghashini as the highest peaks), undulating terrain, grasslands, and forests.
- **Vegetation** - Is diverse, primarily Northern tropical moist deciduous forests with some semi-evergreen areas.
- **Fauna**-The park is renowned for its tiger, elephant, and hill mynah populations, holding the highest number of tigers in Odisha.

### *Tree Shrews of South Asia*

*Recent research by the Zoological Survey of India has transformed the understanding of South Asian tree shrews.*

- **Published in** – The journal Ecology & Evolution, which marks the need for targeted conservation efforts.
- **Research** – Uncovered morphological distinctions among these small mammals, which have often been misidentified due to their resemblance to other species.
- **Order Scandentia** – Tree shrews belong to the order Scandentia, distinct from true shrews or squirrels. They are characterized by elongated snouts and moist nasal pads.
- **Dietary Habits** – Their primary diet consists of insects and fruits, making them omnivores playing a role in controlling insect populations and seed dispersal.
- **Tree shrews**
  - Also known as banxings, are small mammals native to the tropical forests of South and Southeast Asia.
  - Classification of Tree shrews.
  - They belong to the order Scandentia, which is divided into 2 families:
  - **Tupaiaidae**: This family contains 19 species of "ordinary" tree shrews in four genera: Anathana, Dendrogale, Tupaia, and Urogale.
  - **Ptilocercidae**: This family contains only one species, the pen-tailed tree shrew (*Ptilocercus lowii*).
  - **Ecological Importance** - As seed dispersers and insect predators, tree shrews contribute significantly to the health and balance of forest ecosystems.

### ***Mahuadanr Sanctuary***

*Mahuadanr wolf sanctuary in Jharkhand recently garnered attention due to a distinctive practice observed by local tribal communities adhering to the 'Sarna faith'.*

- **Winter Forest Avoidance** - These communities traditionally avoid entering the Sal forests during the winter months, a unique cultural observance.
- **Crucial Wolf Breeding Season** - Interestingly, this period of avoidance by the Sarna community perfectly coincides with the critical breeding and denning season of the Indian grey wolf within the sanctuary.
- **India's First Wolf Sanctuary** - Mahuadanr Wolf Sanctuary, situated in Jharkhand's Latehar district, holds the distinction of being India's first and only sanctuary dedicated to the Indian grey wolf (*Canis lupus pallipes*).
- **Established for Wolf Protection** - Declared in 1976, this sanctuary was specifically created to safeguard the vulnerable Indian wolf population.
- **Sanctuary Area** - The protected area spans approximately 63 square kilometers, providing a crucial habitat for the wolves.
- **Part of Palamau Tiger Reserve** - Mahuadanr Wolf Sanctuary forms an integral part of the larger Palamau Tiger Reserve.
- **Key Wildlife Species** - Besides the Indian wolf, the sanctuary is home to other wildlife including spotted deer, wild boar, hyena, and bear.
- **Conservation Significance** - This unique sanctuary plays a vital role in the conservation efforts for the Indian grey wolf within its natural habitat

### ***Nagaland Launches Ambitious Solar Mission***

*Recently, Nagaland Chief Minister Neiphiu Rio has inaugurated the Nagaland Solar Mission, a significant step towards promoting widespread adoption of rooftop solar power systems across the state.*

- **Aligning with PM Surya Ghar Yojana** – This initiative is in close alignment with the central government's 'PM Surya Ghar: Muft Bijli Yojana', aiming to provide affordable and clean energy to

households.

- **Substantial Subsidies for Solar Adoption** – The Nagaland Solar Mission offers attractive subsidies, covering up to 96% of the cost for 2kW solar systems and 85% for 3kW systems, making solar power significantly more accessible.
- **Financial Commitment to Green Energy** – Demonstrating its commitment to renewable energy, the state government has allocated Rs10 crore for the Nagaland Solar Mission in the financial year 2025-26.
- **Boosting Sustainable Energy in Nagaland** – This mission is expected to accelerate the transition towards sustainable energy in Nagaland, reducing reliance on conventional power sources and empowering households with clean and affordable electricity.

### ***Lichens Thrive Under Stimulated Martian Conditions***

*Recent groundbreaking research has demonstrated the remarkable resilience of certain lichen species to harsh Martian environments, challenging prior assumptions about the possibility of life on Mars.*

- **Unique Symbiotic Nature of Lichens** – They are composite organisms, a symbiotic partnership between a fungus and either algae or cyanobacteria. This unique biological arrangement enables them to survive and flourish in extreme terrestrial habitats like deserts and polar region.
- **Experimental Setup: Simulating Mars** – Scientists conducted rigorous experiments utilizing a Mars simulation chamber. Two distinct lichen species, *Diploschistes muscorum* and *Cetraria aculeata*, were subjected to Martian atmospheric conditions, pressure, temperature fluctuations, and radiation levels for a five-hour duration.
- **Metabolic Activity Confirmed** – The study's key finding revealed that the tested lichens not only survived the simulated Martian conditions but also remained metabolically active throughout the exposure period, indicating a capacity for biological processes under such extreme stress.

### ***Bat Echolocation Monitoring (BatEchoMon)***

*Recently, India's first automated bat monitoring system, BatEchoMon, utilizes real-time acoustic analysis for bat species detection and classification.*

- **Introducing BatEchoMon** – It is an autonomous, AI-powered system for real-time detection, analysis, and classification of bat echolocation calls.
- **Developed by** – Indian Institute for Human Settlements (IIHS), Bengaluru.
- **Aim** – To simplify and accelerate bat data processing for enhanced ecological and biodiversity research with minimal manual effort.
- **Real-time Acoustic Analysis** – The device activates at sunset, employing a Raspberry Pi microprocessor to isolate and analyze bat calls in real time.
- **AI-Powered Species Identification** – BatEchoMon uses convolutional neural networks (CNN) to compare detected call structures with known bat species for accurate identification.
- **Visual and Statistical Output** – The system generates spectrograms and statistical data on bat activity across different species and time intervals.

### ***Telangana Declares Heatwaves as Disasters***

*Recently, Telangana government has officially recognized heatwaves and sunstroke as state-specific disasters.*

- **Enhanced Climate Resilience** – This declaration aims to bolster the state's resilience to climate change impacts and safeguard vulnerable populations.
- **Financial Relief Measures** – The new classification enables the Telangana government to provide

financial assistance to families affected by heat-related incidents.

- **Pioneering State Initiative** – Telangana is among the first states in India to independently classify heatwaves as disasters.
- **National Classification Difference** – This move contrasts with the Union government's current stance of not including heatwaves in the national disaster list.
- **IMD's Heatwave Definition** – According to the India Meteorological Department (IMD), heatwaves occur when maximum temperatures reach at least 40°C or are 5–6°C above normal, with severe heatwaves exceeding 7°C above normal or temperatures surpassing 45°C.

### **Gandhi Sagar Wildlife Sanctuary (GSWS)**

GSWS in Madhya Pradesh will be the 2<sup>nd</sup> relocation site for African cheetahs after Kuno National Park (KNP).

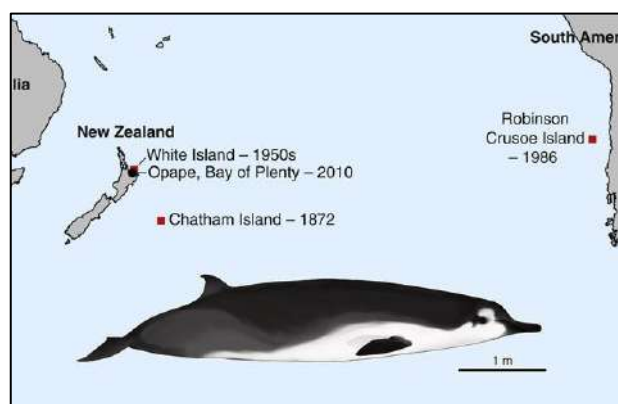
- **Cheetah Relocation** – 2 male cheetahs, Prabhas and Pavak, will be moved from KNP to GSWS as part of India's cheetah reintroduction project.
- **GSWS** – Declared in 1974 and expanded to 362 sq km, the Chambal River bisects it. It's also recognized as an IBA.
- **Located in** – Northwestern Madhya Pradesh along the Rajasthan border, falls within the Khathiar-Gir dry deciduous forests.
- **Features** – Northern tropical dry deciduous, dry mixed deciduous, and dry deciduous scrub forests with species like Khair and Tendu.
- **Fauna** – Chinkara, Leopard, Mugger Crocodile, and diverse birdlife.
- **Chambal River's Role** – It flows through GSWS, supporting aquatic biodiversity and shaping the sanctuary's landscape.

## **SPECIES IN NEWS**

### **8.16 Spade-toothed whale**

Recently, the Scientists gathered to decode the Spade-toothed whale's mystery discovered at the mouth of the Taiari River in New Zealand.

- It is the **world's rarest species of beaked whale**.
- **Scientific name** - Mesoplodon traversii.
- It has **never been seen alive at sea**.
- New Zealand's Indigenous tribal people local Maori iwi consider this whale as a **Taonga, a sacred treasure**.
- Pacific Indigenous leaders signed a treaty recognizing whales as **Legal Persons**, but such a declaration is not reflected in the laws of participating nations.
- **Discovery** – The **first spade-toothed whale bones were found in 1872** on New Zealand's Pitt Island.
- **Appearance** – Nothing is known about their external appearance, but it known from their skeletal remains.
- It thought to be a medium sized beaked whale, with the adult male possessing 2 large tusks that erupt half-way along the lower jaw and curl up and over the beak.
- **Size** - 5.0 - 5.5 m (16 - 18 ft) in length.
- **Habitat** - They're believed to be deep-diving creatures that don't spend much time on the ocean surface.
- **Distribution** - Specimens were found in New Zealand and Chile.





- It thought to live in the South Pacific Ocean or Southern Hemisphere.
- **Diet** - Feed primarily on squid, fish, and different species of crustaceans.
- **Population** - The total population size is unknown.
- **Conservation Status - IUCN** - Data Deficient.
- **Threats** – They may suffer from
  - Noise pollution
  - Climate Change
  - Bycatch
  - Plastic
- **Similar Species** - Strap-Toothed beaked whale.

### 8.17 Typhloperipatus Williamsoni

A group of scientists has announced the rediscovery of a long-forgotten species of velvet worms (phylum Onychophora), which are among the oldest living fossils on the planet, after a gap of 111 years.

- It is an **ancient velvet worm species** (phylum Onychophora), one of the oldest living fossils in the world.

#### Onychophora

- It has an ancient lineage that dates back over 350 million years.
- It comprises only two families and fewer than 200 species, indicating a limited diversity.
- These organisms evolved alongside dinosaurs, and it is likely that many were lost during the mass extinction event.
- **First discovered in** - December 1911 in Siang Valley.
  - After that there have been no documented records of it from India.
- The molecular analysis of *T. williamsoni* revealed that South Asian onychophoras diverged from their
  - Neotropical counterparts, those found in Central and South America, as well as
  - Southern Mexico and the Caribbean approximately 237 million years ago.
- Notably, it was discovered that **Asian onychophoras** lack any relatives among the Australian species.
- This finding is particularly striking, as invertebrates from Southeast Asia and India typically share connections with those in Australia.
- Asian onychophora stands out as one of the rare exceptions to this relationship.



### 8.18 Sea Lions

Recently, a toxic algae bloom on Southern California's coast sickened dozens of sea lions and caused them to become aggressive.

- **Sea lions** – They are **large marine mammals** belonging to the clad **Pinnipeds**.
- **Scientific name** – **Otariinae**, means “little ear” in Greek, refers to their small external ear flaps.
- **Species of sea lion**

**Pinnipeds** are a group of aquatic, fin-footed mammals that include seals, sea lions, and walruses.

- Australian sea lion
- Galapagos sea lion
- New Zealand sea lion
- Steller sea lion
- South American sea lion
- Californian sea lion
- **Distribution** – Pacific Ocean, Bering Sea to southern South America, Falkland Islands in the southern Atlantic Ocean, and others living around Australia and New Zealand.
- **Habitat**—They live on both land and the sea, resting and mating on rocky islands, bays, and coastal beaches.
- **Morphology** – They have a blunt snout, small tail, excellent eyesight, coarse hair and small external (outside) ears with fur seals.
- Their colour ranges from golden brown to dark brown but often looks darker when wet.
- **Characteristics** – They are **generally social, non-aggressive animals** and cool off in the ocean during warm weather.
- **Diet** – Feed on fish and large animals like great white sharks, hammerhead sharks, blue sharks, and killer whales.
- **Major threat - Toxic algal blooms** – It is commonly referred to as **red tides**.
- These blooms produce **domoic acid**, a neurological toxin that makes its way up the food chain and into the diets of marine animals.
- When sea lions consume these marine animals, the neurotoxin affects their neurological functions.
- They get the effects of Difficulty breathing, seizures, and stargazing, in which sea lions unnaturally tilt their heads backwards with closed eyes.
- They act erratically, even aggressively, resulting in attacks on swimmers and surfers.
- **Conservation status**
  - **IUCN** – Endangered.



*Domoic acid (DA) is primarily produced by specific diatoms in the genus Pseudo-nitzschia.*

*The Marine Mammal Care Center in Los Angeles facing an unprecedented crisis and treating 240 animals so far in 2024.*

### 8.19 Euphaea Wayanadensis

A group of researchers have discovered a new species of damselfly in the Wayanad landscape of the Western Ghats, Kerala.

- It is Kerala's 191<sup>st</sup> recorded **odonate species**.
- **Family** – Euphaeidae.
- The team first observed the distinct morphotype of *Euphaea wayanadensis* at the **Kalindi River**, Thirunelli, in Wayanad district in 2013.
- **Morphology** - A longer black hind wing patch, broader and uninterrupted humeral and ante humeral stripes in males, and unique structural traits in the male genital vesicle.
- Genetic analysis also played a crucial role in confirming the species' status.
- **Habitat** - The species preferred fast-flowing streams with rocks and aquatic vegetation with evergreen and semi-evergreen tree growth on the banks to thrive.

### Odonate species

- Odonate species, commonly known as dragonflies and damselflies, are a group of insects belonging to the order Odonata.
- Odonates are predatory insects with 4 wings and are known for their vibrant colors and agility in flight.
- **Suborders** - Anisoptera (dragonflies) and Zygoptera (damselflies).
  - **Dragonflies (Anisoptera)** - Typically, larger and more robust, with eyes that touch on top of the head and wings spread out at rest.
  - **Damselflies (Zygoptera)** - Usually slenderer, with eyes separated and wings folded together along the body at rest.
- **Ecological Importance**- Odonates play a crucial role in freshwater ecosystems as both predators and prey, helping to control populations of other insects, including mosquitoes.
- **Global Distribution**- While they are predominantly found in warmer regions, some species thrive in habitats as far north as Canada.



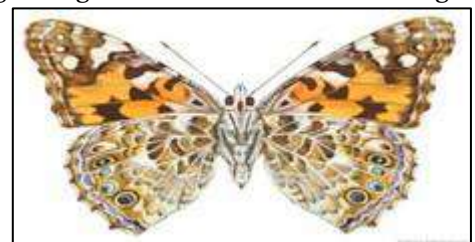
## 8.20 Painted Lady Butterfly

A recent study found that painted lady butterflies (*Vanessa cardui*) don't have significant genetic differences between short- and long-distance migrants.

- Painted Lady butterfly is a medium-sized butterfly belonging to the Nymphalidae family.
- It is renowned for its extensive migratory patterns and adaptability to various habitats.
- **Habitat** – Thrives in diverse environments, from temperate grasslands to deserts.
- They can be found on every continent except Antarctica and South America.
- **Conservation status** – Listed as Least Concern on International Union for Conservation of Nature's Red List.
- **Migratory Behaviour** – This species is a long-distance migrant, originating from areas like the desert fringes of North Africa, the Middle East, and Central Asia.
- Each year, it moves northwards, recolonizing mainland Europe and reaching Britain and Ireland.

### Key findings of the study

- **Isotope Tracking** – Scientist studied about the species using the ratios of the isotopes in the wings of species.
- Wings retain hydrogen & strontium isotopes from larval food/water, revealing birthplace.
- **No genetic difference in migration** – Short- and long-distance painted lady butterflies belong to a single interbreeding population.



- **Migration driven by environment** – *Distance covered depends on environmental factors, not genetics.*
- **Single migratory cycle** – Painted Lady butterfly can travel up to 15,000 km in a single migratory cycle, one of the longest insect migrations on the earth.
- **Multi-generational migration** – The full migration cycle spans 8–10 generations.
- **Super fly Adaptations** – Thoracic muscles like "bodybuilders" enable high-speed, high-altitude flights.
- *Wing shape/size doesn't predict migration distance.*
- **Different from bird migration** – Butterflies *don't return to a single breeding ground*, unlike birds.

A "single migratory cycle" refers an animal (like a bird) makes one round trip between two places—usually moving from a breeding area to a wintering area and back—due to seasonal changes or food needs.

### Phenotype

- **Phenotype** is a physical, biological, or behavioural characteristic shaped by genetics as well as environmental factors.
  - **Example** – Skin and hair colour in humans, vocal behaviour among birds, and the migratory patterns of some animals.
- *Scientists use phenotyping to study migration patterns* in butterflies.
  - **Example** – By examining butterfly wings, researchers can determine their place of origin based on isotopic composition.

## 8.21 Long-snouted vine snake

A rare long-snouted vine snake has been rediscovered in the Dudhwa Tiger Reserve in Lakhimpur Kheri, Uttar Pradesh.

- It is a species of long-snouted **arboreal and diurnal** snake.
- **Scientific Name** - Ahaetulla longirostris.
  - It is a member of the A. fusca clade and as a sister the species to A. laudankia.
- Previously, Ahaetulla longirostris had only been recorded once in Bihar and Odisha in 2024.
- **Appearance** – It can be bright green or orange brown. They typically have orange bellies.
- **Habitat** - These snakes live in forests as well as human-dominated areas like cities.
- **Distribution** - Commonly found in Southeast Asia.
- **Size** - Can reach a length of 4-feet.
- **Characteristics** - It has horizontal, keyhole-shaped pupils, which enhances their binocular vision, aiding them in hunting and navigating their arboreal environment.
- It is mildly poisonous, not very dangerous for humans.
- It is ovoviviparous, meaning it gives birth to live young after incubating eggs inside the female's body.
- **Distinction** - The new species differs from its congeners in bearing an elongate rostral appendage, green or ochre dorsum, orange-brown belly, and moderately keeled vertebral dorsal scale row.





### Dudhwa Tiger Reserve

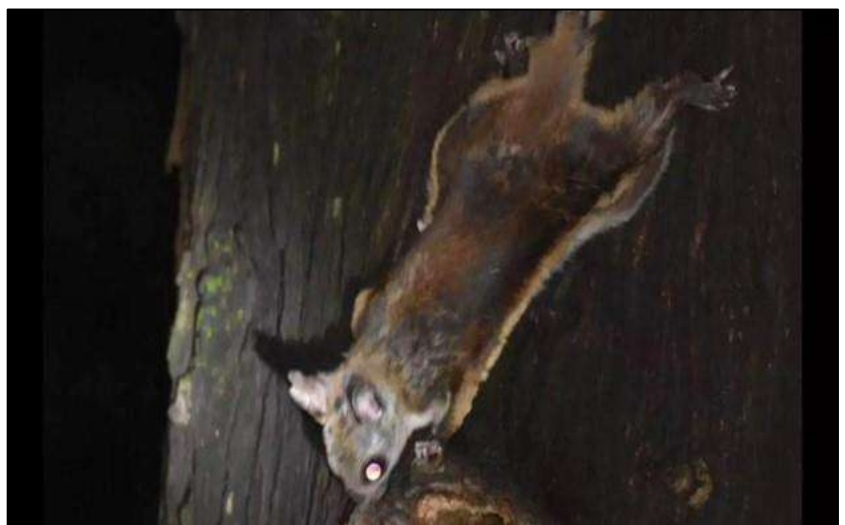
- Dudhwa Tiger Reserve, a protected area in Uttar Pradesh's Terai region.
- It encompasses Dudhwa National Park, Kishanpur Wildlife Sanctuary, and Katarniaghat Wildlife Sanctuary.
- **Established in** - 1988.
- **Rivers**
  - The Sharda River flows by the Kishanpur WL Sanctuary,
  - The Geruwa River flows through the Katarniaghat Wildlife Sanctuary and
  - The Suheli and Mohana streams flow in the Dudhwa National Park, all of which are tributaries of the Ghagra River.
- The reserve is home to some of the last remaining oxbow lakes, along with marshy grasslands, dry riverine grasslands, and dense, moist deciduous sal woodlands.
- It is a biodiversity hotspot, where various flora and fauna are interconnected through food chains and food webs across different niches.
- Katarniaghat now has the highest number of tigers in Dudhwa Tiger Reserve.

### 8.22 Woolly Flying Squirrel

Himachal Pradesh Forest Department (HPFD) has captured the first-ever photographic evidence of the elusive Woolly Flying Squirrel at Miyar Valley in Lahaul and Spiti district.

- **Scientific Name** - Eupetaurus cinereus.
- It is one of the rarest and least known mammals in Asia.
- It is also the largest flying squirrel, the longest squirrel and the heaviest of all gliding mammals.
- **Endemic to** - The north-western Himalayas.
- **Habitat** - Remote and uninhabited region of caves and crevices, found on steep cliffs in dry conifer forests.
- **Distribution** - Northern Pakistan and Northwestern India.
- **Appearance** - Similar to other species of flying squirrels, this animal features flexible membranes on either side of its body that link the front and back legs.
- Its body is adorned with a thick layer of straight, silky fur. The fur on its back is a blue-gray hue, while the underside is a lighter shade of gray.
- The throat and ears are covered in creamy white hairs, and the soles of its feet are lined with dense black fur, leaving only the bare, pinkish-brown toe pads exposed.
- **Behaviour** - This species is nocturnal and arboreal; due to its large size and blunt claws, this terrestrial mammal cannot climb trees.
- It was long believed to be extinct until it was rediscovered in 1994.
- **Diet** - These rodents are herbivores, they generally feed upon mosses, lichens, buds and cones.

Miyar Valley is located in the Western Himalayas and is a part of the Lahaul Range, located between Pir Panjal and Zaskar Range.





- **Conservation Status - IUCN** – Endangered.

### 8.23 Theobaldius Konkanensis

- It is a new species of cyclophorid (any snail in the family Cyclophoridae) land snail.
- **Endemic to** -Northern Western Ghats.
- **Habitat** - Found on the forest floor among leaf litter and on moist, decaying branches in tropical evergreen and semi-evergreen forests.
- **Behaviour** - It is active during the day and night.
- **Distinction** - It differs from all other Indian Theobaldius species.
- This species also tends to have a more elevated spire than other Theobaldius species.
- **Appearance** - Snail's shell is thick, conoidally depressed, widely umbilicated with regularly increasing whorls, corneous **yellow qin colour with brown striations**, collabrally striated periostracum that wears off in patches.
- **Distribution** - Theobaldius currently numbers 20 species and were distributed in India (9 species), Sri Lanka (11 species) and Sumatra (1 species) island in Indonesia.
  - **Species in India** - T. nivicola and T. orites - North-east India.
  - T. anguis, T. deplanatus, T. maculosus, T. ravidus, T. stenostoma, and T. tristis - endemic to the Western Ghats;
  - T. annulatus - occurs in both Sri Lanka and the Western Ghats.
- **Mating** - Most of the operculate land snails have separate sexes and **majority of land snails are hermaphrodite** (having both sex).
- Land snail and slug breed only in rainy season. They reproduce by cross-fertilisation as well as **self-fertilisation**.
- **Lifespan** - 2 to 7 years.
- **Significance** - Land snails are excellent bioindicators and are susceptible to climatic fluctuations.



### 8.24 Leptobrachium Aryatium

*Leptobrachium aryatium*, a new-to-science frog recorded from Garbhanga Reserve Forest on the southwestern part of Guwahati bordering Meghalaya.

- **Genus** – Leptobrachium.
  - It comprising a group of stocky frogs with broad heads, relatively short hind limbs, and distinctively coloured eyes, currently consists of 38 species.
  - It is widely distributed across Southern China and India to islands of the Sunda Shelf and the Philippines.
- **Nomenclature** –Named to honour Arya Vidyapeeth College's enduring contribution to education and science.

- **Appearance** – It has fiery orange-and-black eyes, a unique reticulated throat pattern, and a smooth, rhythmic call at dusk.
- **Distinction** - Scientific analysis of its appearance, DNA, and call patterns confirmed that this was a previously unknown species.



### Garbhanga Reserve Forest

- It is located **southwest of Guwahati**, near the Assam-Meghalaya border.
- The forest is dominated by evergreen and deciduous trees, bamboo groves, and medicinal plants.
- **Notable species** - Hoolock Gibbon, Leopards, Elephants, Deer species (barking deer and sambar deer), Various reptiles and amphibians (Rare frogs, snakes, and monitor lizards).
- **Threats** – Poaching, Timber smuggling, and illegal mining.

## 8.25 Mugger crocodile

Recently, Tamil Nadu Forest Department has conducted survey to map the population of mugger crocodiles in the state.

- The mugger crocodile (*Crocodylus palustris*) is a medium-sized broad-snouted crocodile, also known marsh crocodile.
- **Scientific name** – *Crocodylus palustris*
- **Distribution** – India (15 states), Sri Lanka, Pakistan, Nepal, Bangladesh and Iran.
- **Habitat** – They are primarily found in freshwater habitats like rivers, lakes and marshes.
- **Appearance** – The Mugger crocodile has the broadest snout among living crocodiles and it has a powerful tail and webbed feet.
- **Key populations** – Middle Ganga, Chambal River, Gujarat, Tamil Nadu's Cauvery delta
- **Diet** – Muggers primarily eats fish, crabs, insects, small fish.
- Adults consume amphibians, reptiles (snakes, turtles), birds, monkeys, deer, buffalo.
- **Characteristics** – Crocodiles eat minimally during winters, it is only during their breeding season in summers they become opportunistic predators and use all available resources as food.
- **Threats** – Habitat destruction, fishing equipment entanglement, illegal poaching for skin and meat and the use of body parts in medicine and human conflict.
- **Conservation**
  - **IUCN** – Vulnerable
  - **Wildlife Protection Act, 1972** – Schedule I
  - **CITES** – Appendix I.
- Tamil Nadu to set up **Crocodile Conservation Centre** at Anaikarai near Kollidam River.

### Survey by Tamil Nadu Government

- The Tamil Nadu Forest Department is conducting a study on mugger crocodiles in the Cauvery delta.
- To identify critical crocodile habitats in Tamil Nadu.
- To understand the crocodile-human conflict and propose long-term strategies for habitat conservation.
- Preliminary study has revealed that Tamil Nadu is home to a significant population of mugger crocodiles along Kollidam River.

## 8.26 Grizzled Giant Squirrel

*The Villupuram Forest Division, Tamil Nadu has planned to conduct a population study of the grizzled giant squirrel to provide a fillip to the long-pending demand for notifying the hills as a wildlife sanctuary.*

- It is a large tree squirrel, arboreal, crepuscular (active at dawn and dusk) and spend most of their time foraging in the canopy.
- **Scientific name** - *Ratufa macroura*.
- **Habitat** - Canopy of tropical and subtropical forests in South Asia.
- **Distribution** - Found in Central and Uva provinces of Sri Lanka, and in patches of riparian forest along the Kaveri River and in the hill forests of Karnataka, Tamil Nadu and Kerala states of southern India.
- **Appearance** - Grizzled giant squirrels are the smallest of the giant squirrels.
- It has a distinctive grizzled, grayish-brown fur on its back, with a creamy-white belly. Its fur is soft and dense, and its long bushy tail is usually darker than the rest of its body.
- **Characteristics** - They are agile climbers and jumpers, able to leap up to 6 metres between trees.
- Their bushy tail is used for balance while jumping and as a parachute while descending. They are also important seed dispersers for many plant species in their habitat.
- While males are generally larger than females, there are no significant physical differences between the sexes.
- **Diet** - Primarily herbivorous, feeding on fruits, nuts, and leaves.
- **Conservation Status**
  - **CITES** – Schedule II.
  - **WPA, 1972** – Schedule I.
  - **IUCN** - Near threatened.
- **Threats** - Habitat loss, Poaching and Pet Trade.

*Tamil Nadu Government  
established Grizzled Squirrel  
Wildlife Sanctuary in 1988.*



## Other Important Topics

### Malabar Grey Hornbill

- **Scientific name** – Ocyrceros griseus.
- It has large, curved bill and striking grey plumage.
- **Endemic to** – Western Ghats.

### IISc Creates 'Venom Maps' for Russell's Viper

Recently, Researchers at the Indian Institute of Science (IISc) have developed innovative "venom maps" for the Russell's viper, a highly venomous snake species.

- **Predicting Venom Variations with Climate Data** – These unique maps utilize local climate data to predict the specific characteristics of the Russell's viper's venom across different geographical regions.
- **Aiding Clinicians in Snakebite Treatment** – The primary goal of these venom maps is to assist clinicians in selecting the most effective antivenom treatment for snakebite victims, potentially improving patient outcomes.
- **Russell's Viper: Protected Under WPA** – It's important to note that the Russell's viper is classified as protected wildlife under Schedule II of the Wildlife Protection Act (WPA), 1972 in India.
- **Towards Targeted Snakebite Therapy** – This research represents a significant step towards a more targeted and effective approach to snakebite therapy, considering the geographical variations in venom composition.

### Rare Golden Tiger Sighted in Kaziranga

Recently, a rare golden tiger, also known as a golden tabby tiger, has been recently observed and photographed in Kaziranga National Park, located in Assam. This remarkable sighting highlights the unique biodiversity of the region.

- **Understanding the Golden Tiger** – It is not a distinct subspecies but rather an uncommon color variation of the Bengal tiger. It's striking golden hue and tabby stripes make it a visually exceptional animal.
- **Exclusive Wild Habitat** – Notably, all known wild golden tigers reside exclusively in Kaziranga National Park in Assam. This limited geographic distribution underscores their rarity and the importance of this habitat for their survival.
- **Genetic Basis of the Golden Color** – The distinctive golden coloration is attributed to a genetic mutation in the wideband gene. This mutation leads to an increased production of pheomelanin, the reddish-yellow pigment responsible for their unique appearance.
- **Inheritance of the Trait** – For a golden tiger to be born, both parent tigers must carry the recessive mutated gene. This specific genetic requirement contributes to the rarity of this color variant in the wild.

### Colossal Squid

Recently, a juvenile colossal squid was filmed alive for the first time in over a century. This historic sighting occurred at a depth of 600 meters in its natural Southern Ocean habitat.

- **Scientific name** – Mesonychoteuthis hamiltoni.
- **Classification** – Belonging to the Cephalopoda class, which also includes octopuses and cuttlefish.
- It is the planet's largest known invertebrate, a formidable deep-sea predator seldom seen alive.
- It possesses the largest eyes in the animal kingdom.
- **Habitat** – Deep waters of the Southern Ocean, particularly surrounding Antarctica.
- **Size & weight** – Reaches up to 14 meters in length and weighing as much as 500 kilograms.
- **Diet** – Feed mainly of large fish like the Patagonian toothfish and other squids.



- **Conservation status:**
  - IUCN – *Least concern*.

### *Cheetah Relocation*

*Recently, the Cheetah Project Steering Committee, formed by the NTCA in May 2023, has approved relocating cheetahs from Kuno National Park to Gandhi Sagar Wildlife Sanctuary in Madhya Pradesh, approximately 300 km apart.*

- **Aim** – To establish a meta-population of 60–70 cheetahs across a connected landscape spanning Kuno-Gandhi Sagar and parts of Rajasthan and Madhya Pradesh.
- **Project Cheetah** – Launched in 2022, involved translocating 8 cheetahs from Namibia and 12 from South Africa to Kuno National Park.
- **Kuno mortality** – So far, Kuno National Park has witnessed the death of 8 adult cheetahs and 5 cubs since the project's inception.
- **Concerns and challenges** – The decision comes amid concerns regarding prey availability in the new sanctuary, potential heat stress during transportation, and possible conflict with existing leopard populations.

### *Novel Archaeal Species*

*Recently, researchers have identified a new novel archaeal species Methanobrevibacter Intestini, offering insights into human-microbiome interactions.*

- It is a new archaeon species produces methane and succinic acid, a compound linked to inflammation.
- **Methanogens** – It is a subgroup of archaea, produce methane and are increasingly recognized as important components of the human gut microbiome.
- **Discovery of Methanobrevibacter smithii Variant** – It is named as GRAZ-2, which was isolated and found to produce formic acid, potentially disrupting other gut microbes.
- **Implications for microbiome dynamics** – The discovery of GRAZ-2 highlights the complex interactions within the gut microbiome and their potential influence on human health.

*Archaea are a unique life domain, separate from bacteria and eukaryotes, with distinct cellular and metabolic characteristics.*

### *New Snake Species*

*Recently, Herpetologist Fred Kraus was discovered a new arboreal snake species.*

- **Dendrelaphis anthracina** – It is a coal black tree snake on Sudest Island, Papua New Guinea which was observed defending itself against a goshawk.
- **Size** – 4-foot, 8-inch length.
- **Newly identified 3 Endemic Species** – It were identified within the Louisiade Archipelago:
  - **Dendrelaphis atra** – The atra tree snake is matte black with a white chin, reaching 4 feet, 1 inch found on Misima Island
  - **Dendrelaphis melanarkys** – It is known as black net tree snake (4 feet, 11 inches) has dark, net-patterned scales and orange eyes found on Rossel Island.
  - **Dendrelaphis roseni** – Rosen's tree snake, the smallest at 3 feet, 5 inches found on Woodlark Island.

### *New Labeo Fish Species*

*Researchers recently in Kochi identified 2 new freshwater fish species, Labeo uru and Labeo chekida, in the Western Ghats.*

- **Labeo uru** – Found in the Chandragiri River, is named for its sail-like fins.
- **Labeo chekida** – Locally known as 'kaka chekida' and found in the Chalakudy River.
- **Endemic species** – Both are endemic to their respective river systems.

- **Threats** – Posed by dams and habitat destruction, which threaten the survival of these unique species and the overall ecological health of the rivers.
- **Conservation status** – IUCN – It has not been formally determined.

## 9. SCIENCE & TECHNOLOGY

### PHYSICAL SCIENCE

#### 9.1 Twisted bilayer tungsten diselenide (tWSe<sub>2</sub>)

The researchers recently explored superconductivity in twisted bilayer tungsten diselenide (tWSe<sub>2</sub>).

- **Moire Pattern** - Even though the 2 layers of a moire material have the same arrangement of atoms, the misalignment caused by small twist produces a completely different pattern when seen from the top.
- This is called the moire pattern.
- **Super conductivity in moire material** - In moire materials, the moire pattern gives rise to new behaviours that are not present in the individual 2D materials alone.
- This is because the twist **leads to the formation of flat bands** in the electronic structure of the material.
- The electronic structure of a material describes how electrons in the material behave. The energy bands are a way to visualize the energy the electrons possess and how fast they move within the material.
- In moire materials, because the **bands are flat**, the electrons experience very little variation in energy. As a result, the electrons move slowly and are said to be heavy.
- These slower-moving electrons are more likely to interact with each other, creating strong electron-electron interactions that aren't seen in typical materials.
- These interactions can lead to the **formation of Cooper pairs**, where two electrons pair up across a short distance and move around as a single unit.
- This pairing is central to the phenomenon of superconductivity.
- Their coordinated movement helps them avoid scattering, a process where electrons collide with atoms or impurities in the material and deviate from their path, causing electrical resistance.
- On the other hand, Cooper pairs can travel through the material without scattering, leading to **zero resistance and energy loss**, and thus superconductivity.

#### Recent Findings

- The superconductivity is explored in a moire material created by stacking 2 layers of tungsten diselenide, a semiconductor, and rotating one layer by a small angle.
- The researchers used tWSe<sub>2</sub> with a twist angle of 3.65° to form a moire material.
- Then they examined how the electrons behaved when the material's electronic states were half-filled, a configuration strongly associated with superconductivity in moire materials.
- They also examined the behaviour of the electrons when the energy gap between the sublattices within the material is small, since this influences the superconducting properties.
- **Features - Temperature** - The researchers found that tWSe<sub>2</sub> was a robust conductor with a **transition temperature** of around -272.93° C.
- **Insulating property** - The superconductivity in tWSe<sub>2</sub> occurs precisely when the electronic states are half-filled.
- The team also found that the moire material could transition to **an insulating (non-conducting)** state by altering the electronic properties of the material.

**Sublattices** are smaller grids of groups of atoms within the material.

The **transition temperature** is the critical value below which a material enters the superconducting state, exhibits zero electrical resistance. Conventional superconductors transition around -250° C

- **Coherence Length** - The material had a coherence length ***about 10-times longer than other moire materials***, meaning that its superconducting state is not fragile.
- For tWSe<sub>2</sub>, superconductivity is driven by electron-electron interactions and half-band filling, while graphene-based systems depend on flat bands and electron-lattice interactions.
- As a result, while graphene-based systems become superconducting at higher temperatures, tWSe<sub>2</sub> is more stable.

## 9.2 CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart)

*In recent times, threat actors have been leveraging fake CAPTCHAs to distribute the Legion-Loader malware, ultimately leading to the installation of a malicious browser extension designed to steal sensitive user data.*

- CAPTCHA is a security mechanism that presents challenges easy for humans to solve but difficult for machines.
- It was introduced in the early 2000s, with Luis von Ahn and his team filing the first patent in 2003.
- CAPTCHA protects websites from automated attacks and prevents bots from accessing sensitive user data.

### Evolution

- **Initial Phase** – Early CAPTCHAs primarily used distorted text for human verification.
- **re-CAPTCHA (2009)** – Utilized words from scanned books for verification, simultaneously helping digitize printed texts.
- **Invisible reCAPTCHA (2014)** – Google introduced this version which analyzed user behavior patterns such as mouse movements to determine human identity, reducing user friction.
- **Modern CAPTCHAs** – Now include image recognition tasks, puzzles and behavioral analysis techniques.

### Working Mechanism

- CAPTCHA is fundamentally based on the Turing test concept.
- **Turing Test** – A method proposed by Alan Turing in 1950 for determining if a machine can exhibit intelligent behavior indistinguishable from a human's.
- Modern CAPTCHAs leverage the cognitive gap between human perception and machine learning capabilities.

### Limitations

- **AI Advancement** – Sophisticated bots can increasingly bypass CAPTCHA systems using machine learning algorithms.
- **Accessibility Issues** – Presents significant challenges for people with visual, auditory, or cognitive disabilities.
- **User Experience** – Poorly designed CAPTCHAs cause frustration and may reduce website engagement.

### Way Forward

- **Adaptive Security** – Development of context-aware verification that adjusts difficulty based on risk assessment.
- **Inclusive Design** – Creation of multimodal CAPTCHAs that accommodate various disabilities while maintaining security.
- **Behavioral Analysis** – Increasing reliance on passive verification through user behavior patterns rather than explicit challenges.
- **Integration with Other Security Measures** – Combining CAPTCHAs with multi-factor authentication and risk-based authentication systems.

## 9.3 Cu-Phen

*Indian scientists at CSIR-Central Leather Research Institute (CLRI), Chennai have recently developed specialized Nano-sized particles called Cu-Phen that mimic the function of natural enzymes in our bodies.*

- **Enzymes** – Are nature's catalysts, essential biological molecules that speed up chemical reactions vital for life.

- **Artificial enzymes** – Also known as nanozymes, which mimic the natural functions of enzymes using nanomaterials.
- These nanozymes hold immense potential in fields ranging from medicine to energy.

### Challenge with First-Generation Nanozymes

- Earlier nanozymes often faced significant hurdles, limiting their practical application, especially within biological systems.
- A key challenge was their lack of specificity, often stemming from poorly defined "active sites" which are the parts responsible for the catalytic activity.
- This lack of precision could lead to:
  - Uncontrolled Electron Transfer
  - **Generation of Harmful Byproducts** – Leakage of electrons often resulted in the production of toxic Reactive Oxygen Species (ROS).
  - ROS can cause oxidative stress, damaging cells and contributing to various diseases and aging.
- These limitations posed risks, particularly for therapeutic applications, necessitating the development of next-generation nanozymes with better control and safety profiles.

### Working Mechanism

- Cu-Phen is meticulously self-assembled from copper ions ( $\text{Cu}^{2+}$ ) coordinated with ligands (a molecule that binds to another) derived from the amino acid phenylalanine.
- It interacts precisely with **cytochrome c**, a vital protein in the mitochondrial electron transport chain (the cell's primary energy-generating pathway).
- It binds to cytochrome c in a specific manner, similar to natural enzyme-substrate interactions.
- It facilitates the efficient transfer of electrons from cytochrome c.
- These electrons are then used to reduce oxygen directly to water ( $\text{H}_2\text{O}$ ), the safe end-product seen in natural cellular respiration.

### Significance & Potential Applications

- **Well-Defined Active Site** – Unlike its predecessors, Cu-Phen features a precisely engineered and defined active site. This structural precision is key to its enhanced function.
- **Overcoming Limitations** – Its specific design enables controlled electron transfer, mimicking the efficiency of natural enzymes involved in cellular energy pathways.
- Crucially, this controlled process avoids the generation of harmful ROS.
- **Health & Therapeutics** – Its ability to function efficiently without producing harmful ROS makes it a prime candidate for safer biomedical applications.
- **Bioenergy** – Precise control over electron flow is fundamental to energy conversion.
- Cu-Phen could contribute to developing more efficient biocatalysts for sustainable energy production or understanding and manipulating cellular energy pathways.
- **Biotechnology & Environment** – Cu-Phen can guide the development of advanced artificial enzymes for various biotechnological processes and potentially environmental remediation tasks requiring specific catalytic activity.

## 9.4 Real-time LAMP (rt-LAMP) Assay

Researchers at the Thiruvananthapuram-based Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) have developed and tested cost-effective, rt-LAMP assay for early diagnosis of TB.

- It is a novel **molecular test** with high sensitivity and specificity for **early diagnosis of Tuberculosis (TB)**.
- It was able to detect TB DNA even when only 10 copy numbers were present per microlitre in a sample.
- Researchers used fluorescent dye Syto 16 (commonly used in laboratories for analyzing cells and various biological samples), which does not hinder the reaction, effectively addressing the persistent problem of false negatives observed in previous LAMP tests.



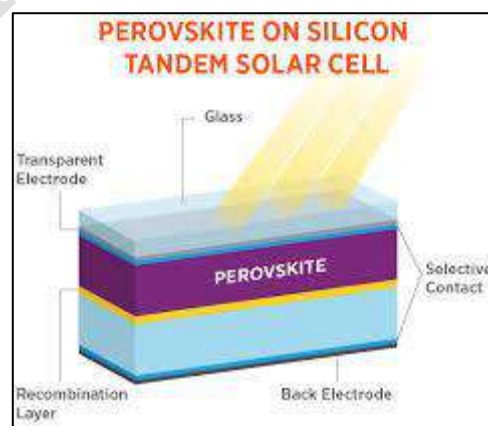
- Unlike RT-PCRs that require 3 different temperature settings to complete a test, the rt-LAMP test works at a single temperature.
- 6 primers used for amplification compared with two in the case RT-PCRs, the rate of amplification is high.
- Results of positive samples can be obtained in 10-20 minutes.
- **Approval Status** – It has been licensed to the industry for production.
- It has received approval from the Central Drugs Standard Control Organisation (CDSCO).
- It is currently being validated by the Indian Council of Medical Research (ICMR).
- The WHO Health Technology Access Pool program is currently evaluating the technology.

## 9.5 Perovskite Solar Cells

Recently scientists have developed a water-based recycling solution for perovskite solar cells.

- **Perovskite solar cells** – A perovskite solar cell is a third-generation solar cell that employs a metal halide perovskite compound as a light absorber.
- Perovskite solar cells are made up of multiple layers.
- The perovskite layer can conduct and transport charges is sandwiched between metal electrodes and glass sheets.
- They are a class of semiconductor materials are known for their unique optical, superconductivity and electronic properties.
- **Advantages** – They are cheaper to produce than silicon-based solar panels and offer higher efficiency in energy conversion.
- **Disadvantages** – But they contain toxic elements like lead that require careful disposal and have shorter lifespans than traditional solar panels.
- Perovskite materials are extremely unstable towards ambient (humidity and oxygen) conditions that restrict their commercialisation.
- **Recycling** – The components of the solar cells are recycled to minimize the emission and lower cost associated with solar energy generation.
- By recycling the components of a perovskite solar cell can be used for as long as possible, to minimise waste and promoting circular economy.
- Currently they are recycled using the toxic organic solvents.

Metal halide perovskites (MHPs) were first discovered by Russian mineralogist L. A. Perovski.



### The new water-based recycling process

- Dissolving and recycling the lead-containing perovskite layer in water was a major challenge to overcome.
- For this, the scientists added three key salts to help in the recycling process.
- **Sodium acetate** – It binds with lead ions in solar cells to form lead acetate, which is easily soluble in water.
- **Sodium iodide** – It helps in repairing and restoring degraded perovskite compounds.
- **Hypophosphorous acid** – It acts as a long-term stabilizer.
- **Ethanol and ethyl acetate solutions** – They are also used to dissolve other components.
- **Results of the new method** – Scientists recovered approximately 99% of different layers after multiple recycling rounds.
- Recycled materials-maintained efficiency comparable to fresh materials even after five recycling cycles.

Stabilizer is a substance that either prevents or slows down reactions, thus enhancing the stability of a system.

### Quick facts

### Carbon-based perovskite solar cells

- Indian scientists have indigenously developed highly stable, low-cost Carbon-based perovskite solar cells with superior thermal and moisture stability.
- The sensitivity of perovskite materials toward humidity and thermal stress is a major obstacle for practical implementation.
- Carbon-based perovskite solar cells (CPSCs) have been successful in minimizing device stability issues.
- It also reduces the fabrication costs.

## 9.6 Coenzyme Q (ubiquinone)

*Recent study reveals that CRISPR-edited rice producing CoQ10, coenzyme can play critical role in human food.*

### Enzymes and Coenzymes

- **Enzymes** – These are proteins that catalyse reactions in a cell, making metabolism efficient.
- **Coenzymes** – Many enzymes require some molecules as cofactors, for efficient functioning. These helper molecules are called coenzymes.
- They are naturally occurring non-protein molecules organic molecules that bind to and support enzyme activity.
- **Types** – Based on the chemical nature, coenzymes can be classified as
  - Vitamins or vitamin-derived coenzymes (Eg, NAD<sup>+</sup> and NADP<sup>+</sup> are derived from vitamin B<sub>3</sub>).
  - Nonvitamins or metabolite coenzymes.

- **Coenzyme Q (ubiquinone)** – It is a metabolite coenzymes type of coenzymes that is present in every cell membrane.
- It is a fat-soluble and water insoluble naturally occurring molecule.
- **Types** - It comes in 10 different types (CoQ1 to Q10).
- **Function** – All these coenzymes play a vital role in the function of the mitochondrion, which is the powerhouse of a cell.
- **CoQ9** – It is a rich source of nutrition and is abundant in cereals (wheat, rice, oats, barley, corn, rye, millet) and plants like bamboo and avocado.
- **CoQ10** – It is critical for high-energy organs like the heart, supports the mitochondrial electron transport chain.
- While humans naturally produce CoQ10, most plant-based foods like rice and wheat primarily synthesize CoQ9.
- The researchers used CRISPR gene editing to modify the native Coq1 gene in rice, specifically targeting the "DdsA" gene.
- This modification allows the rice to synthesize the desired CoQ10.
- **Advantages** - Developing CoQ10-enriched crops offers a cost-effective and sustainable way to enhance nutritional value and improve health benefits.
- The gene-edited rice demonstrated over 75% CoQ10 accumulation in both grains and leaves.
- This offers a potential solution for increasing CoQ10 intake in the diets of individuals, particularly those at risk of deficiency.
- Supplementing CoQ10 has been shown to help patients with neurological problems.

## 9.7 Indigenous HPV Test Kits for Cervical Cancer Screening

*Indigenous HPV (Human papillomavirus) test kits for cervical cancer screening were launched recently in New Delhi.*

- **Objective** – To enable affordable, accessible, and ideally mass screening for cervical cancer.

- **Developed by** - Biotechnology Industry Research Assistance Council (BIRAC) under Department of Biotechnology's (DBT) partnership programme Grand Challenges India (GCI).
- Developed in collaboration with International Agency for Research on Cancer (IARC).

*The Grand Challenges initiative launched by Bill & Melinda Gates Foundation drives innovation (BMGF) to tackle critical health issues in developing nations.*

### Key Features of the Test Kit

- **Focused screening** – The kits include only the 7-8 most common cancer-causing HPV types, making the screening more focused and relevant to the Indian population.
- **RTPCR-based diagnostic** – The kits use RTPCR (Real-Time Polymerase Chain Reaction) technology, which is known for its high sensitivity and specificity in detecting viral genetic material.
- **Efficient and cost-effective** – The focused approach on the most relevant HPV types and the use of existing RTPCR infrastructure make these kits a cost-effective screening method.
- **Point-of-care test** – The testing is conducted close to the site of patient care where care or treatment is provided.

*In 2012, BMGF and DBT signed an MOU to launch Grand Challenges India, to foster health research and innovation.*

*The International Agency for Research on Cancer is an intergovernmental agency is a part of World Health Organization founded in 1965 to conduct and coordinate research on causes of cancer.*

### Cervical Cancer in India

- Cervical cancer is a cancer that develops in the cervix, the lower part of the uterus.
- **Caused by** - Human PapillomaVirus (HPV).
- 2<sup>nd</sup> most common cancer among Indian women.
- According to WHO data, 1 in every 5 women globally suffering from cervical cancer is from India,
- 25% of global cervical cancer deaths occurring in India often due to late diagnosis.
- WHO recommends transitioning to HPV testing with only two tests in a lifetime (at age 35 and 45) to reduce the burden of screening, making it easier for women to access screening programs.
- **Target** - Screen 70% of eligible women by 2030.

## 9.8 Quantum Gravity Gradiometers (QGGs)

*Recently, NASA scientists are exploring the use of advanced cold atom-based QGGs deployed on satellites to precisely measure shifts in Earth's mass distribution, particularly those caused by climate change.*

- It is a highly sensitive instrument that measures spatial variations in gravitational acceleration.
- **Functions** – To cool atoms near absolute zero in a vacuum, inducing wave-like behavior.
- Lasers manipulate these atoms, causing a phase shift directly proportional to the local gravitational force.
- **Application** – It is used in resource exploration to locate less dense hydrocarbon deposits, this technology is now being adapted for climate change monitoring.
- **Measurement capability** – This sophisticated setup allows for the detection of minuscule differences in acceleration, as small as 10–15m/s<sup>2</sup> over a one-meter distance, enabling highly sensitive gravity measurements.
- **Monitoring Earth's mass distribution** – From low Earth orbit, QGGs can estimate the mass of significant geological formations like the Himalayas and monitor the movement of water, ice, and geological materials with unprecedented accuracy.
- The gravitational force across Earth's surface is not uniform; it varies based on the underlying mass distribution.
- Denser regions, such as mountain ranges, exhibit a stronger gravitational pull compared to less dense areas.

## 9.9 New Method to Estimate Helium Abundance in the Sun

*Recent Study conducted by researchers from the Indian Institute of Astrophysics (IIA), reliably estimate Helium abundance in the Sun.*

- **Helium** – It is the 2<sup>nd</sup> most abundant element in the Sun after Hydrogen.
- But the accurate measurement of helium abundance in the Sun's photosphere has been a longstanding challenge.
- Traditional estimates relied on indirect methods, such as:
  - Extrapolation from hotter stars.
  - Measurements from the solar corona and solar wind.
  - Seismology studies of the Sun's interior.
- **Reason** - Helium does not produce observable spectral lines from the Sun's visible surface (photosphere).

### New Methodology

- They analyzed high-resolution solar spectrum data from
  - Neutral magnesium (Mg) atomic lines and magnesium hydride (MgH) molecular lines.
  - Neutral carbon (C) atomic lines and hydrocarbon (CH and C<sub>2</sub>) molecular lines.
- **Relative consistency** - The technique is based on the principle of elemental abundance consistency between atomic and molecular forms of the same element.

### Key Findings

- The research confirmed a helium-to-hydrogen ratio of approximately 0.1.
- It also confirmed that for every 10 hydrogen atoms in the Sun, there is about 1 helium atom.

### Significance

- This could be a major step in assessing the opacity of the Sun's photosphere.
- Validates previously assumed helium abundance values with direct evidence.
- Estimating accurate models of solar structure and evolution, as helium content significantly influences a star's lifetime, energy production, and evolutionary path.
- Solar helium measurements help constrain theories about Big Bang nucleosynthesis and the early universe's elemental production.

## 9.10 RNA-based antiviral for Plant Virus

*Researchers recently reported developing an RNA-based antiviral agent that confers strong protection against cucumber mosaic virus (CMV).*

- **Plant virus** – It is a microscopic, infectious agent that causes diseases in plants.
- It destroys a significant portion of annual crops worldwide.
- Unlike bacteria or fungi, viruses cannot be controlled with pesticides or fungicides.
- **Cucumber Mosaic Virus (CMV)**

- CMV is a plant virus that infects more than 1,200 plant species, including critical food crops like cucumbers, squash, and cereals, and medicinal plants.

*In India, CMV causes 25-30% yield losses in banana plantations.*

- **Spread through** - sap-sucking insects called aphids.
- **Effects** - Infected plants develop mosaic discoloration, stunted growth, and commercially unviable fruits.
- **Severity** - Nearly 90 aphid species are capable of transmitting CMV, making outbreaks difficult to contain.

## Current RNA-based Crop Protection Techniques



- **RNA Silencing** – It is a **natural defense mechanism** in plants.
- When a virus infects a plant, it introduces **double-stranded RNA (dsRNA)**.
- The plant responds by activating Dicer-like enzymes (DCLs), which slice the dsRNA into small fragments called **small interfering RNAs (siRNAs)**.
- These siRNAs guide the plant's defense system to recognize and destroy viral RNA.
  - **Limitations** – Not all siRNAs are effective, and some plant viruses can mutate rapidly.
- **Host-induced gene silencing (HIGS)** – It works by **genetically modifying plants** to produce virus-fighting dsRNA in their cells.
  - **Limitations** - High production costs.
- **Spray-induced gene silencing (SIGS)** - More flexible alternative to HIGS where plants are treated with **RNA sprays** instead of being genetically modified.
  - **Limitations** - Traditional dsRNA Spray formulations produce a random mix of siRNAs, and many are ineffective.

### Key Findings of the Research

- Researchers first screened and identified the **most potent siRNAs** against CMV.
- These specially selected siRNA bind to the virus's genetic material to trigger a stronger antiviral response.
- Then they designed **effective dsRNA (e-siRNAs)** enriched with **highly functional siRNA**.
- These e-siRNAs were assembled into dsRNA constructs for more **targeted protection**.
- CMV infected plants treated with the **enhanced siRNA had** almost **80% lower viral load**.
- The new dsRNA formulation outperformed traditional dsRNA and it is effective against multiple CMV strains.

### Advantages of the New Approach

- More **precise targeting of viral particles** of the most vulnerable genetic regions.
- Stronger defense by targeting multiple regions of viral genome simultaneously.
- The effective dsRNA can be redesigned in about a month to target new viral strains.

### Other Important Topics

#### Third Launch Pad (TLP)

Recently, the Union Cabinet approves the establishment of Third Launch Pad (TLP).

- **Location** – **Sriharikota**.
- It is expected to be completed **within 4 years**.
- **Need** – Next Generation Launch Vehicle (NGLV) is under development, which is **about 90 m tall** with a maximum lift-off mass of **1000 tonne**.
- Existing launch pads at Sriharikota is **not designed** to launch this class of vehicles.
- **Features** – Foundation support & servicing requirements for future augmentation supports the launches of India's Crewed Lunar mission.

#### MeitY's Deepfake Report to Delhi High Court

Ministry of Electronics and Information Technology (MeitY) has submitted a status report to the Delhi High Court, addressing the escalating issue of deepfake technology and its associated risks.

- **Understanding Deepfake Technology** – Utilizes artificial intelligence, specifically generative adversarial networks (GANs), to create synthetic media that manipulates or replaces real content with fabricated, highly realistic versions.

- **Deepfake Creation Process** – Involves data collection, feature learning, synthesis and manipulation, and refinement using GANs, where AI models compete to enhance realism, ultimately producing convincing fake content.
- **Key Concerns Highlighted by MeitY** – Report emphasizes the lack of a uniform definition for "deepfake," hindering regulatory and detection efforts.
- It also raises serious concerns about the targeted use of deepfakes against women during elections, leading to privacy violations and harmful content dissemination.
- **Proposed Mitigation Strategies** – To focus on developing detection technologies, enhancing legal frameworks.
- To promote public awareness to combat the spread of misinformation and protect individuals from malicious deepfake usage.

### ***Gaia's Retirement: A Milestone in Galactic Mapping***

*European Space Agency (ESA) has retired its Gaia space observatory, which significantly advanced our understanding of the Milky Way.*

- **About the Gaia Mission** – Gaia, launched in December 2013, was an ESA operated astrometry mission designed to create a precise 3D map of the Milky Way.
- **Mission Objectives and Scope** – Its primary goal was to chart the galaxy, tracking positions, distances, movements, and characteristics of over 2 billion stars, and to study the Milky Way's formation and future.
- **Key Scientific Discoveries** – Gaia provided a detailed 3D map of the Milky Way, revealed a new class of "dark" black holes, confirmed stellar collisions impacting galactic evolution, and catalogued over 1.5 lakh asteroids.
- **Lasting Legacy and Data Utilization** – Despite mapping only 2% of the Milky Way, Gaia's data will continue to drive astronomical discoveries for decades through future data releases.

### ***Y2K Bug Crisis***

*Recently, the Minister of Commerce & Industry recalled how Indian IT sector leveraged the Y2K bug crisis of late 1990s, to mark IT sectors emergence on the global stage.*

- **Y2K bug** – It was a computer flaw, or bug emerged due to the erstwhile practice followed in computer to store the dates in two-digit format.
  - For instance, to refer 1970, the number "19" was left out and only the number '70' was used.
- Engineers shortened the date because data storage in computers was costly and took up a lot of space.
- **Issue** – As the year 2000 approached, computer programmers realized that computers might not interpret 00 as 2000, but as 1900.
- Y2K stands for Year 2000, where letter 'k' is commonly used to represent the number 1,000.
- It is also known as the Millennium Bug.

### ***Antar Drishti***

*Recently, Antar Drishti was inaugurated in New Delhi.*

- It is a unique sensory dark room specially designed to experience sensory space.
- **Launched by** – National Institute for the Empowerment of Persons with Visual Disabilities (NIEPVD) and National Association for the Blind (NAB).
- **Aims** – To raise awareness and sensitize society towards the challenges faced by persons with visual impairments.
- To foster empathy, understanding, and inclusion by bridging the gap between perception and lived reality.
- **Feature** – In this dark room, individuals experience complete darkness and engage in activities that help simulate the everyday experiences of persons who are blind or have low vision.

### ***Enable Inclusion App***

*The National Institute for the Empowerment of Persons with Visual Disabilities (NIEPVD) will implement the Enable Inclusion App.*

- It is a digital platform for early identification, intervention, and tracking of children with developmental disabilities.
- **Developed by** – Amar Seva Sangam.
- **Role** – It is expected to revolutionize early intervention, tele-counseling, tracking and rehabilitation planning.
- It is setting a benchmark for inclusive practices across India and beyond.
- It has been successfully used across various communities to support intellectual and developmental needs.

### ***iCAST-25 (Integrated Cyber Advanced Security Techniques)***

*Recently, a two-day workshop iCAST-25 was organized at Shimla.*

- It is a Cyber Security Workshop for state police leaders of the Himachal Pradesh Government.
- **Organized by** – Ministry of Electronics and Information Technology (MeitY) and the Government of Himachal Pradesh.
- **Aim** – To promote digital literacy, empower individuals, and bridge the digital divide across Himachal Pradesh.
- **Role** – It aligns with the Government of India's mission to create a cyber-resilient public sector, ensuring a robust digital infrastructure and resilient e-governance services across states.

### ***Integrated Financial Advisors (IFA) System***

*Recently, the Defence Secretary highlighted the role of integrated financial advisors in driving transparency.*

- **Introduced in** – 1975, in various Ministries of Government of India
  - Department of Defence – 1983.
- **Objectives** – To provide independent financial inputs to the Competent Financial Authorities (CFAs) to enable transparency, accountability and responsiveness in defence financial system.
- To enhance capital acquisition outcomes, multifaceted challenges confronting in the Military Engineer Services.

### ***Himalayan High Altitude Atmospheric and Climate Research Centre***

*Recently, the Himalayan High Altitude Atmospheric and Climate Research Centre was launched.*

- It is the 1<sup>st</sup>-ever High-Altitude Climate Research Station in India.
- **Objectives** – To understand the cloud formation, weather patterns, and aerosol interactions.
- **Joint initiative of** – Union Ministry of Earth Sciences, J&K Forest Department, Central University of Jammu and Swiss National Science Foundation.
- **Location** – Nathatop in Jammu and Kashmir (J&K), at an altitude of 2,250 meters above sea level.
- This location was chosen for its clean air and minimal pollution.

### ***ICE-CRUNCH – Indo-Swiss Joint Research Project***

*As of part of recent launch of the Himalayan High Altitude Atmospheric and Climate Research Centre, the ICE-CRUNCH project was flagged off.*

- **ICE-CRUNCH** – Ice nucleating particles and cloud condensation nuclei properties in the North-Western Himalayas.
- It is a joint research initiative between Indian scientist and ETH Zurich in Switzerland.
- **Nodal Ministry** – Ministry of Earth Sciences.
- **Aim** – To explore the properties of ice nucleating particles and cloud condensation nuclei in the region.

- To understand the *role of aerosols in cloud microphysics* and their broader implications on climate systems and precipitation in the Himalayan region.
- **Role** – It will provide the 1<sup>st</sup> set of measurements for Himalayan High Altitude Atmospheric and Climate Research Centre.

*Cloud condensation nuclei are critical components in cloud formation and precipitation processes.*

### Kavach 5.0

*Recently, the Railway Ministry announced the launch of 'Kavach 5.0 for Mumbai's suburban trains.*

- **Kavach** – It is an indigenous Automatic Train Protection (ATP) system to enhance railway safety.
- **Developed by** – Research Designs & Standards Organisation (RDSO).
- **Aim** – To prevent train collisions and over speeding by automatically initiating brake application when necessary.
- **Kavach 5.0** – It is a new and an advanced version, currently under development.
- It will be implemented to increase the number of Mumbai local trains by 30%.

### Mirror Science Explained by IIT Physicist

*Recently, an IIT Kanpur physicist elucidated the science behind mirrors using electron behavior and quantum mechanics, aligning with the International Year of Quantum Science and Technology 2025.*

- A mirror is a smooth surface designed to reflect the majority of incident light, producing clear images through specular reflection, where light bounces off at an equal angle.
- **Material Composition of Mirrors** – Mirrors are typically constructed with a transparent glass front and a thin metallic backing, often made of silver or aluminum. The glass protects the reflective metal layer.
- **The Mechanism of Reflection** – Mirrors function based on the law of reflection. Free electrons within the metal layer uniformly interact with incoming light, causing specular reflection and forming a virtual image that appears behind the mirror.
- **Understanding Image Formation** – Mirrors generate a virtual image, a perception created by the way reflected light reaches our eyes. Contrary to common belief, mirrors reverse front and back, not left and right.

### Ironwood Tensor Processing Unit (TPU)

*Recently, Google has introduced Ironwood, its 7<sup>th</sup>-generation TPU, specifically designed to accelerate the processing of artificial intelligence models.*

- Ironwood is the latest TPU, engineered exclusively for high-performance AI workloads.
- **Developed by** – Google Cloud's AI Infrastructure team.
- **AI-specific architecture** – As an ASIC chip, Ironwood is built to efficiently process tensors, the fundamental data structures in machine learning, making it highly specialized for matrix operations and neural networks.
- **Enhanced processing capabilities** – Ironwood significantly reduces the time required for AI model training, potentially cutting down processes that previously took weeks to mere hours.
- **Integration and scalability** – Serving as a crucial component of the Google ecosystem, Ironwood powers AI in services like Google Search, YouTube, and DeepMind. Its full integration with Google Cloud enables cloud-ready scalability for large-scale AI applications.

### Flue Gas Desulphurisation

*A study commissioned by the Principal Scientific Adviser suggests the Union Environment Ministry should reverse its 2015 policy mandating FGD installation in all coal-fired plants.*

- **Flue Gas Desulphurisation (FGD)** – FGD is a process used in fossil-fuel power plants to remove sulfur compounds, particularly sulfur dioxide (SO<sub>2</sub>), from exhaust emissions using absorbents.



- **Wet Process Dominance** –The wet process, often using lime or limestone slurry in a scrubber tower, is the primary FGD method for large power plants, achieving up to 95% SO<sub>2</sub> removal.
- **Why FGD is Necessary** –Burning fossil fuels releases sulfur into the atmosphere as sulfur dioxide (SO<sub>2</sub>), a major air pollutant.
- **Environmental Impacts of SO<sub>2</sub>** – SO<sub>2</sub> contributes to acid rain, harming forests, water bodies, soils, and aquatic life, and also causes corrosion and weathering.
- **Importance of SO<sub>2</sub> Removal** – Removing sulfur dioxide is crucial for creating a safe and clean environment by limiting toxic emissions.

### Enzymes & Co-enzymes

- **Enzymes** – They are proteins that catalyse reactions in a cell, making metabolism efficient.
- For efficient functioning, many enzymes require some molecules as cofactors.
- These helper molecules are called coenzymes.
- **Coenzymes** – They are naturally occurring organic molecules that bind to and support the activity of enzymes.

### Digital Connectivity in Ladakh

*Recently, Indian Army has successfully provided 4G and 5G mobile connectivity to remote border communities in Ladakh, including challenging terrains and the Siachen Glacier.*

- **Aim** – To uplift remote border villages by fostering local economies, promoting tourism, and improving access to vital services.
- **Collaboration** – The Army collaborated with Telecom Service Providers and Ladakh administration, utilizing optical fiber infrastructure to install mobile towers, including a 5G tower in Siachen.
- **Coverage** – The mobile network extends to strategically important and remote areas like Galwan Valley, DBO, Chumar, Batalik, and Dras, enhancing connectivity near the LAC.
- **Significance** – This initiative addresses the critical need for improved communication in high-altitude areas, particularly for troops facing isolation and harsh conditions.
- It sets a precedent for future infrastructure projects in remote areas, highlighting the importance of digital connectivity in national development and improving lives in high-altitude regions.

## SPACE

### 9.11 Neutrinos

*The AMoRE experiment in South Korea has reported not finding evidence of neutrino less double beta decay, imposing stringent limits on this elusive subatomic event.*

- **Neutrinos** – They are the 2<sup>nd</sup>-most abundant subatomic particle in the universe, after photons, the particles of light.
- They were produced in abundant amounts during the Big Bang event.
- They are produced in radioactive decay, when massive stars explode, and when cosmic rays strike the earth's atmosphere.
- They are also made during nuclear fusion; the sun alone is responsible for flooding every square centimetre on the earth with 60 billion neutrinos each second.
- These particles are also extraordinarily hard to catch because they interact very weakly and very rarely with matter.
- **Weight** – Unknown.
- **Types** – It come in three flavours, or varieties, and the differences between the squares of their masses is known, but not the individual masses themselves.

- **Anti-Particle**- A subatomic particle having the same mass as a given particle but opposite electric or magnetic properties.
- If two of them meet, they will annihilate each other in a flash of energy.
- **Majorana particle** – It is a type of fermion that, gets its mass through a self-interaction mechanism that does not involve the Higgs field.
- **Key feature** – Majorana fermions must be their own antiparticle, where the particle and its anti-particle are identical.
- Since antiparticles typically have opposite electric charges to their corresponding particles, Majorana fermions can only be neutral particles.
- **Majorana hypothesis** – As a result, neutrinos are often considered as potential candidates for being Majorana particles, since they are neutral.
- This has led to several experiments attempting to find evidence of Majorana neutrinos through neutrino less double beta decay.
- **Double beta decay** – It typically involves a nucleus emitting 2 protons, 2 electrons and 2 anti-neutrinos.
- **Neutrino less Double Beta Decay ( $0\nu\beta\beta$ )** – It is a rare nuclear process where two neutrons decay into two protons and emit two electrons, but no anti-neutrinos are produced.
- For  $0\nu\beta\beta$  to occur, neutrinos must be their own **anti-particle**.
- Here the neutrino emitted by one neutron is absorbed as an anti-neutrino by the other neutron, allowing the decay to proceed without emitting an anti-neutrino.
- **Significance** – If  $0\nu\beta\beta$  is observed, it would prove that neutrinos are Majorana particles, because such a decay can only happen if neutrinos and anti-neutrinos are the same.
- Ongoing experiments like the **AMoRE experiment** aim to detect  $0\nu\beta\beta$  by looking for the distinct energy signatures and confirming if neutrinos are indeed Majorana particles.

Higgs field gives mass to fundamental particles such as electrons and quarks. Particles gain mass by interacting with the Higgs field and the strength of the interaction is proportional to mass of the particle.

## 9.12 Saturn

Astronomers have discovered 128 new moons around Saturn, increasing its total count to 274 moons.

- Saturn is the **second-largest planet** in the solar system.
- **Position**- 6<sup>th</sup> planet from the Sun.
- **Type**- Gas giant.
- It is surrounded by a beautiful ring system.
- **Size** - With an equatorial diameter of about 74,897 miles (120,500 kilometers), Saturn is 9 times wider than Earth.
- **Distance** - Saturn is 9.5 Astronomical Units (AU) away from the Sun.
- **Mass**- 95 times the mass of Earth.
- **Composition**- Mostly hydrogen and helium, similar to Jupiter.
- **Density**- The **least dense planet** in the Solar System (it could float in water).
- **Orbit & Rotation** - One day on Saturn takes only **10.7 hours**.
- **Orbital Period**- Takes **29.5 Earth years** to complete one orbit around the Sun.
- **Moon system of Saturn**
  - **Total Moons**- 274 (after the recent discovery of 128 new moons).
  - **Largest Moon**- Titan (2,159 miles across).
  - **Other Major Moons**- Enceladus is known for its subsurface ocean and icy plumes.

One astronomical unit (abbreviated as AU), is the distance from the Sun to Earth.

- Many newly discovered moons are small (as tiny as 2 miles across) and follow irregular, retrograde orbits.
- **Discovery - Observation in 2023** - Conducted using the Canada-France-Hawaii Telescope at **Mauna Kea, Hawaii**.
- **Tracking Technique**- Scientists observed patches of space near Saturn and tracked the motion of small moon-like objects over time.
- **Characteristics of the new moons**
  - All are irregular moons – meaning they have highly inclined orbits and travel backward (retrograde motion).
  - Some moons are as small as 2 miles across.
  - The discovery suggests these moons are remnants of cosmic collisions that happened 100 million years ago.
- The **International Astronomical Union (IAU)** has officially ratified the newly identified moons.

#### International Astronomical Union

- **Established in** – 1919.
- **Mission**- Promote and safeguard astronomy through research, education, and international cooperation.
- **Headquarters** - Paris, France.
- **Governance**
  - **General Assembly (Every 3 years)** defines long-term policy
  - **Executive Committee** implements decisions
  - **IAU Officers & Secretariat** handle day-to-day operations
- **India is an active member in IAU.**

### 9.13 Biomass Mission

*Biomass mission will lift off soon aboard the Vega C rocket from Europe's spaceport in French Guiana.*

- Biomass is an **Earth explorer satellite** mission to map the world's forests.
- **Launched by** - European Space Agency (ESA).
- **Aim** – It will provide information about the state of the planet's forests and how they are changing, which will help expand the knowledge about the role forests play in the carbon cycle.
- It will also observe the movement of ice sheets in Antarctica, and generate digital models of terrains covered by dense vegetation.
- **Orbit** - It will be placed in a **sun-synchronous orbit (SSO)**, a type of orbit in which satellites are in sync with the Sun at an altitude of around 666 km.
- **Instrument used** - **Synthetic aperture radar (SAR)**, a satellite imaging technique which uses radar waves to map the Earth's surface.
- This SAR sensor will operate in the long-wave P-band frequency range, with a wavelength of 70 cm.
- Therefore, unlike other shorter-wave SAR sensors, the P-band SAR will be able to peer down through forest canopies to assess how much carbon is stored on the floor and branches of the trees in the world's forests and to assess how levels are changing.
- The sensor will also estimate the amount of forest biomass.
- Biomass is the 1<sup>st</sup> satellite in the world to **host a P-band SAR**.
- Biomass will address the huge technical challenge of mapping forest biomass from space.

### Earth Explore program

- The satellites launched under this program are meant to provide essential information about Earth's interior, cryosphere (frozen parts), hydrosphere, atmosphere, ionosphere and land surface.
- **Gravity field and steady-state Ocean Circulation Explorer (GOCE)** - The first spacecraft mission took off in 2009 and worked till 2013.
- The mission helped further research in areas of ocean circulation, physics of Earth's interior, etc.
- **Earth Cloud Aerosol and Radiation Explorer (EarthCARE) mission** - Launched in May 2024.
- It contributes to a better understanding of Earth's radiative balance in climate, among other things.

#### 9.14 Microbial Conditions on K2-18 b

*Researchers utilizing the James Webb Space Telescope have detected possible bio-signature gases in the atmosphere of exoplanet K2-18 b hinting at the presence of microbial life.*

- **Recent Findings** - The atmosphere of the planet holds chemical signatures of gases that, on Earth, are exclusively generated through biological activities, primarily microbial life such as marine phytoplankton algae.
- The two gases
  - Dimethyl sulfide, or DMS, and
  - Dimethyl disulfide, or DMDS
- The gases were detected at atmospheric concentrations of more than 10 parts per million by volume.
- To ascertain the chemical composition of an exoplanet's atmosphere, astronomers analyze the light from its host star as the planet passes in front of it from the perspective of Earth, called the **transit method**.
- Earlier observations by Webb had identified methane and carbon dioxide in K2-18 b's atmosphere, the first time that carbon-based molecules were discovered in the atmosphere of an exoplanet in a star's habitable zone.

#### K2-18 b

- It is an **exoplanet** (orbits a star outside of our own solar system) found in a habitable zone, a distance where liquid water, a key ingredient for life, can exist on a planetary surface.
- **Discovered by** - Kepler Space Telescope in 2009.
- Constellation – Leo.
- **Location** - It orbits the red dwarf star K2-18, located approximately 124 light-years away from Earth.
- **Size & weight** – It is with a radius 2.6 times that of Earth and a mass 8.6 times greater.
- **Type of Planet** – It is part of the "sub-Neptune" class of planets, with a diameter greater than Earth's but less than that of Neptune, our solar system's smallest gas planet.

*A light-year is the distance light travels in a year, 9.5 trillion km.*

#### James Webb Space Telescope (JWST)

- It is the largest and most powerful infrared space telescope ever built.
- **Joint project by** - NASA, the European Space Agency (ESA), and the Canadian Space Agency (CSA).
- **Launched in** - December 2021.
- **Location** - JWST is positioned at the Sun-Earth L2 Lagrange point, a stable location for observation and minimal orbital adjustments.
- **Objective** - To study the formation of stars and galaxies, examine exoplanet atmospheres, observe the early universe, and explore the origins of life.
- **Infrared Focus** - Unlike Hubble, which primarily observes visible and ultraviolet light, JWST is optimized for infrared, enabling it to see through dust clouds and observe objects far beyond Hubble's reach.

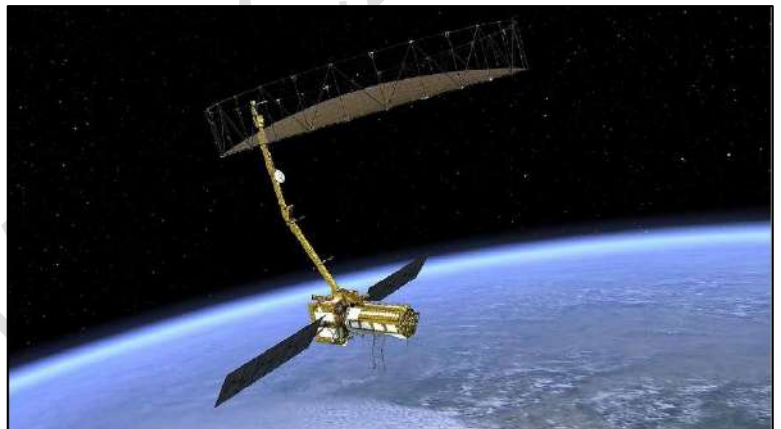
#### 9.15 NISAR (NASA-ISRO Synthetic Aperture Radar) Mission



ISRO Chairman V Narayanan has recently confirmed that the satellite is scheduled for launch in June 2025 from Srihari Kota.

- **NISAR** – NISAR is the 1<sup>st</sup> collaboration between NASA and ISRO for a **joint Earth observation satellite mission**.
- **Aim** - To deliver exceptionally precise, high-resolution image of Earth's dynamic surface to observe and understand natural processes (solid Earth, ice masses, and ecosystems).
- **Launch vehicle** – GSLV-F16 rocket.
- **Key specification**
  - **Dual-band radar** – NISAR uses dual-band radar frequencies (L-band and S-band) to map the Earth's surface.
  - Together, they provide comprehensive Earth observations by capturing different aspects of surface features.
  - **Orbit**– Sun-synchronous, low Earth orbit (LEO) at an Altitude of 747 km.
  - **Repeat cycle** – It will scan nearly the entire globe every 12 days.
  - **Mission life** – 3 years.
- **Contributions - NASA** – It provides the L-band radar, reflector antenna, deployable boom, communication subsystem, GPS receivers, recorder, and data subsystem.
- **ISRO** – It provides the S-band radar and handles calibration and data processing.
- ISRO is also **providing launching service** with its GSLV Rocket.
- **Significance** – Measuring land deformation from earthquakes, landslides, and volcanic activity.
- It will monitor,
  - The movement of glaciers and ice sheets
  - Forest and wetland changes
  - Soil moisture and water resources
- Detecting surface changes with centimeter-level precision through dense clouds and vegetation.
- It provides critical data for both scientific research and disaster management.
- The mission will help us to understand the global carbon cycle.

**L-band** (25-centimeter wavelength) detects larger features like tree trunks and penetrates vegetation, while **S-band** (10-centimeter wavelength) detects smaller features like leaves and rough surfaces.



### 9.16 LEDA 1313424, Bullseye Galaxy

A team of international researchers recently discovered a galaxy with nine rings, named Bullseye.

- It is a collisional ring galaxy discovered recently by NASA's Hubble Space Telescope.
- **Size** - It is nearly **2.5-times larger than the Milky Way** with a diameter of 250,000 light-years.
- **Type** - Spiral galaxy.
- A blue dwarf galaxy, positioned at the center-left of the image, is believed to have interacted with the Bullseye Galaxy approximately 50 million years ago.
  - It results in the distinctive shape of the Bullseye Galaxy.
- A thin trail of gas connecting the two galaxies even though they are separated by 130,000 lightyears (or 1.22 billion billion km).
- The blue dwarf galaxy's straight path through the Bullseye Galaxy caused gas in the latter to ripple back and forth in waves, creating new places of star formation.

- The interaction didn't alter the orbits of individual stars but it caused groups of stars to pile up and form the distinct rings over millions of years.
- Bullseye hosts a lot of neutral hydrogen gas, considering its mass in stars.
- That reservoir of star-forming material is similar to known *low surface brightness galaxies*, strengthening the notion that collisional ring galaxies evolve into these fainter objects as their rings fade.
- The Bullseye Galaxy will continue to evolve and, as a result, will have these star-filled rings only for a short interval of time.
- This means the astronomers captured an intriguing image of a multi-ring galaxy in a special moment.
- Bullseye Galaxy also contains signs that it could one day evolve into a giant low surface brightness (GLSB) galaxy, which are important in the study of dark matter.

*Giant low surface brightness (GLSB) galaxies are the largest of the low surface-brightness galaxies. All GLSB galaxies are truly colossal.*

### Other Important Topics

#### Gaganyaan Mission : Astronaut Safety

*The recent return of NASA astronauts Sunita Williams and Barry Wilmore highlights the critical role of safety protocols in human spaceflight. ISRO is now prioritizing similar measures for its Gaganyaan mission.*

- **3 Phases of Human Spaceflight** – Launch, Orbit, and Re-entry.
- Each phase necessitates specific and stringent safety protocols to ensure astronaut well-being.
- **Launchpad emergency measures** – Drawing lessons from tragedies like the Apollo-1 fire, ISRO has implemented launchpad safety measures, including ziplines and fireproof lifts for rapid evacuation.
- **Crucial emergency exit system** – A key safety feature during launch is the emergency exit device. The human-rated launch vehicle incorporates a tower-like Crew Escape System for quick detachment of the crew module during emergencies.
- **Crew escape system functionality** – The Crew Escape System utilizes two motors: the Low-altitude Escape Motor (LEM) and the High-altitude Escape Motor (HEM), activating based on the altitude of the emergency. Pad aborts involve both motors for swift evacuation.
- **Historical precedents** – Incidents like the Soyuz T-10 launch abort and Blue Origin's NS-23 mission underscore the proven effectiveness and vital importance of robust crew escape systems in safeguarding astronauts during launch emergencies.

#### Lyrid Meteor Shower, 2025

*India is set to witness the Lyrid Meteor Shower, 2025, an annual event known for bright meteors and fireballs, occurring every April, which is expected to peak on the night of April 21 into the early hours of April 22.*

- It is one of the oldest recorded celestial events in human history, with observations dating back over 2,700 years.
- It occurs when the Earth passes through debris from Comet C/1861 G1 (Thatcher).
- **Comet C/1861 G1 (Thatcher)** – It is a sand-sized fragments burn up in the atmosphere, creating meteors. Typically, 10-20 meteors per hour are seen at its peak, with occasional outbursts and lingering dust trails.
- **Observation** – To maximize viewing, find a dark location with a clear view of the north-eastern sky and the naked eye is sufficient to enjoy this cosmic display.
- **Viewing locations** – Hill stations, remote areas in Himachal Pradesh, Uttarakhand, Rajasthan, and the Northeast, national parks, and rural countryside with a clear north-eastern horizon are ideal.

#### Asteroid Donaldjohanson

*Recently, NASA's Lucy spacecraft is preparing for a flyby of the asteroid Donaldjohanson and it is a significant milestone in its 12-year mission to explore ancient asteroids.*

- **Located in** – 139 million miles from Earth within the asteroid belt between Mars and Jupiter.
- It is formed about 150 million years ago.
- **Asteroid characteristics** – During the flyby, Lucy gathered vital data, primarily focusing on determining the precise size and shape of Donaldjohanson.
- Scientists anticipate a unique form, potentially like a bowling pin or a snowman.
- **Lucy Mission** – Launched in 2021 and it is the 1<sup>st</sup> spacecraft to explore the Trojan asteroids.
- **Aim** – To study primitive asteroids orbiting in tandem with Jupiter, remnants from the solar system's formation, acting as time capsules of early planetary conditions.
- **Importance of the upcoming flyby** – The Donaldjohanson flyby serves as a crucial preparatory phase for Lucy's future encounters with the Trojan asteroids near Jupiter, allowing for instrument testing and preliminary data collection.

### ***Lunar Nuclear Power Plant***

*China and Russia intend to construct a nuclear power plant on the Moon to provide energy for their joint International Lunar Research Station (ILRS).*

- **Aim** – To conduct research in lunar geology, astronomy, space environment observation, fundamental science experiments, and lunar resource utilization.
- **Participation** – Currently, 17 countries and international organizations, along with over 50 research institutions.
- **Capabilities** – It will feature essential capabilities including,
  - Earth-Moon transportation, a robust energy supply system, centralized control, communication, navigation, and ground support.
- **"555 Project" Invitation** – Their plan includes the "555 Project," an initiative to invite 50 countries, 500 research institutions, and 5,000 researchers to participate in the ILRS.

### ***Extraordinary Bullseye Galaxy***

*LEDA 1313424, or the Bullseye Galaxy, is a captivating giant elliptical galaxy located 567 million light-years away in the Pisces constellation.*

- It stands out due to an unprecedented phenomenon: nine glowing star rings encircling its core.
- **Basic Characteristics** - Approximately 2.5 times larger than our Milky Way, the Bullseye Galaxy spans about 250,000 light-years in diameter. Its defining feature is the spectacular series of stellar rings, resembling a cosmic bullseye.
- **Formation Through Galactic Collision** - Scientists believe these unique rings formed from a violent galactic collision. Around 50 million years ago, a smaller blue dwarf galaxy plunged through the Bullseye's center, triggering a ripple effect. This compressed gas and initiated waves of new star formation, leading to the distinct rings.
- **Unprecedented Number of Stellar Rings** - While typical ring galaxies might have one to 3 rings, the Bullseye Galaxy boasts nine distinct stellar rings, an unprecedented number that makes it a unique subject in galactic studies.

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### 3D Microscope for Glaucoma Surgery

*Army Hospital (Research and Referral), New Delhi, has pioneered the use of a 3D microscope in India for minimally invasive glaucoma surgery.*

- **Understanding Microscopes** - A microscope magnifies small objects, revealing details invisible to the naked eye, utilizing light or electron manipulation through refraction, diffraction, or digital imaging.
- **Science Behind Magnification**- Microscopes employ lenses or sensors to focus light or electron beams, generating enlarged images of minute structures for detailed observation.
- **Types of Microscopes** - Various types exist, including optical microscopes using light, electron microscopes using electron beams (TEM, SEM), digital microscopes capturing digital images, and 3D microscopes offering spatial visualization.
- **About 3D Microscopes** - 3D digital microscopes capture multiple focal planes to construct high-resolution, three-dimensional images of specimens. They use 3D polarization glasses and a 4K display.
- **Advantages of 3D Microscopy** - Benefits include enhanced surgical precision, lower complication rates, improved surgeon comfort, and eco-friendly operation with reduced light exposure and power usage.

## DEFENCE

### 9.17 Saras Mk2 Aircraft

*The Saras Mk2, an updated version of an India-designed civilian aircraft, is set to test-fly in December 2027*

- Saras Mk2 is a 19-passenger, **versatile civilian aircraft**, upgraded version of Saras MK 1.
- It is the first Indian multi-purpose civilian aircraft in the light transport aircraft category.
- **Aim** - It enhances regional **air travel throughout India**, particularly targeting tier-2 and tier-3 towns that have limited airport facilities.
- **Developed by** - CSIR–National Aerospace Laboratories (CSIR–NAL) under the Ministry of Science and Technology.
- **Manufacturing assistance** - Hindustan Aeronautics Limited (HAL).
- **Objective** - To foster domestic civilian aircraft production, decrease reliance on imports, and support the UDAN (Ude Desh ka Aam Naagrik) initiative for improved regional air connectivity.
- **Speed** – Maximum cruise speed of 500kmph and stall speed of 180kmph.
- **Weight** – 7.5 tons.
- **Endurance** – 6 hours with a service ceiling of 29,000ft.
- **Key Features**
  - **Enhanced Model** - An upgraded version of the original 14-seater Saras, which first took to the skies in 2004, featuring redesigned aerodynamics and optimized engine placement.
  - **Versatile Applications** - Capable of functioning as a commuter aircraft, air ambulance, or for charter services in remote areas.
  - **Indigenous Components** - Avionics provided by Genesis, with brake and environmental systems developed internally by CSIR–NAL; composite wings are also produced in-house.
  - **Twin Prototype Strategy** - Two aircraft will be constructed to expedite certification processes and reduce developmental delays.



- **Digital and Modular Architecture** - Features a CSIR-NAL-developed aircraft computer, allowing for future integration of automation and AI enhancements.
- **Significance**
  - **Enhance Regional Aviation** - Facilitates air connectivity to underserved areas, in line with the government's UDAN objectives.
  - **Revitalize Civil Aviation Research and Development** - Strengthens India's role as a technology innovator in the civilian aviation sector.
  - **Decrease Foreign Dependency** - Provides a domestic alternative to imported aircraft such as the Dornier or ATR.
  - **Offer Cost-effective Aviation Solutions** - Well-suited for short-haul routes, increasing passenger capacity in low-demand markets.
  - **Foster Defence-Civil Collaboration** - The Indian Air Force has expressed interest in acquiring 15 units, promoting integration between civil and military production efforts.

### 9.18 Gaurav Glide Bomb

Defence Research and Development Organisation (DRDO) has successfully conducted the release trials of the long-range glide bomb "Gaurav" from the Sukhoi aircraft.

- Gaurav is a **long-range glide bomb** designed for precision strikes **on land targets** from a safe distance, specifically beyond the reach of enemy air defenses.
- **Developed by** – DRDO in partnership with the Armament Research and Development Establishment (ARDE), Research Centre Imarat, and the Integrated Test Range.
- **Features - Range** - Capable of operating between 30 km and 150 km, with successful demonstrations nearing 100 km.
- **Weight** - The winged variant, Gaurav, has a mass of 1,000 kg, while the non-winged version, Gautham, weighs 550 kg.
- **Navigation** - It employs an **Inertial Navigation System (INS)** complemented by satellite guidance and digital control mechanisms.
- **Importance for India's Defence**
  - This system significantly boosts the Indian Air Force's (IAF) ability to conduct stand-off strikes.
  - It minimizes the exposure of fighter aircraft to enemy air defenses, thereby enhancing operational safety.
  - Furthermore, it reinforces India's capabilities in developing indigenous smart munitions and supports precision targeting, which is crucial in contemporary warfare.

### Other Important Topics

#### SAFE Agromet Project

The ASEAN Food Security Information System (AFSIS) has recently appreciated ISRO and other space agencies for the successful implementation of the SAFE Agromet Project.

- **AFSIS** – It is a project led by Thailand, with support from ASEAN, China, Japan, and the Republic of Korea.
- It aims to develop satellite-derived Agromet data in comparison with in-situ data.
- **SAFE (Space Applications for Environment)** – It is a multilateral project, led by the Indian Space Research Organization (ISRO).
- **Aim** – To provide high-quality space-based agrometeorological (agromet) information including extreme events such as flood or drought for end-users to evaluate rice crop growth.

### Successful VLSRSAM Flight Test

Recently DRDO and the Indian Navy successfully tested the Vertically-Launched Short-Range Surface-to-Air Missile (VLSRSAM) at ITR Chandipur, Odisha.

- **Indigenous Development and Purpose** – VLSRSAM is an indigenously developed missile designed for short-range air defence, capable of engaging low-altitude aerial threats.
- **Advanced Technology** – The missile features an indigenous Radio Frequency seeker, enhancing target acquisition and engagement precision.
- **Test Execution and Results** – Launched from a land-based vertical launcher, it successfully engaged a high-speed aerial target, demonstrating Near-Boundary-Low Altitude capability and high agility.
- **Significance for Indian Defence** – This successful test marks a significant advancement in India's defence capabilities, strengthening its short-range air defence systems.

### Indian Naval Ship (INS) Sunayna

Recently, INS Sunayna was deployed as a part of Mission IOS SAGAR and set to sail from Karwar, Karnataka.

- It is an Indian Navy Offshore Patrol Vessel (NOPV)
- It comes under Saryu-class Offshore Patrol Vessel (OPV).
- **Developed by** – Goa Shipyard Limited.
- **Mission** – It is carrying 44 naval personnel from 9 Friendly Foreign Nations (FFNs).
- It would be undertaking port calls at Dar-es-Salaam, Nacala, Port Louis, Port Victoria and Male and Joint surveillance of Exclusive Economic Zones (EEZs) of Southwest IOR.

### Mission IOS SAGAR

- **IOS SAGAR** – Indian Ocean Ship (IOS) SAGAR (Security & Growth for All in the Region).
- It is an initiative towards continued cooperation with Indian Ocean Region (IOR) nations.
- **Objectives** – To bring together the navies and maritime agencies of the Southwest IOR on an Indian Naval platform.
- To provide comprehensive training to sea-riders from the Friendly Foreign Nations (FFNs) and marks an unprecedented collaboration in maritime security.

### INS TRIKAND Medical Mission

Recently, INS TRIKAND was deployed to render critical medical assistance to a Pakistani crew of a Fishing Vessel (FV) to the east of the Oman coast

- It is a stealth frigate operating in the Central Arabian Sea.
- **Mission** – The Medical Officer of INS Trikand, along with a team comprising MARCOS (Marine Commandos) and the Ship's Boarding Team, boarded the FV to administer aid.
- Additionally, medical supplies, including antibiotics, were provided to the FV to ensure the crew's well-being until they reached their destination.

### Mi-17 V5 helicopters

Recently, the Ministry of Defence has signed a contract with Bharat Electronics Limited for acquisition & installation of Electronic Warfare (EW) suites and aircraft modification kits on Mi-17 V5 helicopters.

- It is a Russian made aircraft purchased for the Indian Air Force (IAF).
- **Role** – It is designed to carry personnel, cargo and equipment inside the cargo cabin or on an external sling.
- **Features** – Night vision technology, on-board weather radar, a new PKV-8 autopilot system, and a KNEI-8 avionics suite which helps reduce pilot workload.

- **Top speed** – 250 kilometres per hour.

### ***Gaurav – Long-Range Glide Bomb (LRGB)***

Recently, the Defence Research and Development Organisation (DRDO) has successfully conducted the trials of Gaurav from a Su-30 MKI aircraft.

- **LRGB ‘Gaurav’** – It is a 1,000 kg class glide bomb.
- **Indigenous production** – It is indigenously designed and developed by DRDO's Research Centre Imarat, Armament Research and Development Establishment, and Integrated Test Range, Chandipur.
- **Range** - The trials successfully demonstrated range close to 100 kms with pin-point accuracy.



### ***India's BM-04 Missile***

India's DRDO recently unveiled the BM-04, a next-generation short-range ballistic missile (SRBM) akin to the Agni-P, specifically targeting Pakistan with conventional capabilities.

- **Technical Specifications** – The BM-04 is 10.2m long, weighs 11,500 kg, and has a 1,500 km range with a 500 kg conventional warhead and 30m CEP.
- It utilizes a two-stage solid-fuel system and a six-wheel Transporter Erector Launcher (TEL) for launch.
- **Advanced Features** – Likely a hypersonic missile with AI assistance, the BM-04 can be upgraded with new technologies.
- Its manoeuvrable re-entry vehicle that is designed to evade enemy air defences, enabling strikes on time-sensitive targets.
- **Strategic Implications** – A potential pre-emptive strike posture against Pakistan's military assets and critical infrastructure from a safer distance.

### ***Acoustic Test Facility (ATF)***

Recently, the Underwater Acoustic Test Facility (ATF) at the National Institute of Ocean Technology (NIOT) has attained global recognition and international certification.

- **Established in** – 2004.
- It is the only facility accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL).
- **Objective** – To enhance ocean observation capabilities, supports tsunami detection systems, and reinforces national security.
- It includes precise testing and calibration of a wide range of underwater acoustic instruments such as hydrophones, transducers, and acoustic modems.
- **Significance** – ATF is India's only facility accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) for hydrophone calibration.
- **Underwater Acoustic Test Facility (ATF)** – It is crucial for ensuring measurement accuracy across strategic sectors.
- In the field of underwater acoustics under the International Bureau of Weights and Measures (BIPM), Paris, have recognised the underwater ATF facility of CSIR-NPL.

### ***Siachen Day: Honoring the Siachen Warriors***

Recently, Siachen Day was observed on April 13<sup>th</sup> to commemorate the unwavering courage and resolve of Indian soldiers stationed in the Siachen Glacier, the world's highest battlefield.

- **Commemorating Operation Meghdoot** – This day specifically marks the anniversary of Operation Meghdoot, launched on April 13, 1984. The operation saw the Indian Army successfully secure the Siachen Glacier, preempting Pakistan's attempts to seize strategically vital locations.
- **Significance of India's Strategic Control** – Siachen Day underscores India's strategic control over the glacier, particularly the crucial Bilafond La and Sia La passes. It highlights the dedication of soldiers serving in extremely challenging conditions.
- **Background to the Historic Mission** – Operation Meghdoot was initiated in response to Pakistan's cartographic aggression and intelligence indicating their plans to capture key passes. The Indian Army's proactive operation secured India's presence in the region.
- **A Legacy of Courage and Sacrifice** – As 2025 marks the 41<sup>st</sup> anniversary, Siachen Day serves as a poignant reminder of the sacrifices and heroism of the "Siachen Warriors," inspiring generations with their indomitable spirit.

### ***GPS Spoofing Targets IAF Aid Mission***

*Recently, Indian Air Force (IAF) aircraft involved in delivering aid to earthquake-stricken Myanmar under Operation Brahma reportedly encountered GPS spoofing attacks, highlighting significant airspace cybersecurity vulnerabilities.*

- **Understanding GPS Spoofing** – It is a cyberattack that transmits counterfeit GPS signals to deceive receivers about their actual geographical position. This manipulation involves broadcasting stronger, fake signals that overpower genuine satellite signals, leading to inaccurate location readings.
- **How Spoofing Works** – GPS receivers determine location by processing signals from orbiting satellites. Spoofers exploit this by transmitting fabricated GPS signals. When these fake signals are stronger, the receiver locks onto them, generating false location data for the affected device.
- **Serious Implications of Spoofing** – GPS spoofing carries substantial risks. In aviation, it can misdirect aircraft, endangering flight safety. It can also disrupt logistics, compromise defense and surveillance operations, and negatively impact consumer applications relying on location services.

### ***DUSTLIK-VI Military Exercise***

*Recently, the 6th edition of the India-Uzbekistan Joint Military Exercise, DUSTLIK-VI, commenced at the Foreign Training Node in Aundh, Pune.*

- **Aim** – To significantly enhance the interoperability and foster greater cooperation between the armed forces of India and Uzbekistan.
- **Participating contingents** – The Indian contingent comprises 60 personnel from a battalion of the JAT Regiment and units of the Indian Air Force. Uzbekistan is represented by personnel from its army.
- **Focus of the current edition** – DUSTLIK-VI will concentrate on Joint Multi-Domain Sub-Conventional Operations within a semi-urban environment, simulating various counter-terrorism scenarios.
- **Simulated operations** – It will involve territory capture, establishing a joint operations center, population control, raids, search-and-destroy missions, and the coordinated utilization of air assets.
- **Technology and Strategic Elements** – It will also include the deployment of drones, counter-UAS systems, Air Force logistics support, heliborne operations, and special forces missions, promoting tactical and technical exchange.

### ***Operation ATALANTA***

*Recently, European Union Naval Force (EUNAVFOR) under Operation ATALANTA has suggested a joint maritime exercise with the Indian Navy.*

- **Timing and Location** – The proposed naval drill is expected to take place around the end of May 2025 in the Western Indian Ocean and Red Sea region.
- **Goal of Enhanced Cooperation** – The primary aim is to improve coordination and maritime cooperation between European and Indian naval forces, especially concerning piracy and regional instability.
- **Advanced Drill Scope** – The exercise, if approved, will go beyond standard PASSEX and include advanced tactical maneuvers, counter-piracy operations, and inter-naval communications training.



- **Context of Piracy Resurgence** – Renewed piracy threats near the Horn of Africa, coupled with Houthi activity in the Red Sea, necessitate stronger maritime coordination.
- **About Operation ATALANTA** – Launched in 2008, it is the EU's counter-piracy mission in the Western Indian Ocean and Red Sea with an expanded mandate including protecting WFP vessels, enforcing the Somalia arms embargo, and combating various illegal maritime activities.

### *Exercise Desert Flag-10*

*Recently, Indian Air Force (IAF) has deployed a contingent to Al Dhafra Air Base in the UAE for Exercise Desert Flag-10.*

- It is a prestigious multinational air combat exercise, hosted by UAE Air Force.
- **Aim** – To facilitate the exchange of operational knowledge and best practices among participating air forces.
- **Participation** – It includes contingents from eleven other nations, fostering a rich training environment.
- **IAF Aircraft Deployment** – It includes combat-proven MiG-29 fighter jets and Jaguar strike aircraft, showcasing diverse capabilities.
- **Enhancing Global Military Cooperation** – India's participation underscores its commitment to strengthening military ties and operational readiness through international collaboration.
- **Exercise Desert Flag-10** – It emphasizes complex and diverse fighter engagements simulating realistic combat scenarios.

### *New Hydrogen-Based Explosive*

*Recently, China has successfully tested a 2-kilogram hydrogen-based explosive device, showcasing non-nuclear military potential.*

- **Developed by** – China State Shipbuilding Corporation's (CSSC).
- **Explosive capabilities** – The device produces a white-hot fireball lasting over two seconds, 15 times longer than TNT, and reaches temperatures exceeding 1,000 degrees Celsius, enabling extensive thermal damage.
- It utilizes magnesium hydride as its key material.
- **Mechanism of sustained detonation** – It causes magnesium hydride to decompose, releasing and igniting hydrogen.
- The blast shatters the hydride, with fragments continuing to release hydrogen, creating a self-sustaining explosion and allowing for controlled intensity.
- **Military Applications** – This weapon can be used to clear dispersed forces or target high-value assets like bridges and fuel depots.
- China has established a mass production facility for magnesium hydride in Shaanxi.

### *Successful Missile Test by INS Surat*

*Indian Navy's guided missile destroyer INS Surat recently conducted a successful test-firing of a medium-range surface-to-air missile in the Arabian Sea, demonstrating its operational capabilities.*

- **Commissioned in** - Indian Navy in January 2025.
- **Design and Construction** - The warship was indigenously designed by the Navy's Warship Design Bureau and expertly built by Mazagon Dock Shipbuilders in Mumbai, highlighting domestic shipbuilding prowess.
- **Project 15B Destroyer** - INS Surat is the 4th and final ship of the Project 15B stealth guided missile destroyer class, also known as the Visakhapatnam class, marking a significant advancement in India's naval power
- **Indigenous Content** - It is equipped with cutting-edge weapon-sensor packages and advanced network-centric capabilities
- **Design and Construction** - The warship was indigenously designed by the Navy's Warship Design Bureau and expertly built by Mazagon Dock Shipbuilders in Mumbai, highlighting domestic shipbuilding prowess.

### **DRDO has achieved a significant advancement in scramjet engine technology**

Recently, DRDL Hyderabad achieved a major milestone in hypersonic technology by successfully ground-testing an active cooled scramjet combustor for over 1,000 seconds at the newly built state-of-the-art Scramjet Connect Test Facility at Hyderabad.

Key points about hypersonic missiles:

- Hypersonic missiles travel at or above Mach 5 (five times the speed of sound).
- Their key differentiating feature from ballistic missiles is their manoeuvrability during flight.
- Unlike ballistic missiles that follow a predictable trajectory, hypersonic missiles can adjust their course to reach the target.
- There are two main types: Hypersonic Glide Vehicles (HGVs) and Hypersonic Cruise Missiles.
- HGVs are launched by a rocket and then glide, while hypersonic cruise missiles use scramjet engines for sustained high-speed flight after reaching their target.

#### **Scramjet Combustor**

- Scramjets are advanced ramjets generating thrust through supersonic airflow and combustion, ideal for speeds above Mach 5.
- Hypersonic missiles travel above Mach 5 (over 5,400 km/hr) and can potentially evade air defense systems for rapid strikes.
- Several nations like the USA, Russia, India, and China are developing this technology.
- Scramjets are crucial for hypersonic vehicles, enabling sustained combustion at supersonic speeds without moving parts.

### **Indian Ocean Ship (IOS) SAGAR**

Recently, IOS SAGAR reached Port Louis Harbour, Mauritius after finishing Phase I of joint Exclusive Economic Zone (EEZ) surveillance with the National Coast Guard (NCG) Mauritius. This surveillance was part of its deployment to the South Western Indian Ocean.

- **Participating Nations** - Involves India and 9 African partner nations: Comoros, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, Sri Lanka, and South Africa.
- **Regional Engagements** - The deployment included port calls at Dar-es-Salaam (Tanzania), Nacala (Mozambique), Port Louis (Mauritius), Port Victoria (Seychelles), and Male (Maldives), fostering regional maritime cooperation.
- **EEZ Surveillance** – Joint surveillance exercises were conducted within the EEZs of Tanzania, Mozambique, Mauritius, and Seychelles, enhancing maritime security and domain awareness.
- **Capacity Building** – Furthermore, African personnel received training at Indian naval institutions in Kochi, focusing on essential naval operations, watch keeping procedures, and security protocols.

## **HEALTH**

### **9.19 Aortic Stenosis & TAVI**

TAVI is a minimally invasive procedure for treating severe heart valve diseases in high-risk patients.

- **Aortic Stenosis** – It is a condition where the **aortic valve narrows**, obstructing blood flow from the heart to the aorta.

- As a result, the heart must work harder to pump blood, causing increased pressure within the heart chamber, which can lead to further complications.
- Aortic valve is a door that separates the heart from the aorta, the largest artery that carries blood to different organs of our body.
- As people age, the valve stops working properly. It becomes stiff and calcified (like a bony structure) that restricts its movements.

Metal	Health effects e-waste-related
Lead	Damages brain function, particularly in children
Americium	Can induce cancer
Mercury	Causes memory loss, muscle weakness, reduced fertility, and more
Cadmium	Severe lung damage if breathed in
Sulfur	Damages the liver, heart, kidneys, and eyes
Chromium	A known cause of cancer

- **Common causes** - Degenerative aortic valve disease, bicuspid aortic valve disease and rheumatic heart disease.
- **Prevalence** - 0.4% in the general population and as high as 2.8% in people above the age of 75 years. It is also estimated that more than 10% of individual may have it after 80 years.
- **Symptoms** - Most of the patients remain asymptomatic till the disease becomes severe.
- **Some symptoms include** - Breathlessness, chest pain, syncope (passing out) and fatigue. Some of the individuals develop the weakness of the left side of the heart due to this disease.
- **Diagnosis** - Echocardiogram plays pivotal role in diagnosing the problem.
- **Treatment** -Until a few years ago, the treatment for this condition was surgical replacement of the valve through open-heart surgery.
- **Transcatheter Aortic Valve Replacement (TAVI)** – First done in 2002 by professor Alain Cribier, France.
- It is the **first percutaneous valve replacement procedure**, where a new valve is implanted into the old, diseased valve via the arteries.
- It is also known as Transcatheter Aortic Valve Implantation (TAVR).
- TAVI is superior to **Surgical Aortic Valve Replacement (SAVR)**.
- TAVI is a minimally invasive procedure, and patients can often be discharged successfully within 2-3 days after the procedure.
- In younger patients, Surgical Aortic Valve Replacement (SAVR) remains the treatment of choice.
- However, in older patients, transcatheter aortic valve implantation (TAVI) is done through the leg arteries for patients aged 65 or older or for those expected to have a life expectancy of less than 10 years.
- The ESC (European Society of Cardiology) recommends considering TAVI for patients older than 75.

## 9.20 Signet Ring Cell Carcinoma (SRCC)

A team of scientists has developed new ways to better understand and treat signet ring cell carcinoma (SRCC).

- It is a **rare form of colon cancer (CRC)** and is considered one of the deadliest subtypes of the disease.

- It gets its name from the signet ring-like appearance (a finger ring with a flat top) of its cancer cells under a microscope.
- It most commonly develops in the **gastrointestinal tract**, particularly the stomach, but can also occur in the colon and other organs. It spreads quickly.
- **Symptoms** – Indigestion, Abdominal pain, Nausea and vomiting, Diarrhea, Bloody stools, Fatigue, Joint pain, Pallor (paleness, fast heartbeat and trouble breathing).
- **Prevalence** - CRCs are the 3<sup>rd</sup> most common cancer and the 2<sup>nd</sup> leading cause of cancer deaths in the world. Globally, this type of cancer constitutes about **1%** of all cases of CRC.
- It resists conventional therapies, and is often diagnosed at advanced stages.
- **Severity** - It has the tendency to spread to the peritoneum.
- **Treatment** - Surgery, chemotherapy, and other therapies, often used in a multidisciplinary approach.

*Giant low surface brightness (GLSB) galaxies are the largest of the low surface-brightness galaxies. All GLSB galaxies are truly colossal.*

*The peritoneum is a smooth, transparent membrane that lines the abdominal cavity and covers most of the organs in the abdomen.*

### Recent Findings of the study

- Researchers have developed miniature representations of **actual human SRCC tumors** cultivated in laboratory petri dishes and subsequently implanted into mice.
- It provides valuable opportunity to investigate cancer in detail and evaluate potential therapies within a controlled setting.
- The research has revealed **distinct molecular traits of SRCC** that clarify its resistance to conventional chemotherapy.
- The research team also explore a variety of drug combinations to identify therapeutic vulnerabilities, specific weaknesses that could be targeted with focused treatments.
- Among the most encouraging outcomes of the study was the testing of a novel three-drug combination, which not only reduced tumor size but also inhibited the cancer's progression in laboratory models.

## 9.21 Magnetic Nanoparticles for Cancer Treatment

Scientists from the Institute of Advanced Study in Science and Technology (IASST), Guwahati, in collaboration with NIT Nagaland, used magnetic nanoparticles to treat cancer.

- The magnetic system is developed with newly synthesized nanocrystalline cobalt chromite magnetic nanoparticles.
- It can treat cancer by increasing temperature of tumour cells through a procedure called **magnetic hyperthermia**.

### Magnetic Hyperthermia

- Magnetic hyperthermia is a **non-invasive technique** to treat cancer, where magnetic nanoparticles are introduced into the body and guided to the tumour site.
- When subjected to an alternating magnetic field, these particles generate **localized heat**, raising the temperature of tumour cells to around 46°C, leading to **necrosis** (cell death) of cancerous cells without affecting nearby healthy tissue.

- **Material used** - Scientists developed **nanocrystalline cobalt chromite** magnetic nanoparticles using the chemical co-precipitation method.
- These nanoparticles are doped with **Gadolinium (Gd)** to enhance magnetic and heat-generating properties.
- They act as **nano-heaters** when introduced into the body in fluid form.
- Under an alternating magnetic field, they produce **localized self-heating**.
- This heating can raise the **tumour temperature to 46°C**, leading to cancer cell death (necrosis).
- **Advantages** - Targeted and localized treatment of cancer.
- External control through magnetic fields.



- Minimally invasive and potentially cost-effective therapy.
- Fewer side effects compared to chemotherapy and radiation.

## 9.22 Acute Promyelocytic Leukemia (APL)

The new test, RAPID-CRISPR developed using CRISPR technology can quickly and accurately diagnose acute promyelocytic leukemia (APL).

- It is a rare but serious **blood cancer** characterized by the abnormal accumulation of immature white blood cells called promyelocytes, often leading to severe bleeding and clotting problems.
- It is classified as a subtype of Acute Myeloid Leukemia (AML), a cancer of the blood-forming tissue (bone marrow).
- It accounts for about **10-15%** of newly diagnosed AML cases.
- **Common symptoms**
  - Sudden bleeding from the gums and nose
  - Fatigue
  - Unexplained fever
  - Bone pain
- While these symptoms may mimic those of other conditions, definitive diagnosis relies on histopathological assessments, including complete blood count (CBC) and cell morphology.
- APL results from a genetic mutation that causes an abnormal fusion of two genes, PML and RARA, which disrupts the normal production of blood cells.
- This genetic alteration leads to a significant decrease in white blood cells and platelets, hindering the body's ability to combat infections and manage bleeding.
- **Average Diagnosis age in India** - 34 years.
- **Affecting Ratio** - Male-to-female ratio of 1.5:1.
- **Severity** - The condition poses a particular risk due to the potential for sudden internal bleeding in critical organs such as the lungs and brain, which can be life-threatening within days if not addressed promptly.
- **Prognosis** - With appropriate treatment, APL is considered one of the most curable subtypes of AML, with high remission and cure rates.
- **Treatment** - Often treated with a combination of chemotherapy and non-chemotherapy drugs like all-trans-retinoic acid (ATRA) and arsenic trioxide (ATO).

## 9.23 Fixed-dose combination drugs (FDCs)

The Central Drugs Standard Control Organisation (CDSCO) has recently prohibited the manufacture, sale, and distribution of 35 FDCs that were authorized by drug regulators across all States and Union Territories, citing the lack of prior safety and efficacy assessments.

- **Fixed-dose combination drugs** – FDC drugs are those which contain a combination of two or more Active Pharmaceutical Ingredients (APIs) in a fixed ratio.
- FDC drugs are widely used in the treatment of tuberculosis, Diabetes and as painkillers and nutrition supplements.
- **Advantages of FDC drugs**
  - Increased patient acceptance
  - Increased health worker compliance

*Active Pharmaceutical Ingredients (APIs) is the biologically active component of a drug product (tablet, capsule, cream, injectable) that produces the intended effects.*

- Easier drug management
- Lower risk of misuse of single drugs
- Lower risk of emergence of drug resistance
- **Regulation of FDC** – In India FDC are regulated by CDSCO as per the provision of NDCT (New Drugs and Clinical Trials Rules) Rules 2019 under the **Drugs and Cosmetics Act 1940**.
- As per the Drugs and Cosmetics Act 1940, **FDCs that Combined for the first time in a fixed ratio are classifies as New Drugs** and it requires evaluation of safety and efficacy by CDSCO.

### The Central Drugs Standard Control Organisation (CDSCO)

- **CDSCO** - The Central Drugs Standard Control Organisation (CDSCO) is India's national regulatory body for **pharmaceuticals and medical devices** under the Drugs and Cosmetics Act, 1940
- **Headed by** – Drugs Controller General of India (DCGI)
- It functions under the **Ministry of Health and Family Welfare**.
- **Zonal Offices** - CDSCO has 6 zonal offices of at Mumbai, Kolkata, Chennai, and Ghaziabad, Hyderabad, Ahmedabad.
- **Functions** - CDSCO is responsible for discharging functions assigned to the Central Government under the **Drugs and Cosmetics Act - 1945**.
  - Approval of new drugs and novel drug formulations including Fixed-Dose Combinations (FDCs)
  - Oversight of clinical trials conducted in India.
  - Quality control of imported drugs and medical devices.
  - Coordination with State Drug Control Organizations to ensure uniform enforcement of regulations.

### Other Important Topics

#### Anemia Mukht Bharat (AMB) Strategy

Union Minister of State for Health and Family Welfare has recently updated about the status of Anemia Mukht Bharat (AMB) Strategy.

- **Objective** – To **combat anemia in children and women**, including pregnant and lactating mothers.
- **Methods to combat anemia** – Using a life-cycle approach and **6 interventions** includes,
  - Iron and Folic Acid (IFA) supplementation, deworming, intensified behavioral change communication, anemia testing & treatment, IFA-fortified food provision, and addressing non-nutritional causes.
- **Financial support** – The government **distributes fortified rice**, enriched with iron, folic acid, and vitamin B12, through various welfare schemes nationwide.

6X6X6 strategy aims to reduce anaemia among 6 beneficiaries' age groups through implementation of 6 interventions and 6 institutional mechanisms.

#### Endometriosis

A recent study finds, traumatic experiences and genetics may increase endometriosis risk.

- **Endometriosis** – It is a **chronic and systemic inflammatory disease** where uterine endometrial-like **tissue grows outside the uterus**.
- **Symptoms** – Debilitating pelvic pain before and during menstruation, or during intercourse.
- **Causes** – Infertility and digestive issues such as painful bowel movements.
- **Spread** – Globally, it affects a staggering **10%-15% of female individuals** of reproductive age.

## Homeopathic Medicine

Recently, World Homoeopathy Day is celebrated on April 10<sup>th</sup>, to raise awareness about the role of homoeopathy in healthcare.

- It supports the body's natural ability to heal instead of just covering up symptoms.
- **Homoeopathic pills** – They are easy on the stomach and do not weaken the body's natural defences.
- **Treatment** – It focuses on finding and treating the main cause of the illness.
- **Advantages** – It can be used along with other medical methods.
- It is usually safe and gentle as they are made from natural and non-toxic sources.

**World Homoeopathy Day** is linked to the birth of Dr. Samuel Hahnemann who was born on April 10, 1755.

## Black Rats: Primary Hantavirus Carriers in Madagascar

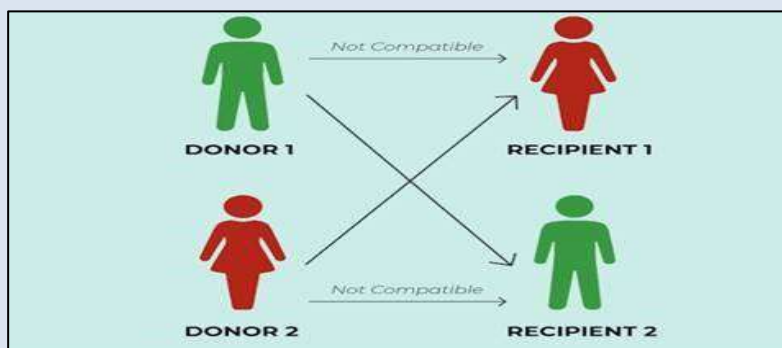
Recent research published in *Ecology and Evolution* has identified black rats as the primary carriers of hantavirus in rural Madagascar, highlighting a significant health risk to local populations.

- **Hantavirus infection** - Hantavirus is a serious viral infection transmitted to humans through contact with the excreta (urine, droppings, saliva) of infected rodents.
- **Associated Syndromes**
  - Hantavirus Pulmonary Syndrome (HPS), a potentially fatal respiratory disease
  - Hemorrhagic Fever with Renal Syndrome (HFRS), which primarily affects kidney function.
- **Black rat (*Rattus rattus*)** – It is an invasive species, introduced to Madagascar centuries ago, between the 10th and 14th centuries.
- **Increased Human Contact** - Deforestation and agricultural expansion in Madagascar have led to increased interaction between human communities and hantavirus-carrying black rats, elevating the potential for disease transmission.

## Swap Kidney Transplant (SKT)

Recently, the All India Institute of Medical Sciences (AIIMS) of Raipur successfully performed its 1<sup>st</sup> Swap Kidney Transplant.

- **Process of SKT** – A patient with kidney failure who has a willing living donor, but is unable to receive the kidney due to an incompatible blood group.
- The patient can still undergo a transplant by exchanging donors with another incompatible pair.
- Through this arrangement, both recipients receive compatible kidneys, resulting in successful transplants for both pairs.
- It leads to a 15% increase in the number of transplants.
- It also known as a Kidney Paired Transplant (KPT).
- **AIIMS Raipur** – It becomes the 1<sup>st</sup> government hospital in the state of Chhattisgarh to carry out this complex and life-saving procedure.

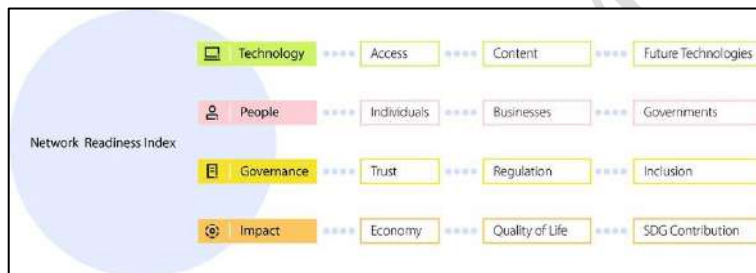


## 10. INDICES AND REPORTS

### 10.1 Network Readiness Index (NRI) 2024

Recently, the Portulans Institute released a report of Network Readiness Index (NRI) 2024 which showed that India has raised 11 places to enter into top 50 nations.

- **NRI** – It is one of the leading global indices on the application and impact of Information and Communication Technologies (ICTs) in economies across the world.
- **Aim** - To measures the propensity for countries to exploit the opportunities offered by information and communications technology.
- **Launched in** – 2002.
- **Published by** - World Economic Forum in collaboration with European Institute of Business Administration (INSEAD) annually.
- **NRI 2024** – It evaluates the network readiness of 133 economies that collectively account for 95% of global Gross Domestic Product (GDP).
- It is anchored in the 3 core principles outlined by the NRI Technical Advisory Group in 2019.
- It assessing the performance based on 4 main pillars and each pillar is further divided into 3 sub-pillars.
- **Released by** - Portulans Institute and Said Business School at the University of Oxford.



- **Global Performers** - For the 3<sup>rd</sup> consecutive year, the United States, Singapore, and Finland leads the world in NRI.
- Each of the top 10 countries secures a position within the top 25 across the 4 main pillars.
- China, ranking 17th overall demonstrates impressive capabilities in various domains.
  - Singapore and the Republic of Korea are the only countries from Asia.
- In terms of income distribution within the rankings,
  - High-income economies - 52
  - Upper-middle-income economies – 36
  - Lower-middle-income economies – 32
  - Low-income economies - 13
- **Low Ranking Countries** – It particularly affecting African nations like Uganda (118th), Malawi (119th), and Chad (130th).
- **India's ranking** – India ranked at 49<sup>th</sup> position globally, from 60<sup>th</sup> position in the 2023 report.
- It also increased its score from 49.93 in 2023 to 53.63 in 2024.

Top Countries	NRI Ranking
United States	1
Singapore	2
Finland	3
Sweden	4
Republic of Korea	5
Netherlands	6
Switzerland	7
United Kingdom	8
Germany	9
Denmark	10

- It reflects its dual nature as a technology powerhouse and developing economy.
- **India's Performance** – Its achievements in several key areas which includes,
  - **1<sup>st</sup> Rank** – Artificial Intelligence (AI) Scientific Publications, AI Talent Concentration and ICT Services Exports.
  - **2<sup>nd</sup> Rank** - FTTH (Fiber to the Home) / Building Internet Subscriptions, Mobile Broadband Internet Traffic within the Country, International Internet Bandwidth.
  - **3<sup>rd</sup> Rank** - Domestic Market Scale.
  - **4<sup>th</sup> Rank** - Annual Investment in Telecommunication Services.

India has also **ranked 2<sup>nd</sup>** among lower-middle-income countries.



- It is the International Organization for Public-Private Cooperation.
- **Founded in** – 24 January 1971.
- **Headquarters** - Cologne, Switzerland.
- **Principles** - Legitimacy, accountability, transparency and concerted action.
- It provides a global, impartial and not-for-profit platform for meaningful connection between stakeholders.

## 10.2 Digital Threat Report 2024

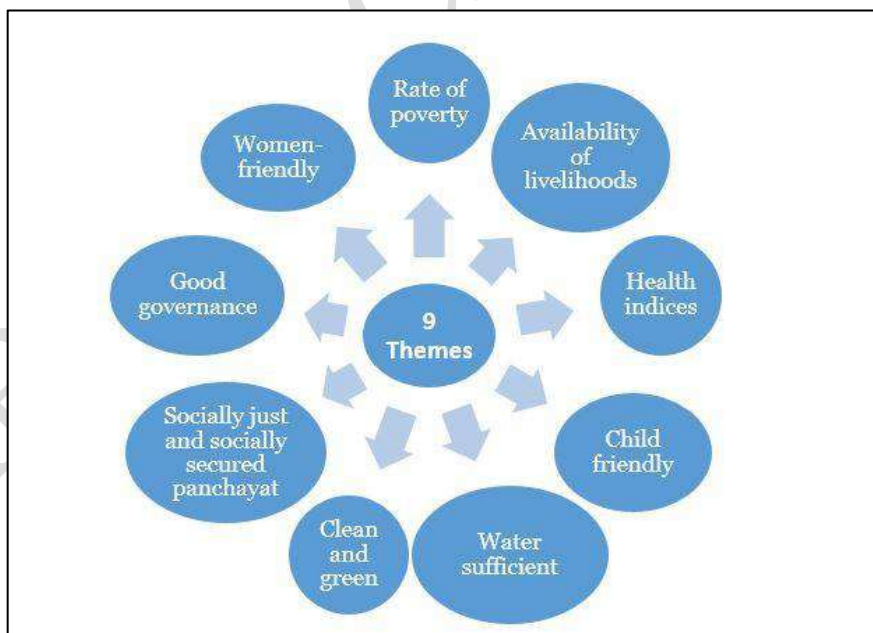
*India launches first Digital Threat Report 2024 recently.*

- **Aim** - To address the escalating cyber threats faced by financial institutions.
- **Launched by** - Ministry of Electronics and Information Technology.
- **Collaborated with** - CERT-In (MeitY), CSIRT-Fin and SISA, a global Cybersecurity company.
- It highlights the critical need for a cohesive cybersecurity framework to safeguard the nation's financial infrastructure.
- The report addresses
  - Illuminate Adversaries' Playbook
  - Anticipate Future Attacks
  - Assess the Impact of AI in Breaches
  - Recommend Preventive and Detective Controls
  - Highlight Current Trends and Select Cases
- **Anticipated Cyber Threats in 2025**
  - Rise of deep fakes and AI-generated content
  - Growing threat of supply chain attacks and malicious libraries
  - Emerging threat of LLM prompt hacking in applications
  - Influence of adversarial LLMs enhancing attack capabilities
  - Quantum computing – A looming threat to cryptography
  - Crypto – A new frontier for cyber threats
  - IOT, the emerging threats to embedded devices.
- **Suggestions to Policy Makers**
  - Cybersecurity should be a techno commercial business decision and not just decided only on commercials
  - Digital Payment Security to have common standards for all Digital Payment Form Factors
  - Clear Preparation Roadmap for Post Quantum Cryptography
  - Empower CISOs through direct reporting to the CEO/CRO instead of CTO or CIO
  - Create more Certified Digital Payment Security Specialists in the ecosystem
  - Building a Responsible AI Framework for BFSI
- The report calls on financial institutions, regulators, and security experts to take a proactive stance in addressing cyber threats.
- As AI-driven attacks become more prevalent and compliance demands grow increasingly complex, the necessity for strategic direction in managing the cybersecurity environment is important.

## 10.3 Panchayat Advancement Index

In a push for data driven governance, the Department of Panchayati Raj has come up with the first ever Panchayat Advancement Index (PAI).

- **Panchayat Advancement Index (PAI)** – Aims to assess and measure the progress made by grassroots-level institutions in achieving localized SDGs, thereby contributing to the attainment of SDG 2030.
- It is a multi-domain and multi-sectoral index that is intended to be used to assess the overall holistic development, performance & progress of Panchayats.
- The index takes into account various socio-economic indicators and parameters to gauge the well-being and development status of the local communities within the jurisdiction of a Panchayat.
- **Launched by** – Ministry of Panchayati Raj.
- **9 themes** – PAI has been compiled based on 435 unique local Indicators (331 mandatory & 104 optional) on nine themes.
- These themes align global goals with rural realities, helping local governments tailor their strategies for holistic development.
- **Categories of performance** – Based on these, gram panchayats are grouped into one of the 5 categories of performance
  1. Achiever (90+)
  2. Front runner (75 to below 90)
  3. Performer (60 to below 75)
  4. Aspirant (40 to below 60)
  5. Beginners (below 40)
- **Performance** – The 2022-23 PAI data reveals that out of 2,55,699 Gram Panchayats, 2,16,285 submitted validated data.
- 699 (0.3%) Panchayats emerged as Front Runners, 77,298 (35.8%) were Performers, 1,32,392 (61.2%) were Aspirants while 5,896 (2.7%) Gram Panchayats were at the Beginner Level.
- None of the Gram Panchayat was qualified as an Achiever and as of now, no inter-state comparison has been done.
- Gujarat led the index with 346 Gram Panchayat as Front Runners, followed by Telangana with 270 Front Runners.
- States with a high number of Performers include Gujarat, Maharashtra, Telangana along with Madhya Pradesh and Uttar Pradesh.
- Bihar, Chhattisgarh, and Andhra Pradesh have a significant share of Aspirant Gram Panchayats.
- **Significance of PAI** – Promotes Evidence-Based Planning.
  - Enhances Accountability & Transparency.
  - Fosters Competitive Federalism.
  - Localizing SDGs.
  - Informs Resource Allocation.



#### 10.4 India Justice Report, 2025

India Justice Report (IJR) 2025 released recently said that not a single State or Union Territory has met their own reserved quotas for women in the police.

- It is India's only **ranking of States/UTs on the delivery of justice** released annually.
- **Initiated by** - Tata Trusts and supported by several civil society organizations and data partners.
- **Indicators** - Police, Judiciary, Prisons and Legal Aid.
- **Filters** - human resources, infrastructure, workload and diversity.

*Karnataka is the only State that met quotas in both Police and Judiciary and Bihar has the highest share of women in State police.*

## Key Findings

### Positive Findings

- Southern states of India are performing the best when it comes to policing, justice delivery and prison management.
- **Top states** - All the top spots in the large and mid-sized category were taken by southern states - Karnataka, Andhra Pradesh, Telangana, Kerala and Tamil Nadu.
- **Bottom states** - Bengal came at the bottom of the table, followed by Uttar Pradesh, Uttarakhand, Jharkhand and Rajasthan.
- Among the 7 small states, Sikkim was the best-performer, while Goa was the laggard.
- **Improving states** - Telangana, which ranked 11<sup>th</sup> in the last survey, jumped to the 3<sup>rd</sup> spot in the latest report.
- Bihar showed the most improvement in the category of police from 2022 to 2025.
- **Case disposal rate** - High Courts have consistently achieved a disposal rate exceeding 100%, while subordinate courts have also shown progress.
  - For instance, more than 86% of prisons are now equipped with video-conferencing facilities for conducting trials.
- **Prison Management** - Tamil Nadu retained its top position in managing prisons, with increased budget allocation and 100% utilization.

### Negative Findings

- **Reserved quota gap** - Not a single State/UT meets their own reserved quotas for women in police force
- **Infrastructure gap** - 17% of police stations in the country do not have a single CCTV, while 3 in 10 police stations do not have women help desks.
- **Police-population ratio** - Nationally, the ratio remained stagnant at 155 police personnel per 100,000 population, significantly below the sanctioned strength of 197.5.
  - In India, one civil police personnel is available for 831 people.
- **Under-trial issue** - 91% of Delhi's prison population consisted of under-trials.
- **Prison overcrowding** - 176 prisons operate at over 200% capacity.
- **Inadequate spending**
  - **On legal aid** – Rs. 6 per annum.
  - **On prisons** - Rs. 57.
  - **On the judiciary** - Rs. 182.

## 10.5 NITI Aayog report on India's Hand & Power Tools Sector

Recently, NITI Aayog released a report named, *Unlocking \$25+ Billion Export Potential - India's Hand & Power Tools Sector.*

- **Objective** – To outline a strategic path for the sector to enhance its global competitiveness and capture a significantly larger share of the international market.

### Findings of the report

- **Global market** – The worldwide tools market, which was estimated in 2022, is anticipated to be doubled to expand by 2035.

- Hand tools and Power tools sector are expected to experience steady growth.
- China dominates global exports, holding about **50%** of the hand tools market and **40%** of the power tools market
- **Indian market** – India has a smaller presence, 1.8% market share in hand tools and 0.7% market share in power tools.
- **India's potential** – India can reach 10% market share in power tools and 25% in hand tools in exports over the next decade.
- It could create approximately 35 lakh jobs.
- **Challenges in Indian tools market growth** – Cost disadvantage compared to China due to higher structural costs and smaller operational scale.
- This disadvantage stems from elevated raw material costs, such as steel, plastic, and motors and lower labour productivity.
- Higher interest rates and logistics costs for transporting goods from inland states to ports.

#### Suggested measures by the report

- India can solidify the nation's position as a reliable, high-quality global manufacturing hub by,
  - Fostering innovation
  - empowering our MSMEs
  - Strengthening India's industrial ecosystem
- Developing world-class hand tool clusters under a public-private partnership (PPP) with advanced infrastructure.
- Addressing structural cost disadvantages through market reforms such as reducing import duties and reducing penal provisions like interest on defaults.
- Providing bridge cost support to offset cost disadvantages to give impetus to growth of the sector.

#### Quick Facts

- **Hand tools** – These are non-motorized tools that rely on manual effort.
- Common examples include screwdrivers, hammers and handsaws.
- **Power tools** – Power tools use external source such as electricity or batteries to work faster and stronger.
- Both types are essential in construction, woodworking, automotive repair, and other industries.
- **Hand and Power tools sector** – The tools industry serves as a foundational pillar of the global manufacturing ecosystem.
- The Hand and Power Tools sector represents a significant opportunity to realise India's ambition of becoming a global manufacturing hub.

#### 10.6 Report on DBT implementation

*Recent report by Blue Kraft Digital Foundation (NGO) reveals India's Direct Benefit Transfer (DBT) system has helped to reduce Expenditure on subsidy.*

- **Direct Benefit Transfer** – It is a government initiative that transfers subsidies and benefits directly into the beneficiaries' bank accounts, bypassing traditional intermediaries.
- **Launch** – DBT was officially launched on *January 1, 2013*.
- **Implementation** – DBT Mission was originally created by the Planning Commission to act as the nodal point for the implementation of the DBT programmes.
- The Mission was transferred to the Department of Expenditure in 2013.
- To give more impetus, DBT Mission and matters related thereto has been placed in **Cabinet Secretariat** under Secretary from 2015.

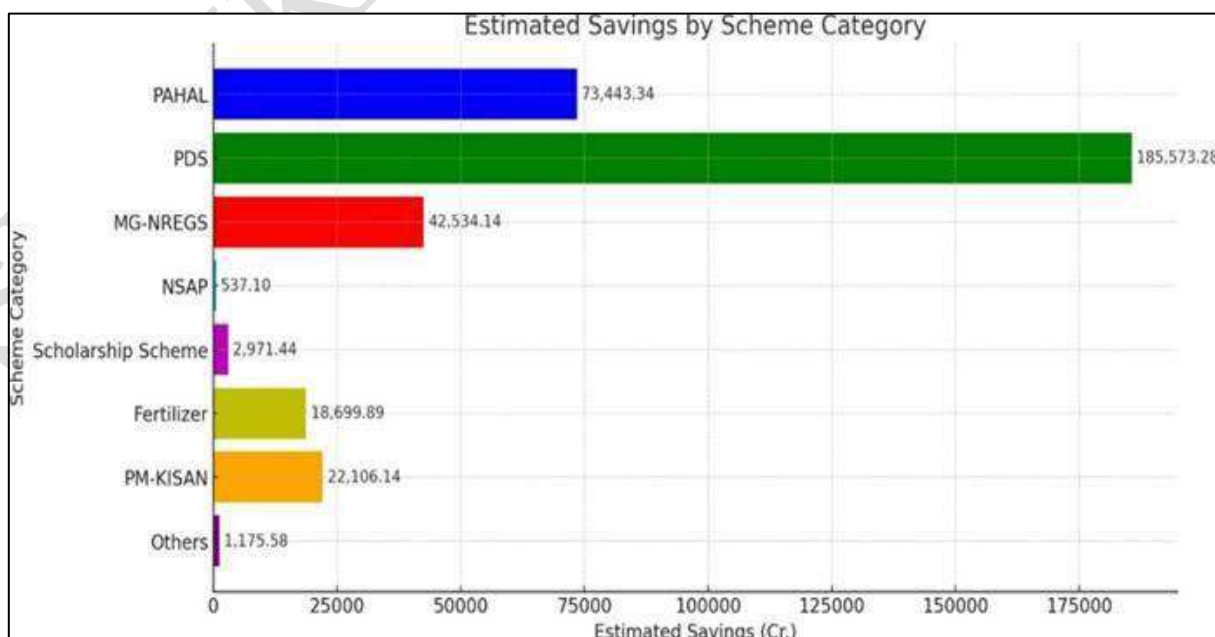


- **JAM trinity** – One of the key features of DBT is the use of the **JAM trinity**, to facilitate direct benefit transfers.
- Aadhaar is *preferred but not mandatory* for DBT schemes.
- **Core objective** – Promote "Maximum Governance, Minimum Government" through technology.



#### Key findings of the report

- **Welfare Efficiency Index** – Introduced by Blue Kraft Digital Foundation (NGO).
- It is a methodology for assessing the impact of the Direct Benefit Transfer (DBT) system.
- It was developed as a composite metric to measure efficiency gains across various dimensions.
- **Components**
  - DBT Savings (50% weight)
  - Subsidy Reduction (30% weight)
  - Beneficiary Growth (20% weight)
- The Index rose nearly threefold from 0.32 in 2014 to 0.91 and its emphasis the efficiency in governance system.
- **Savings to government** – Direct Benefit Transfer (DBT) system has helped the government achieve cumulative savings of Rs. 3.48 lakh crore by plugging leakages in welfare delivery.
- **Reduced expenditure** – Subsidy allocations have been halved from 16% to 9% of total expenditure.
- **Beneficiary growth** – Despite reduced budget allocation percentage, beneficiary coverage increased 16-fold.
- **Food Subsidies (PDS)** – Over 53% of total DBT savings is from food subsidy and is primarily through Aadhaar-linked authentication.
- **MGNREGS** - 98% of wages were transferred timely through DBT-driven accountability.
- **PM-KISAN** – Got DBT benefit by deleting 2.1 crore ineligible beneficiaries from the scheme.
- **Fertilizer Subsidies** - Sales of fertiliser were reduced, through targeted disbursement.



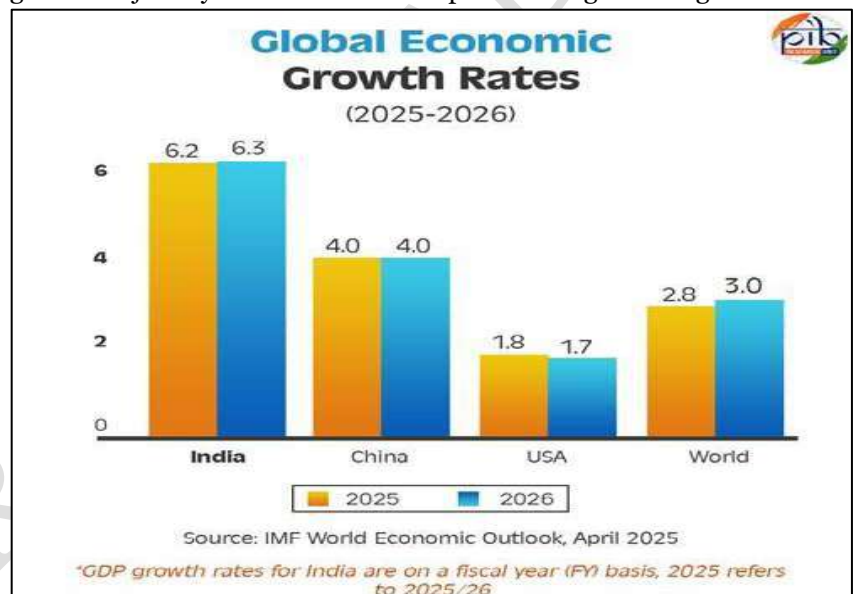
## 10.7 World Economic Outlook, 2025

India is poised to lead the global economy once again, with the World Economic Outlook projecting it to remain the fastest growing major economy over the next two years.

- **Released by** - International Monetary Fund (IMF).
- **Duration** - Published twice a year.
- It provides projections for the near and medium term, covering advanced, emerging, and developing economies.
- The report supports the IMF's economic surveillance and guides discussions on policy among member countries.

### Recent Findings of the Report

- **Global Findings** - IMF projects global economic growth to be much lower, at 2.8% in 2025 and 3.0% in 2026.
- China's GDP growth forecast for 2025 has been downgraded to 4.0%, down from 4.6% in the January 2025 edition of the World Economic Outlook.
- Similarly, the United States is expected to see a slowdown, with its growth revised downward by 90 basis points to 1.8%.
- Despite these revisions, India's robust growth trajectory continues to set it apart on the global stage.
- **Findings For India** - The growth outlook is relatively more stable. The IMF projects steady expansion for the Indian economy, supported by firm private consumption, particularly in rural areas.
- In a global environment marked by uncertainty and subdued growth, India's resilience stands out, reinforcing its role as a key driver of global economic activity.
- India's economy is expected to grow by 6.2% in 2025 and 6.3% in 2026, maintaining a solid lead over global and regional peers.
- India is projected to remain the fastest-growing large economy for 2025 and 2026, reaffirming its dominance in the global economic landscape.



### Other Important Topics

#### Landmark Gene Therapy Trial for Haemophilia

BRIC-inStem, Bengaluru, in collaboration with CMC Vellore, has achieved a significant milestone by successfully conducting India's first-in-human gene therapy trial for Haemophilia.

- **Gene Therapy** - Gene therapy is an innovative biomedical technique focused on modifying or replacing faulty genes within a person's cells to treat or prevent diseases by introducing functional genes or inactivating malfunctioning ones.
- **Targeting Root Causes** - Unlike traditional medicines that address symptoms, gene therapy aims at the fundamental genetic causes of diseases at a cellular level.
- **Approaches in Gene Therapy** - Current clinical trials employ methods like ex vivo modification of blood stem cells and T-lymphocytes, as well as in vivo gene delivery or gene-editing reagents directly into the patient.
- **Haemophilia** - Haemophilia is a rare inherited bleeding disorder characterized by impaired blood clotting due to mutations in genes on the X chromosome, predominantly affecting males.

## 11. OTHERS

### 11.1 Sangita Kalanidhi Award

*Rudrapatna Krishnamurthy Shriramkumar has been chosen for this year's Sangita Kalanidhi Award by the Music Academy, Chennai.*

- Sangita Kalanidhi, which translates as 'Treasure of Music and Art', is the highest honour in Carnatic music.
- It is awarded annually by the Madras Music Academy, one of the oldest academies of Carnatic music in India.
- **Established in** – 1928.
- The Music Academy was established in 1928, following a decision taken at the Indian National Congress session in Chennai in December 1927 to promote Carnatic music and Bharatanatyam.
- **Rewards** – The award comprising a gold medal and a birudu patra (citation).
- Since 2005, the Sangita Kalanidhi also receives the MS Subbulakshmi Award instituted by The Hindu.
- **Carnatic music** – Carnatic music is a classical music tradition of South Indian states such as South Indian states of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, and southern Odisha.
- It emphasizes vocal music and compositions, with a focus on intricate melodies, rhythms, and improvisations based on ragas and talas.
- **Origin** – Carnatic music has roots in ancient Hindu traditions and scriptures, particularly the Samaveda.
- It is considered one of the two main classical music traditions of India, the other being Hindustani music.
- **Instrumented used** – The violin, mridangam, tambura, ghatam, and veena.
- Carnatic music uses the Melakarta system, a system of 72 parent ragas (janaka ragas) to classify ragas.

The lawyer, freedom fighter, and artiste E Krishna Aiyar was trying at the time to revive Bharatanatyam, which had suffered from the stigma of association with devadasis.

### 11.2 Breakthrough Prize, 2025

*Breakthrough Prize Foundation recently announced the winners for Breakthrough Prize, 2025.*

- It is an **international award** recognizing outstanding achievements in life sciences, fundamental physics, and mathematics.
- It is also known as 'Oscars of Science'.
- **Established in** – 2013.
- **Established by** - Mark Zuckerberg and his wife Priscilla Chan, Sergey Brin, Anne Wojcicki, and Yuri and Julia Milner.
- **Reward** - \$3 million each in all categories.

#### Breakthrough Prize in Life Sciences

<b>For Weight-loss drugs</b>	<ul style="list-style-type: none"> <li>• <b>Drugs</b> - <u>Ozempic and Wegovy</u>.</li> <li>• <b>Awarded to</b> - Daniel J. Drucker, Joel Habener, Jens Juul Holst, Lotte Bjerre Knudsen and Svetlana Mojsov.</li> <li>• Scientists discovered and characterised the <b>GLP-1 hormone</b>, which aided the creation of drugs treating diabetes and obesity.</li> </ul>
<b>Multiple Sclerosis treatment</b>	<ul style="list-style-type: none"> <li>• Multiple Sclerosis is an unpredictable chronic disease caused by the immune system attacking the protective sheath that covers nerve fibres of the central nervous system.</li> <li>• <b>Awarded to</b> - Alberto Ascherio and Stephen L. Hauser.</li> </ul>

	<ul style="list-style-type: none"> <li>They identified the role of the <b><i>B-cells</i></b> of the immune system in Multiple Sclerosis (MS) and devised treatments targeted at the same.</li> <li>The duo also established the <b><i>Epstein-Barr virus infection</i></b> as the leading cause of MS.</li> </ul>
<b>Gene-editing technologies</b>	<ul style="list-style-type: none"> <li><b>Awarded to</b> - David R Liu</li> <li>Developing the base editing and prime editing technologies widely used to edit the DNA of living organisms.</li> <li>They can edit the DNA without cutting its <b><i>double helix</i></b>, and rewrite entire stretches of defective DNA with a corrected version.</li> </ul>

### Breakthrough Prize in Mathematics

- Awarded to** - Dennis Gaitsgory
- Achievement** - Role in the proof of the geometric Langlands conjecture.

### Breakthrough Prize in Fundamental Physics

- Awarded to** - 4 collaborations at the Large Hadron Collider (LHC) in European Organization for Nuclear Research (CERN) – ALICE, ATLAS, CMS and LHCb.
- The collaborations studied the ***Higgs boson*** to understand how they impart mass to fundamental particles.
- They also discovered ***new types of particles*** to understand the strong nuclear force, and tested fundamental theories by discovering new processes to understand why matter exists in the universe.

*Langland's program is described as a broad research program spanning several fields of mathematics, which grew out of a series of conjectures proposing precise connections between seemingly disparate mathematical concepts.*

## 11.3 MacGregor Memorial Medals

Five military personnel were recently conferred the MacGregor Memorial Medal by Chief of Defence Staff General Anil Chauhan.

- Instituted on** - July 03, 1888.
- The medal commemorates Major General Sir Charles Metcalfe MacGregor, founder of USI (established in 1870).
- Aim** - Originally intended to recognize the acts of military reconnaissance and exploratory journeys.
- The medal's scope was expanded in 1986, post-Independence, to include military expeditions and adventure activities.
- Eligibility** - The medal is ***available to individuals of all ranks***, both active and retired, from the ***Indian Armed Forces, Territorial Army, and Assam Rifles***.
- Recent Awardees - Awardees for 2023** - Wing Commander D. Panda from the Air Force and Electrical Artificer (Radio) Rahul Kumar Pandey from the Navy.
- Awardees for 2024** - Chief Electrical Aircraft Artificer (Radio) Ram Ratan Jat of the Navy and Sergeant Jhumar Ram Poonia from the Air Force were honoured with the medal.
- Colonel Ranvir Singh Jamwal, Director of the National Institute of Mountaineering and Adventure Sports in Arunachal Pradesh, was also awarded.
- The event also featured the launch of the book ***Bravest of the Brave***, inspirational chronicle on the life and heroic journey of Naib Subedar Chunni Lal, AC, Vrc, SM, by the Chief of Defence Staff.

### United Service Institution of India (USI)

- It is a ***national security and defense services think tank*** based in New Delhi, India.
- Founded in** - Simla in 1870 by Col. (later Maj Gen) Charles Metcalf MacGregor.
- Aim** - Established to advance military knowledge and professional development among British Indian Army officers.



- Its mission encompassed promoting knowledge in the art, science, and literature of national security, with a particular focus on the Defence Services.
- It focuses on national security, defense, and military affairs, providing a platform for research, debate, and the advancement of knowledge in these areas.

#### 11.4 Navika Sagar Parikrama-II Expedition

Recently, INSV Tarini entered Cape Town, South Africa, completing the 4<sup>th</sup> leg of the Navika Sagar Parikrama II (NSP) expedition.

- It is **global circumnavigation mission** of Indian Navy.
- **Flagged off in** – October 2024.
- **Undertaken by** – **2 women officers** of the Indian Navy.
- **Onboard vessel** – Indian Naval Sailing Vessel (**INSV Tarini**).
- **Objectives** – To cover more than 23,400 nautical miles in 8 months, with a scheduled return to Goa in May 2025.
- To further marine and scientific researches.
- To promote women empowerment in the Indian Armed Forces and is to motivate many young women to join the Services and Indian Navy in particular.
- **Coverage** – It will unfold in 5 legs with stop overs at 4 ports for replenishment and maintenance, as required.
- The broad contour of voyage will be as follows
  - Goa to Fremantle, Australia
  - Fremantle to Lyttleton, New Zealand
  - Lyttleton to Port Stanley, Falkland (UK)
  - Port Stanley to Cape Town, South Africa
  - Cape Town to Goa
- **4<sup>th</sup> stopover in South Africa** – It is at Royal Cape Yacht Club in for 2 weeks, for scheduled maintenance and repairs.
- It exhibits the growing relations between India and South Africa and how India stands committed to strengthen its maritime cooperation with the friendly countries in the Indian Ocean Region.
- **Significance** – It symbolises India's maritime endeavours, showcasing nation's prominence in global maritime activities and Indian Navy's commitment to excellence and women empowerment.
- It is a significant step in fostering maritime consciousness, embodying the *spirit of Sashakt and Saksham India (Strong and Aabled India)*.
- It is 1<sup>st</sup> ever circumnavigation of the globe onboard a sailing vessel by Indian women in double handed mode.

*In the recent past, Indian Naval Ship Talwar participated in the 8th edition of Exercise IBSAMAR in October 2024 in South Africa. In January 2025, the latest stealth frigate of Indian Navy INS Tushil made a port call at Durban and engaged with the South African Navy and the Indian community in Kwa-Zulu Natal.*

*The indigenously built INSV Tarini is a 56-foot sailing vessel, which was inducted in the Indian Navy in 2018 and has participated in many such expeditions earlier. The vessel is a true testament of 'Make in India' and Aatmanirbhar Bharat initiative of the Government of India.*

#### 11.5 Gantenerumab, drug on early-onset Alzheimer's disease

A recent study found that gantenerumab, experimental drug reduced the build-up of amyloid plaques one of the hallmarks of Alzheimer's disease in the brain.

##### Alzheimer's disease

- It is a progressive **neurodegenerative disorder** that primarily affects memory and thinking skills, eventually leading to a loss of the ability to perform simple tasks.



- It is the most common cause of dementia, and is characterized by the abnormal buildup of proteins in the brain, forming plaques and tangles that disrupt brain cell function.
- Alzheimer's disease is usually associated with old age. But around 5%-10% of all Alzheimer's cases occur in people under the age of 65.
- **Early-onset Alzheimer's disease** – It progresses more rapidly and often strikes people in the prime of their lives.
- Early-onset Alzheimer's is often linked to genetic mutations in 3 specific genes.
- These mutations cause the brain to produce excessive amounts of amyloid beta, a protein that clumps together to form plaques.
- These plaques disrupt brain function, leading to memory loss.

### Gantenerumab

- **Recent Trial** - Gantenerumab is an experimental drug, initially discontinued but has now shown promise in new clinical trials.
- The recent clinical trial was a randomised, placebo-controlled study to evaluate gantenerumab's effects on people with early-onset Alzheimer's.
- Researchers monitored changes in the participants' cognitive abilities, and also used brain imaging and blood biomarkers.
- **Gantenerumab** – It is a type of antibody called a monoclonal antibody, designed to target and remove amyloid plaques in the brain through a subcutaneous administration.
- **Developed by** - Hoffmann-La Roche.
- It works by binding to amyloid plaques, promoting their clearance through a process called phagocytosis, where microglia (brain's immune cells) engulf and remove the plaques.
- The drug works by engaging microglial cells. Microglia constantly monitor the brain for damage and remove harmful substances, including amyloid beta.
- However, in people with Alzheimer's disease, microglia often fail to clear plaques efficiently.
- Gantenerumab enhances this natural defense mechanism by tagging amyloid plaques, making them easier for the microglia to recognize and break down.

## 11.6 Equivalence Certificates for Foreign Degrees

*The University Grants Commission (Recognition and Grant of Equivalence to Qualifications Obtained from Foreign Educational Institutions) Regulations 2025 were notified recently.*

- **Equivalence certificate** – Confirms a foreign qualification (degree, diploma) is equivalent to a specific Indian qualification level for higher studies or employment.
- **Issuing Authority** – University Grants Commission will now grant these certificates, replacing the previous system managed by the Association of Indian Universities (AIU).
- This marks the first dedicated regulatory framework by UGC for this purpose.
- **Validity** – Valid for all UGC academic institutions, higher education, research, and employment requiring UGC-recognized qualifications with few exceptions.
- **Exceptions** – Medical, pharmacy, nursing, law, architecture and others regulated by the norms of respective Statutory Councils in India" will not be covered under the regulations.
- **Applicability** – Applicable to qualifications obtained via distance or online learning modes.
- Also applies to school qualifications (requiring min. 12 years of schooling) for UG admissions in India.

### Conditions for Granting Equivalence

- Qualification awarded by a foreign institution recognized in its home country.
- Entry requirements (credits, thesis, etc.) comparable to similar Indian programmes.
- Programme pursued according to the foreign institution's norms.

- Qualifications from off-shore campuses are eligible if compliant with regulations in both the host country and the institution's origin country.

### Process for granting equivalence

- Applications via a dedicated UGC online portal.
- UGC-appointed standing committee decides (accept/reject) within 10 working days.
- Mechanism for review available in case of rejection.

### Need for the issuance of the regulations

- Aligns with NEP 2020's focus on internationalization of higher education.
- Provides a structured, transparent, and statutory framework, replacing the non-statutory AIU system.
- Ensures clarity, consistency, and fairness in recognizing foreign qualifications.
- Facilitates seamless integration of students with foreign qualifications into India's education system and workforce.

## 11.7 Chintan Shivir 2025

*Chintan Shivir has been organized across various ministers for developmental programs.*

- **Chintan Shivir** - It is a mission-oriented platform for Constructive Dialogue, Ideation, and Exchange of Best Practices.

### Ministry of Social Justice & Empowerment

- **Key pillars** - Education, Economic development, Social protection, and Accessibility.
- Department of Empowerment of Persons with Disabilities (DEPwD) presented progress under schemes such as
  - Assistance to Disabled persons (ADIP),
  - Scholarships for PwDs, and
  - Initiatives for skill development and digital inclusion.
- It focused on educational empowerment under schemes such as *Pre-Matric and Post-Matric Scholarships* for marginalized sections, and [PM-YASASVI](#).
- **Key livelihood-oriented schemes** - [Pradhan Mantri Anusuchit Jaati Abhyuday Yojana](#) and [Scheme for Economic Empowerment of DNTs \(SEED\)](#) were reviewed, showcasing successful models of asset creation, cluster development, and entrepreneurship support.
- The [NAMASTE Scheme](#) discussions underscored the importance of modernizing sanitation work and eradicating manual scavenging through a blend of technology, legal safeguards, and skill development.
- The focus remained on ensuring dignity and financial independence for sanitation workers, particularly women, through sustained collaboration and inter-agency coordination.

### Ministry of Mines

- It has organized Chintan Shivir to engage with stakeholders and drive reforms in the mining sector to propel growth and development.
- **Key topics**
  - Increasing mineral production and operationalization of mineral blocks.
  - Circular economy.
  - Encouraging private exploration and access to geo-scientific data.
  - Developing a local ecosystem for mining equipment manufacturing.

**Mission Vatsalya** is to ensure the welfare and rehabilitation of children in difficult circumstances, with a focus on child rights, advocacy, and strengthening the juvenile justice system.

### Ministry of Women and Child Development (MoWCD)

- **Key Initiatives** - Mission Vatsalya, [Mission Shakti](#), and Mission Saksham Anganwadi and Poshan 2.0.
- These sessions aim to address critical issues and chart a way forward for strengthening the welfare of women and development of children in India.

## Ministry of Youth Affairs and Sports

- Focused on Preparation for Los Angeles 2028 and Discussed Roadmap to Host 2036 Olympics.
- **Key topics** - Fresh emphasis should be given to promoting school sports, production of quality coaches and welfare of athletes.
- **National Sports Repository System** is being upgraded to enable close monitoring and systematic development of every registered athlete.
- The program will help the NSRS and the **Khelo India Rising Talent Identification (KIRTI) program**.
- Welfare of coaches and their holistic skilling were also discussed.
- States to utilize the Khelo India State Training Centres to train and excel at the global level.

Saksham Anganwadi and Poshan 2.0 is an Integrated Nutrition Support Programme, seeks to address the challenges of malnutrition in children, adolescent girls, pregnant women and lactating mothers.

## Ministry of Coal

- **Key Topics** - Coal PSUs and industry partners to adopt state-of-the-art technologies and implement rigorous safety standards to safeguard the lives of workers and ensure the well-being of the workforce.
- It necessitated developing robust mechanisms for mine closures, focusing on biodiversity conservation, land reclamation, and transforming mined-out areas into hubs of community activity and ecological balance.
- It targets 2 billion tonnes of coal production, improving coal transportation systems, and adopting cleaner technologies like coal gasification to align with India's energy transition goals.
- **Key Initiatives** - Special Campaign 4.0. & iGOT Karmayogi platform, a learning platform aimed at promoting capacity development among civil services, part of Mission Karmayogi.

## 11.8 Modernization of Command Area Development and Water Management

*The Union Cabinet recently approved the Modernization of Command Area Development and Water Management (M-CADWM) as a sub-scheme of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) for the period 2025-2026.*

- **Aim** - Modernization of the irrigation water supply network to supply of irrigation water from existing canals or other sources in a designated cluster.
- **Micro irrigation facilitation** - It will make robust backend infrastructure for micro-irrigation by farmers from established source to the Farm gate upto 1 Ha with underground pressurized piped irrigation.
- **Use of technology** - Supervisory Control and Data Acquisition (SCADA), Internet of things technology will be used for water accounting and water management.
- **Irrigation Management Transfer (IMT)** - Water User Society (WUS) will manage Irrigation assets.
- The Water User Societies will be linked with existing Economic Entities like FPO or PACS for five years.
- **Benefits** - This will increase the Water Use Efficiency (WUE) at the farm level, increase agriculture production & productivity; and thereby increase the income of farmers.

### Command Area Development And Water Management (CAD&WM) Programme

- The programme was launched in 1974-75.
- It is being implemented under Pradhan Mantri Krishi Sinchai Yojna (PMKSY) - Har Khet Ko Pani from 2015-16.
- The ongoing CADWM programme has now been restricted to implementation of CAD works of 99 prioritized Accelerated Irrigation Benefits Programme (AIBP) projects.
- **Components of CADWM Programme**
- **Structural Intervention**
  - On-Farm Development (OFD) works;
  - Construction of field, intermediate & link drains;
  - Correction of system deficiencies; and

- Reclamation of waterlogged areas.
- **Non-Structural Intervention** - Activities directed at strengthening of Participatory Irrigation Management (PIM) including:
  - One time Functional Grant to the registered Water Users' Associations (WUAs);
  - One time Infrastructure Grant to the registered WUAs;
  - Trainings, demonstration

### 11.9 Niveshak Didi

Recently, a Memorandum of Agreement (MoA) has signed jointly to launch the Phase 2 of the Niveshak Didi.

- **Niveshak Didi** – A unique initiative that **trains women postal workers and community leaders** to act as financial educators within their local regions.
- **Aim** – To scale financial literacy among **women in rural, semi-urban, and underserved areas** through grassroots mobilization and community-driven education.
- To empower rural women with the skills and **confidence to make informed financial decisions**.
- **Nodal Ministry** – Ministry of Corporate Affairs.
- **Launched by** – Investor Education and Protection Fund Authority (IEPFA) and India Post Payments Bank (IPPB).
- **Significance** – It is a **women-centric model** led by almost 40,000 women postal workers trained as Niveshak Didis, who will conduct sessions on **responsible investing, fraud awareness, savings habits, and digital banking tools**.
- It enables them to **build trust, inspire & share financial discipline**, and create a lasting impact at the grassroots level.

Phase 1 of Niveshak Didi was launched in 2022 and more than 55,000 beneficiaries participated in IPPB Financial Literacy Camps across India.

Approximately 60% female beneficiaries mostly in the youth & economically active age group.

Phase 2 will see the deployment of over 4,000 financial literacy camps across India.

#### Investor Education and Protection Fund Authority (IEPFA)

- **Established on** – 2016.
- It is a statutory body, under the Ministry of Corporate Affairs.
- **Vision** – To build a financially aware and confident India.
- **Objective** – To ensure that investors across the country are both informed and protected.
- To educate people about their rights and responsibilities as investors.

#### India Post Payments Bank (IPPB)

- **Established on** – 2018, under the Ministry of Communication.
- **Vision** – To build the most accessible, affordable and trusted bank for the common man in India.
- **Objective** – To remove barriers for the unbanked & underbanked and reach the last mile leveraging the Postal network.
- **Key pillars** – Enabling Paperless, Cashless and Presence-less banking in a simple and secure manner at the customers' doorstep.
- **Significance** – It delivers simple and affordable banking solutions through intuitive interfaces.

### 11.10 World Haemophilia Day

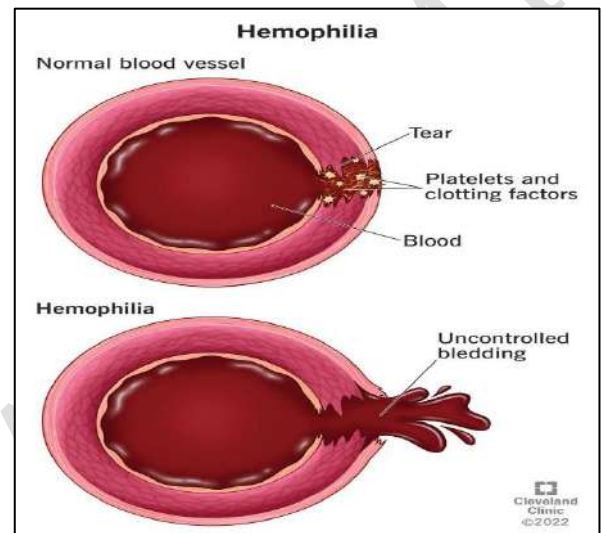
Recently World Haemophilia Day was observed on April 17 by World Federation of Haemophilia (WHF) a Non-Profit organization.

- World Haemophilia Day is observed annually as a global healthcare initiative **to create awareness on bleeding disorders.**
- Objectives** – To promote better control and prevention of haemophilia, through collaboration with local policymakers.
  - To ensure improved treatment and care for those affected.
- Theme, 2025** – "Access for All – Women and Girls Bleed Too".
- Organizing Body in India** – Department of Empowerment of Persons with Disabilities (DEPwD), Union Ministry of Social Justice and Empowerment.

India has the World's second largest burden of Haemophilia with a case load of 1.36 lakhs.

## Haemophilia

- It is a **rare genetic bleeding disorder** where blood doesn't clot normally.
- Cause** – Haemophilia is caused by a mutation or change, in one of the genes located on the X chromosome, that provides instructions for making the clotting factor proteins needed to form a blood clot.
- Males are more commonly affected.
- Females can be carriers with 50% chance of transmitting to sons.
- Symptoms** - Prolonged bleeding after injuries or surgeries, as well as spontaneous bleeding into joints and muscles.
- Types** – There are two types based on the protein factor deficiency,
  - Haemophilia A** - Factor VIII (F-8) deficiency (more common)
  - Haemophilia B** - Factor IX (F-9) deficiency (less common)
- Treatment** – There is no cure for hemophilia, effective treatments are available to manage the condition and prevent severe bleeding, includes replacement of missing clotting factors using Gene therapy.
- WHF Humanitarian Aid Program** – Launched in 1996 by WHF to provide access to support care and treatment of bleeding disorder globally.



Recently Indian scientist has conducted first human clinical trial of Gene therapy for Haemophilia A at Christian medical college, Tamil Nadu.

## Quick facts

### Other Major Bleeding Disorders

- Von Willebrand Disease** – Deficiency or dysfunction of von Willebrand factor (vWF), a protein that helps platelets stick to damaged blood vessels.
- Most common inherited bleeding disorder.
- Autosomal dominant (affects males and females equally).
- Prolonged bleeding from cuts, nosebleeds, heavy menstrual bleeding.
- Thrombocytopenia** – Caused due to **low platelet count** (below 150,000 platelets per microliter).
- Small red/purple spots and prolonged bleeding.

## 11.11 Gonorrhea

*A new study finds that a new type of antibiotic, gepotidacin for the treatment of urinary tract infections in women could also work against gonorrhoea infections*



- It is a contagious **sexually transmitted infection**.
- **Caused by** - Neisseria gonorrhoeae, type of bacteria.
- It is often called "the clap" and can affect the genitals, mouth, or rectum.
- **Transmission** - Primarily occurs through vaginal, oral, or anal sex.
- It can also be transmitted from a mother to her baby during childbirth.
- **Symptoms**
  - **Men** - May experience pain or burning while urinating, discharge from the penis, and/or testicular pain.
  - **Women** - May experience vaginal discharge, pain or burning while urinating, and/or pelvic pain.
  - **Rectal Gonorrhea** - May cause anal itching, discharge, or pain during bowel movements.
  - **Throat Gonorrhea** - Can cause sore throat.
  - **Asymptomatic Infections** - Many people with gonorrhea have no symptoms, making it easy to spread unknowingly.
- **High -Risk Category** - Sexually active women younger than 25 and men who have sex with men are at increased risk of getting gonorrhea.
- **Severity** - Gonorrhea can lead to serious health problems if left untreated, and though rare, can even spread to the blood or joints.
- Among women, untreated gonorrhea can cause an infection of the reproductive organs called pelvic inflammatory disease, which can lead to a greater risk of pregnancy complications and infertility.
- In men, gonorrhea also can lead to infertility in rare cases.
- **Treatment** - The primary treatment for gonorrhea is ceftriaxone, an injectable cephalosporin antibiotic.
- However, due to the emergence of drug-resistant strains, dual therapy with ceftriaxone and azithromycin is often recommended, especially in areas with high rates of resistance.
- **Prevalence** - Gonorrhea is the 2<sup>nd</sup> most common sexually transmitted disease caused by bacteria, just behind chlamydia.
- In the United States, gonorrhea and other sexually transmitted infections or STIs have become more common.

#### 11.12 Measles-Rubella Elimination Campaign (2025-26)

*Recently, Union Health Minister launched the National Zero Measles-Rubella Elimination Campaign on first day of the World Immunization Week (24-30 April)*

- **Launched by** – Ministry of Health and Family Welfare.
- **Objective** – To achieve **100% immunization coverage** to provide high quality life to children by administering them with two doses of Measles and Rubella vaccine.
- It is a significant step towards India's goal of eliminating Measles and Rubella by 2026.

#### Campaign Activities

- **Awareness programs** – Intensive IEC (Information, Education, and Communication) outreach campaign about vaccination in multilingual formats.
- **Data-based surveillance** – By leveraging the data available from Integrated Disease Surveillance Program (IDSP) and the [U-WIN](#) digital platform.
- **Targeted vaccination** – To reach out to remote and hard to reach areas, slums, migratory population, areas with frequent outbreaks.
- Achieve and maintain high population immunity with *at least 95% vaccination coverage with 2 doses of measles and rubella* containing vaccines in each district of the country.

Recently Indian scientist has conducted first human clinical trial of Gene therapy for Haemophilia A at Christian medical college, Tamil Nadu.

The Integrated Disease Surveillance Program (IDSP) launched in 2004 with World Bank assistance is a nationwide disease surveillance system to detect and monitor diseases, enabling timely policy decisions.

## India's progress in Measles & Rubella (MR) elimination

- **Current MR vaccination coverage in India:**
  - First dose MR vaccination - 93.7%
  - Second dose MR vaccination - 92.2%
- **Reduction in MR cases** – In 2024, India has recorded a decline of 73% in Measles cases and a 17% reduction in Rubella cases in comparison with 2023.

The Universal Immunization Programme (UIP) is the world's largest vaccination program for pregnant women and newborns providing protection against 12 vaccine-preventable diseases.

### Measles & Rubella

- **Measles** – It is an extremely **contagious viral infection** that usually causes high fever, rashes, cough, muscle pain, headache and red eyes.
- Severe symptoms include *pneumonia and brain swelling, leading to death.*
- **Rubella** – It is also a **contagious viral infection** that can cause Low-grade fever, sore throat, rash (*often mild and less severe than measles*), and swollen lymph nodes.
- While it is mild in children and adults, it can lead to serious complications during pregnancy such as miscarriage, stillbirths, *birth defects and developmental problems.*
- Both viral diseases can be *prevented by MMR vaccination.*

MMR is a vaccine for the prevention of measles, mumps, and rubella in individuals 12 months of age or older.

## Other Important Topics

### Bodh Gaya Temple Act Protest

Buddhist monks, under the All-India Buddhist Forum (AIBF), have been protesting since February 2024, demanding the repeal of the Bodh Gaya Temple Act (BTA), 1949.

- **BTA, 1949** – It established an 8-member management committee to oversee the Bodh Gaya Temple's administration.
- **Management committee composition** – The Act mandated equal representation for Hindus and Buddhists.
- **District Magistrate (DM)** – Ex-officio chairperson, historically from the Hindu community, created a perceived Hindu majority in the committee.
- **Hindu control** – In 1590, a Hindu monk established the Bodh Gaya Mutt, resulting in Hindu control over the temple's administration.

### International Federation of Red Cross and Red Crescent Societies (IFRC)

IFRC has recently launched a \$100 million appeal to aid victims of the recent devastating Myanmar earthquake.

- The IFRC unites 192 Red Cross and Red Crescent societies, mobilizing millions of volunteers for humanitarian aid.
- **Founded in** – 1919 and based in Geneva.
- **Aim** – To assist vulnerable populations by coordinating international emergency response to disasters, including natural, man-made, and health crises, and strengthening community resilience.
- **Funding and Partnerships** – The IFRC relies on voluntary contributions from various sources and collaborates with the International Committee of the Red Cross (ICRC), which focuses on humanitarian law and conflict aid.

### ***Bollard Pull (BP) Tug Ojas***

Recently, the 5<sup>th</sup> 25T Bollard Pull (BP) Tug Ojas was launched.

- **Tugs** – It is designed indigenously and built in accordance with relevant Naval Rules and Regulation of Indian Register of Shipping (IRS).
- **Objective** – To provide assistance to naval ships and submarines during berthing, un-berthing and manoeuvring in confined waters.
- To provide afloat firefighting support to ships and it have the capability to conduct limited search and rescue operations.

### ***INS Tarkash***

Recently, INS Tarkash has successfully intercepted and seized over 2500 kg of narcotics.

- **About** – It is a frontline frigate of the Indian Navy operating under the Western Naval Command.
- **Part of** – Combined Maritime Forces (CMF), for Maritime Security Operations.
- **Deployed in** – Western Indian Ocean.
- It is participating in the multi-national forces joint focus operation, Anzac Tiger.

### ***Tarang***

Recently, the Tarang facilities was discussed in the Parliament.

- **About** – It is a 64-bit High Performance Computing (HPC) system, capable of supporting multi-tasking, multi-programming, multi-user and time-sharing environment.
- It avoids single point of failure, to meet the operational requirements.
- **HPC technical support** – It is supported by transformers, diesel generators, UPS, batteries, multiple utility paths, lighting system, adequate number of earthing pits and cables.

### ***Dharti Aaba TribePreneurs 2025***

Recently, the Ministry of Tribal Affairs (MoTA) inaugurated Dharti Aaba TribePreneurs 2025.

- **Launched by** – Ministry of Tribal Affairs.
- It is transforming tribal entrepreneurship, paving the way for self-reliant, sustainable, and innovative enterprises.
- **Objective** – To emphasis Bhagwan Birsa Munda vision by creating sustainable opportunities for Scheduled Tribe (ST) entrepreneurs and startups.
- To redefine the tribal startup landscape and contribute to a more inclusive and resilient economy.

### ***Mundi-Cut Passport***

Recently, it was found that 'mundi-cut' passports were used to illegally send people abroad from Mumbai.

- It is a one of the fake passports, which is entirely forged and changed by an agent.
- **Mundi cut (photo change) Passport** – A legitimate passport purchased from the original holder, where the photograph of original holder is replaced with photograph of illegal migrant.

- The personal details remain same of the original holder.
- It is considered as a safest way by the criminals for the illegal migration.

### Healthy Beginnings, Hopeful Futures' Campaign

Recently, 'Healthy beginnings, hopeful futures' campaign was launched as a part of World Health Day (April 7, 2025).

- It is a year-long campaign on maternal and newborn health.
- **Launched by** – World Health Organization (WHO).
- **Objective** – To urge the governments and the larger medical community to ramp up efforts to end preventable maternal and newborn deaths.
- To prioritise women's longer-term health and well-being.

### India in Mission Innovation Annual Gathering (MIAG), 2025

Recently, India highlighted their initiatives at Mission Innovation Annual Gathering, 2025 which was held at Seoul, South Korea.

- **Mission Innovation** – It is a global clean energy initiative to catalyse action and investment in research, development and demonstration in clean energy.
- **Launched in** – It was announced at COP21 in 2015 by the then President Obama of the United States.
- **Members** - 23 countries including India and the European Commission (on behalf of the European Union).
- **Missions**
- **Mission Innovation 2.0** - It was launched on 2021, is catalysing a decade of action and investment.
- **India's leadership** - The Department of Biotechnology (DBT), Government of India - co-leads the Mission Integrated Biorefinery jointly with the Netherlands as part of Mission Innovation (MI) 2.0.
- **Bio E3 Policy** - Biotechnology for Environment, Energy, and Economy Policy.

ZERO-EMISSION SHIPPING  
GREEN SHIPPING CORRIDOR HU  
CLEAN HYDROGEN  
GREEN POWERED FUTURE  
CARBON DIOXIDE REMOVAL  
SMART CDR COMPETITION  
URBAN TRANSITIONS  
NET-ZERO INDUSTRIES  
INTEGRATED BIOREFINERIES

### National Safe Motherhood Day, 2025

National Safe Motherhood Day is observed annually on April 11th in India, coinciding with Kasturba Gandhi's birth anniversary, to emphasize the critical need for maternal healthcare.

- **Theme** - "Healthy Beginnings, Hopeful Futures," focusing on ensuring accessible and quality maternal healthcare from the beginning of pregnancy for safe outcomes.
- **Maternal death** – It is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy.
- **Maternal mortality rate in India** – It is declined from 130 per 100,000 live births in 2014-16 to 97 per 100,000 live births in 2018-20.
- While some states, like Kerala, Maharashtra, Telangana, Andhra Pradesh, and Tamil Nadu, have witnessed a significant reduction in maternal deaths, others continue to struggle with large numbers.
- **White Ribbon Alliance** – It is an international non-profit organization that advocates for maternal health.
- **Janani Shishu Suraksha Karyakram (JSSK)** – It is one of the schemes launched by the central government to provide free and zero-expense delivery and treatment for pregnant women and sick newborns.



### Karnataka Caste Census Report

Recently, the Caste Census Report was submitted to Karnataka Chief Minister, marking a significant step in the state's socio-economic landscape.

- **Based on** – Socio-Educational Survey, 2015, which was conducted by the Karnataka State Commission for Backward Classes in 2015.
- **Aim** – To develop and uplift the backward classes in Karnataka.
- **Methodology** – The Data was collected using 54 indicators, to understand the socio-economic conditions of various caste groups.
- **Significance** – It contains detailed social and economic indicators for non-SC/ST communities, including taluk-wise data and insights from secondary sources.

### Affordable Medicines and Reliable Implants for Treatment (AMRIT) Pharmacy

Recently, the Union Minister of Health inaugurated the EHS Clinic and AMRIT Pharmacy in Bhubaneswar, Odisha.

- It is a pharmacy chain initiative of the Ministry of Health & Family Welfare.
- **Operated by** – HLL Lifecare Ltd.
- **Objective** – To provide essential medicines, life-saving drugs, and medical devices at affordable prices to the public.
- It provides a wide range of products, including specialised medicines for,
  - Oncology and Cardiology, stents, orthopaedic implants, medical disposables, and a variety of branded and generic drugs at discounts of up to 50% on MRP.
- **Significance** – It supports tertiary healthcare facilities such as AIIMS, medical colleges, district hospitals and general hospitals across India.

### Bohag Bihu 2025: Assamese New Year Celebrations

Recently, Bohag Bihu also known as Rongali or Xaat Bihu, is Assam's vibrant spring festival and New Year, observed over seven days from April 14th to 20th.

- **Marking the Assamese New Year** – This significant festival heralds the start of the Assamese solar year, bringing with it celebrations of new beginnings and the arrival of the spring season.
- **Harvest and Agrarian Gratitude** – Primarily an agrarian festival, Bohag Bihu is a time for the farming community to express their gratitude for the recent harvest and to pray for a prosperous agricultural year ahead.
- **Cultural Significance and Unity** – The seven-day celebration is rich in colorful rituals, folk songs, traditional dances, and communal feasts, acting as a unifying force across Assamese communities and villages.
- **Spring Festival Equivalents** – Bohag Bihu shares its spirit with other Indian spring festivals like Baisakhi in Punjab, Puthandu in Tamil Nadu, Vishu in Kerala, and Pohela Boishakh in West Bengal.
- **Seven Days of Festivities** – Spanning a week, each day of Bohag Bihu holds unique cultural and agricultural importance, contributing to the overall joyous and celebratory atmosphere of the festival.

### April's "Pink Moon" Illuminates the Sky

Recently, on April 12th, the first full moon of April, popularly known as the "Pink Moon," graced the night sky. This celestial event is a captivating sight for stargazers.

- **Understanding Super moons: A Brighter, Larger Full Moon** – NASA defines a super moon as a full moon occurring when the moon is at its perigee, its closest point to Earth in its orbit. At perigee, the full moon appears noticeably larger and brighter than usual.
- **Enhanced Size and Brightness** – Super moons are typically about 7 percent larger and approximately 15 percent brighter than an average full moon. This difference, while noticeable, may not be dramatically apparent to casual observers.
- **The "Pink Moon" Misnomer** – Despite often being called a "Pink Moon," the super moon's colour isn't actually pink. This name originates from the Wild Ground Phlox, a species of pink wildflower that blooms in



North America during the spring, around the time of the April full moon.

- **The "Paschal Moon" Connection** – In the Christian calendar, this particular full moon is also known as the Paschal Moon. Its timing is significant as it determines the date of Easter, which is celebrated on the first Sunday following the Paschal Moon.

### ***Kathak Legend Kumudini Lakhia Passes Away***

*Recently, Renowned Kathak dancer Kumudini Lakhia, a pioneer in group performances, passed away at 95 in Ahmedabad shortly after receiving the Padma Vibhushan. She revolutionized Kathak, traditionally a solo art form, by bringing ensemble work to the forefront.*

- **The Essence of Kathak: Storytelling Through Dance** – Derived from the Sanskrit word 'Katha' (story), Kathak originated from Kathakars, ancient storytellers who narrated epics like the Ramayana and Mahabharata using music, dance, and mime.
- **Historical Journey and Evolution** – Born in North India during the Bhakti movement (8th-12th centuries), Kathak flourished in royal courts under Mughal patronage, incorporating Persian influences. Despite colonial marginalization, it was revived post-independence and recognized as a classical dance form.
- **Distinct Gharanas: Shaping Diverse Styles** – Three prominent Gharanas (schools) define Kathak: Lucknow, known for grace and expression; Jaipur, emphasizing intricate footwork and rhythm; and Banaras, balancing footwork and narrative with unique spins.
- **Key Elements of a Kathak Performance** – Kathak performances blend 'Nritya' (pure dance with complex footwork and spins synchronized with percussion) and 'Nritya' (expressive dance conveying emotions and stories through gestures and expressions). It is accompanied by Hindustani classical music.
- **Major Exponents of Kathak** – Key figures who shaped Kathak include Bindadin Maharaj and Birju Maharaj (Lucknow Gharana), among others, who contributed significantly to its evolution and popularization. Lakhia herself stands as a pivotal figure in its modern adaptation.

### ***Mario Vargas Llosa: Literary Titan Passes Away***

*Recently, Renowned Peruvian novelist, essayist, and journalist Mario Vargas Llosa died on April 14, 2025, at 89. The 2010 Nobel laureate for Literature profoundly explored power structures and individual struggles.*

- **Early Life and Influences** – Born in Arequipa, Peru, in 1936, Vargas Llosa's early life in Bolivia and his time at a Lima military academy significantly shaped his initial literary works. He later studied law and literature.
- **Groundbreaking Literary Career** – His debut novel, *The Time of the Hero* (1963), launched his career. Subsequent major works include *The Green House*, *The War of the End of the World*, *The Feast of the Goat*, and *Harsh Times*. He also ventured into children's literature with *Fonchito and the Moon*.
- **Evolution of Political Views** – Initially holding Marxist views, Vargas Llosa later embraced liberal democracy. He unsuccessfully ran for the Peruvian presidency in 1990 and was a prominent president of PEN International.
- **Lasting Legacy and Influence** – Vargas Llosa's extensive body of work, comprising over 30 novels and numerous essays translated globally, has left an indelible mark on literature and intellectual discourse in the Spanish-speaking world and beyond.

### ***Poshan Pakhwada 2025***

*Recently, the 7<sup>th</sup> edition of Poshan Pakhwada was started.*

- It is annual event focuses on improving nutrition across India, especially for women and children.
- **Nodal Ministry** – Ministry of Women and Child Development.
- **2025 Theme** – Shuddh Jal aur Swachhta Se Swasth Bachpan (Clean Water and Sanitation for Healthy Childhood).
- **Aim** – To combat malnutrition through behaviour changes at individual, family, and community levels.
- **4 key areas**
  - Emphasis on the first 1000 days of human life.
  - Popularization of the Beneficiary Module in the [Poshan Tracker App](#).

***Community-Based Management of Acute Malnutrition (CMAM)*** is a training module that focuses on community-based approaches to managing acute malnutrition.

- Effective management of malnutrition through the CMAM module.
- Promotion of healthy lifestyles to address childhood obesity.

### ***Vanajeevi" Ramaiah: Environmentalist Dies***

*Recently, Daripalli Ramaiah, the esteemed environmentalist known as "Vanajeevi" or "Chettu Ramaiah," passed away at 87 in Khammam district, Telangana, due to a heart attack.*

- **A Lifetime of Planting Trees** – Ramaiah dedicated his life to afforestation, remarkably planting over one crore saplings across Khammam, significantly contributing to local ecosystems and combating deforestation.
- **Padma Shri Recognition** – His extraordinary efforts in environmental conservation were recognized with the prestigious Padma Shri award in 2017, a testament to his impactful work.
- **Philosophy: Humans and Nature** – Ramaiah deeply believed in the essential interdependence of human survival and a healthy environment, dedicating his life to promoting ecological awareness.
- **Inspiring Grassroots Action** – Starting as an individual, Ramaiah's dedication inspired widespread community engagement in environmental conservation, leaving a lasting legacy for future generations.

### ***World Chagas Disease Day 2025: A Global Call to Action***

*Recently, World Chagas Disease Day 2025 seeks to raise global awareness about the global impact of Chagas disease, urging equitable healthcare access and long-term care.*

- **The 2025 theme emphasizes** – Shared responsibility in prevention, control, and patient support.
- **Understanding Chagas Disease** – Also known as American trypanosomiasis, Chagas disease is a parasitic illness caused by *Trypanosoma cruzi*. It was discovered in 1909 by Brazilian physician Carlos Chagas.
- **Transmission Pathways** – The primary mode of transmission is through the bite or feces of infected triatomine bugs ("kissing bugs"). Other routes include congenital transmission, blood transfusion, organ transplant, contaminated food, and lab accidents. It's not spread by casual contact.
- **Disease Progression and Symptoms** – The acute phase may present with fever, rash, and swollen glands. The chronic phase, affecting 20-30%, can lead to severe heart, digestive, or neurological issues. Alarming, 70-80% remain asymptomatic.
- **Global Prevalence and Risk** – Endemic in 21 American countries, 6-7 million people are infected globally, causing 10,000-12,000 annual deaths. 100 million are at risk worldwide, with rare cases in other regions.
- **Treatment and Management** – Currently, no vaccine exists. Antiparasitic drugs like Benznidazole and Nifurtimox are effective in the acute stage. Treatment in the chronic phase is less effective but can slow progression.
- **Prevention Strategies** – Prevention focuses on vector control (eliminating triatomine bugs), mandatory blood screening in endemic regions and emerging areas, and raising crucial awareness and surveillance.

### ***Recognition by International Diabetes Federation (IDF)***

*Recently, IDF has officially acknowledged Type 5 diabetes as a distinct condition at the World Diabetes Congress in Bangkok.*

- **Type 5 diabetes** – It is a form of malnutrition-related diabetes. It primarily affects lean, undernourished teenagers and young adults, particularly in low- and middle-income regions.
- **Global Prevalence** – An estimated 20 to 25 million people worldwide suffer from this condition. It is most prevalent in Asia and Africa, where malnutrition is more common.
- **Key Characteristics** – Unlike Type 1 and Type 2 diabetes, Type 5 diabetes is not caused by insulin resistance but by a severe defect in insulin secretion due to chronic undernutrition.
- **Historical Background** – First identified in Jamaica in 1955 as J-type diabetes, it was later reported across South Asia and Africa. WHO briefly recognized it in 1985 but withdrew support in 1999 due to limited research.

### ***Maharashtra Partners with ROSATOM for Thorium SMR***

*Recently, Maharashtra has entered into a Memorandum of Understanding (MoU) with Russia's ROSATOM to collaboratively develop a thorium-based Small Modular Reactor (SMR). This marks a pioneering step for an Indian*

state in the nuclear energy sector.

- **Understanding Small Modular Reactors (SMRs)** – It is a compact and adaptable nuclear reactor engineered for secure, efficient, and versatile power generation. Thorium-based SMRs utilize Thorium-232, a fertile material that is transmuted into Uranium-233 to serve as nuclear fuel.
- **Key Players in the Initiative** – The primary institutions involved in this groundbreaking collaboration are MAHAGENCO (Maharashtra State Power Generation Company Ltd) from India and ROSATOM (Russia's State Atomic Energy Corporation), leveraging their respective expertise in energy generation and nuclear technology.
- **Advantages of Thorium SMR Technology** – Thorium-based SMRs offer several key benefits. They utilize thorium as fuel, which is converted to Uranium-233 for clean energy production. Their modular design allows for phased and economical deployment. Their compact size makes them suitable for remote areas, and they incorporate passive safety systems for automatic shutdown in emergencies.
- **Regulatory Framework and Safety** – The development and operation of this thorium-based SMR will adhere to stringent Indian nuclear safety regulations as mandated by the Atomic Energy Regulatory Board (AERB) and relevant central government guidelines, ensuring safe and responsible energy production.

### **CENJOWS Hosts Defence Literature Festival**

Recently, Centre for Joint Warfare Studies (CENJOWS), organized the 2<sup>nd</sup> Defence Literature Festival 'Kalam & Kavach 2.0' in New Delhi.

- **Theme** – Securing India's Rise through Defence Reforms.
- **Expert participation and focus areas** – The festival brought together armed forces experts, policymakers, industry leaders, and specialists to discuss crucial aspects of India's national security. Key focus areas included Defence Technology and Future Warfare, Defence Manufacturing, and Procurement Reforms.
- **Defence technology and modern warfare** – Discussions highlighted the critical role of integrating emerging technologies such as AI, cyber technologies, quantum computing, drones, space technology, and semiconductors into contemporary military operations.
- **Future warfare dynamics** – Central deliberations revolved around the evolving nature of warfare, emphasizing the increasing convergence of multiple domains – land, air, sea, cyber, and space – in shaping modern defence strategies.
- **AI and cyber capabilities** – The increasing significance of Artificial Intelligence and cyber capabilities in bolstering operational efficiency and strengthening cybersecurity within military operations was particularly emphasized during the discussions.

### **Adarsh Sanskrit Village Program**

The Uttarakhand cabinet recently approved the Adarsh Sanskrit village program.

- **Aim** – To teach the language to one village in each district of the hill state.
- To promote Sanskrit, which is the state's second official language, and follows other comparable programs, including financial support for girls and SC/ST students who choose to study Sanskrit in schools.
- The Village are selected on pilot basis.

### **Selected Villages & its Districts**

Bhogpur – Dehradun	Urg – Pithoragarh
Mukhem – Tehri	Pandeykota – Almora
Kotgaon – Uttarkashi	Seri – Bageshwar
Baiji – Rudraprayag	Khark Karki – Champawat
Dimmar – Chamoli	Nurpur – Haridwar
Goda – Pauri	Pandeygaon – Nainital
Nagla Terai – Udham Singh Nagar	

### **World Creativity and Innovation Day (WCID)**

*Recently, WCID observed annually on April 21<sup>st</sup>, designated by the UN, highlights the vital role of creativity and innovation in human development.*

- **UN Recognition** – On April 27, 2017, the UN officially recognized April 21<sup>st</sup> as WCID, linking it to the 2030 Sustainable Development Agenda.
- **Importance for SDGs** – It underscores how creative and innovative approaches are crucial for achieving the ambitious Sustainable Development Goals.
- **Founded by** – Marci Segal in 2001.
- **Aim** – To encourage positive community impact through creative thinking.
- **Features** – The day encompasses creative problem-solving, driving economic, social, and sustainable development transformations.
- **Driving Global Progress** – It emphasizes human creativity as a key asset for developing sustainable solutions to complex global challenges.

### ***World Liver Day, 2025***

*Recently, World Liver Day observed annually on April 19<sup>th</sup>, emphasizes the importance of liver health and disease prevention.*

- **Theme** – Food is Medicine.
- It underscores the powerful impact of nutrition on liver health and healing.
- The day serves as a global reminder that informed food choices are powerful tools in preventing liver diseases.
- **Liver's Role** – As the largest internal organ, the liver performs over 500 crucial functions essential for life.
- **Functions** – These include detoxification, aiding digestion, regulating blood sugar, and producing vital proteins.
- A balanced diet and conscious lifestyle choices are key to enhancing liver function and resilience.

### ***Pope Francis***

*Recently, Pope Francis, aged 88, has passed away following a prolonged illness, including a recent bout of double pneumonia, as announced by the Vatican.*

- **Historic Papacy** – The first Latin American and Jesuit pope, Francis's reign was defined by reform, compassion, controversy, and a strong commitment to social justice.
- **Born on** – 1936, Jorge Mario Bergoglio in Buenos Aires, he was the son of Italian immigrants, known for his simple lifestyle and advocacy for the poor.
- Francis became the first pope from the Americas, the first Jesuit pope, and the first non-European pope in over 1,200 years.
- **Election** – His election marked a significant moment for the Catholic Church, symbolizing its efforts to renew itself and embrace global diversity.
- **Lasting legacy** – Pope Francis leaves behind a legacy of significant reforms and a profound impact on the Church and the world, characterized by his dedication to the marginalized and his efforts to modernize the Church.

### ***National Yak Day, 2025***

*Recently, Nepal observed its first 'National Yak Day' on April 20, 2025, recognizing the yak's significant cultural, ecological, and economic contributions in the Himalayan region.*

- **ICIMOD's call to action** – International Centre for Integrated Mountain Development (ICIMOD) urged stakeholders to prioritize the yak in sustainable development agendas across the Hindu Kush Himalaya (HKH).
- **Historical role** – The indigenous communities like the Sherpa, Tamang, Thakali, Rai, and Limbu in yak herding, linking it to food security, cultural identity, and biodiversity conservation.
- **Yaks** – Wild yaks (*Bos mutus*) and domesticated yaks (*Bos grunniens*) are inhabit on the high-altitude alpine tundra across the Himalayan region.



- **Biological adaptations** – It include a large lung capacity, smaller red blood cells, and long, shaggy hair for survival in low-oxygen environments.
- **Conservation status** – IUCN – Vulnerable (Wild yaks).

### ***Pahalgam Terror Attack***

*Recently, horrific terrorist attack struck in Pahalgam, on April 22, 2025, resulting in the tragic deaths of more than 25 individuals, predominantly tourists.*

- **Located in** – Baisaran Valley of Anantnag district, a well-known hill station in the Jammu and Kashmir Valley, approximately 90 km from Srinagar.
- Its remote, high-altitude location, accessible only by foot or horseback.
- **Tourist site** – The attack occurred in the scenic Baisaran Valley, a popular tourist destination renowned for its resemblance to European landscapes and often called "Mini Switzerland."
- **Other tourist sites** – Its attractions include the Amarnath Cave Temple, Aru Wildlife Sanctuary, Betaab Valley, and Tulian Lake, drawing numerous tourists annually.

### ***Special Category National Panchayat Awards, 2025***

*Recently, the Special Category National Panchayat Awards are conferred at the event of National Panchayati Raj Day (NPRD) on 24<sup>th</sup> April, 2025.*

- It is the 1<sup>st</sup> time, that the Ministry of Panchayati Raj has institutionalised dedicated Special Category Awards.
- **Objective** – To incentivize and acknowledge exemplary efforts of Gram Panchayats in the key national priorities of Climate Action and Atmanirbharta (Self-Reliance) through augmentation of Own Sources Revenue (OSR).
- **Climate Action Special Panchayat Award (CASPA)** – To encourage Panchayats to act as climate-responsive local governments.
- **Atma Nirbhar Panchayat Special Award (ANPSA)** – To promote Atmanirbharta through augmentation of Own Source Revenue (OSR) by Panchayats.
- **Panchayat Kshamta Nirman Sarvottam Sansthan Puraskar (PKNSSP)** – To recognize excellence in capacity building and training of Panchayati Raj representatives and functionaries.
- This award was instituted in 2023 and 1<sup>st</sup> awards were conferred in 2024.

### ***Asia University Rankings, 2025***

*Recently, the Higher Education Asia University Rankings 2025, released on April 23<sup>rd</sup>, 2025.*

- The rankings indicate an intensifying competitive landscape in Asian higher education and highlighting leaders in research, teaching, and innovation.
- It features 853 universities across 35 Asian countries and territories.
- **Top Positions** – China continues to lead the regional rankings, with Tsinghua University and Peking University securing the first and second positions, respectively.
- **IISc Tops Indian Institutions** - Remains India's top-ranked university at 38th in Asia, although it experienced a drop from its 32nd position in 2024.
- **Other Indian Universities Ranking** - Anna University (111th), IIT Indore (131st), and Mahatma Gandhi University (140th) also saw slight decreases in their rankings compared to the previous year.
- Indian institutions experienced a decline amidst strong performances from universities in China, Singapore, Japan, and Hong Kong.

### ***National Centre for Sports Science and Research (NCSSR)***

*Recently, the Minister of Youth Affairs inaugurated NCSSR at the Indira Gandhi Stadium in New Delhi.*

- It is a hub for high-level research, education, and innovation under the Sports Authority of India (SAI).



### World Immunization Week (WIW) 2025: A Global Effort

WIW 2025, observed globally from April 24th to 30th, is a crucial campaign led by the World Health Organization (WHO).

- **Goal** - Is to champion the life-saving power of vaccines and underscore their vital role in public health
- **Theme for 2025** - Immunization for all is Humanly Possible, stresses the importance of universal vaccine access for all ages to prevent deadly diseases and improve health.
- **Universal Access to Vaccines** – which encourages individuals, communities, and governments to ensure everyone has access to necessary vaccines for a long and healthy life.
- **Life-Saving Impact** - Since 1974, immunization has saved roughly 6 lives per minute, protecting against over 30 diseases.
- **Promoting Awareness** - The campaign aims to tackle challenges like missed vaccinations that cause disease resurgence by increasing awareness and public education about immunization's importance.

### World Day for Safety and Health at Work

The World Day for Safety and Health at Work is observed annually on April 28th.

- **Organized by** - International Labour Organization (ILO)
- **Established in** - 2003.
- **Themes** - Revolutionizing health and safety: The role of AI and digitalization at work."
- **Objective** – **Promote the prevention** of occupational accidents and diseases globally.
- **Raise awareness** about the importance of creating and maintaining safe and healthy work environments for all workers.
- **Commemorate** workers who have been injured or lost their lives due to work-related incidents or illnesses (as the date also coincides with the International Commemoration Day for Dead and Injured Workers).

### Dr. K. Kasturirangan: A Legacy of Space and Education

Recently, former ISRO Chairman Dr. Kasturirangan's passing on April 25, 2025, at 84, marks the loss of a visionary who profoundly impacted India's space program and education system, inspiring generations.

- **Early Life and Education** – Born in Ernakulam, Kerala, in 1940, Dr. Kasturirangan earned degrees in Physics from Bombay University and a doctorate in High Energy Astronomy in 1971.
- **Leadership at ISRO** – As ISRO Chairman (1994-2003), he spearheaded the operationalization of PSLV and successful GSLV testing, marking a period of significant technological progress.
- **Chandrayaan-1 Mission** – Dr. Kasturirangan conceptualized India's first lunar mission, Chandrayaan-1 (launched 2008), which famously discovered water molecules on the moon.
- **Contributions Beyond ISRO** – Post-ISRO, he served in the Rajya Sabha and Planning Commission, notably chairing the committee for the transformative New Education Policy 2020.
- **Awards and Recognition** – His immense contributions were recognized with India's highest civilian honors: Padma Shri, Padma Bhushan, and Padma Vibhushan.

### National Institute of Electronics and Information Technology (NIELIT)

Recently, NIELIT signs MoUs with 8 Visionary Organizations to Propel Digital India Initiatives.

- **NIELIT Status** - Operates as an autonomous organization under the Ministry of Electronics and Information Technology (MeitY).
- **Mission** – To Provide Advance education, specialized training, and foster research and development in the fields of Electronics, Information Technology, and cutting-edge technological domains.
- **Also recognized** – As a National Examination Body for accrediting institutions and organizations conducting non-formal sector courses in IT and Electronics.
- **Organisations with whom NIELIT has signed MoU** – Semi-Conductor Laboratory (SCL), ERNET

India, National Institute of Solar Energy (NISE), Amrita Vishwa Vidyapeetham, SKYROOT Aerospace, Institute for Financial Management and Research (IFMR) and Kyndryl India.

### World Veterinary Day 2025

Recently, World Veterinary Day 2025, was observed on April 26<sup>th</sup>.

- The 2025 theme, "Animal Health Takes a Team," underscores the collaborative spirit within veterinary medicine.
- **First initiated by-** World Veterinary Association (WVA) in year 2000.
- **In India initiated by -** Department of Animal Husbandry and Dairying under Ministry of Fisheries, Animal Husbandry and Dairying.
- **Aims to -** Honor the dedication of veterinary professionals but also emphasizes their crucial contributions to animal well-being, human health, and environmental protection.
- **Livestock Statistics -** India is home to over 536 million livestock, the largest in the world and nearly 70% of rural households depend on animals for income, food, and security.

### Prestigious French Award

Recently, Mumbai filmmaker Payal Kapadia received the 'Officier dans l'Ordre des Arts et des Lettres' from the French Government for her cinematic contributions.

- **Joining Illustrious Company** – This honor places Payal Kapadia alongside prominent Indian artists like Amitabh Bachchan, Shah Rukh Khan, and Lata Mangeshkar.
- **About 'Officier dans l'Ordre des Arts et des Lettres'**
- **French Recognition** – Prestigious French award for significant contributions to arts and literature.
- **Order of Merit** – One of France's four ministerial orders, ranking below the Ordre National du Mérite and Légion d'Honneur.

### Indian National Space Promotion and Authorisation Centre (IN-SPACe) Launches Satellite Bus as a Service (SBaaS)

Recently, IN-SPACe has launched the SBaaS initiative.

- **Empowering Private Space Sector** - SBaaS encourages private Indian companies to design and develop satellite-bus platforms, fostering indigenous capabilities.
- **Reducing Import Dependence** - This initiative aims to decrease India's reliance on imported satellite technology, promoting self-sufficiency in the space sector.
- **What is a Satellite Bus?** - A satellite bus is the central, modular structure of a satellite, housing essential operational systems to which the mission-specific payload is attached.
- **SBaaS Initiative Objectives** - Includes promoting innovation among Indian Non-Governmental Entities (NGEs) and facilitating the development of small satellite-bus platforms for various applications.
- **Global Service Provider Goal** - Ultimately, SBaaS seeks to position India as a global hub for small satellite-bus and hosted-payload services.

### Agentic AI Demand Surge

Recently, India faces a critical shortage of agentic AI professionals as demand skyrockets due to the increasing adoption of sophisticated AI agents.

- **Talent Supply Gap** - The current pool of under 100,000 experts struggles to meet the projected need of 200,000 by 2026, creating a significant talent gap.
- **Intense Hiring Competition** - This shortage fuels intense competition among Global Capability Centers (GCCs), IT firms, and startups, leading to rapidly increasing salaries.
- **Defining Agentic AI** - Agentic AI refers to intelligent systems with the capacity for autonomous decision-making, independent action-taking, and continuous learning in complex environments.
- **'Service as Software' Shift** - This technology enables a shift towards a 'service as software' model, allowing tech companies to deliver enhanced value compared to traditional 'software as a service'.

- **Agentic AI Problem-Solving** - Agentic AI systems solve problems by ingesting diverse data, independently analyzing challenges, developing strategic solutions, and autonomously executing tasks.

### **AI Kiran: Empowering Women in AI**

*Recently, the AI Kiran, a national movement co-led by the Principal Scientific Adviser (PSA), Verix, and INK Women, aims to boost women's leadership in India's rapidly growing AI sector.*

- **Addressing Gender Disparity** - Despite rising STEM enrollment, women hold only 33% of junior and 19% of senior GenAI roles, highlighting the urgent need for diverse leadership to combat algorithmic bias.
- **Goals** -The initiative seeks to empower women innovators, create an inclusive AI ecosystem, develop funding, and provide mentorship, learning, and leadership opportunities.
- **Recognizing Women Leaders** - AI Kiran spotlights over 250 prominent women in AI across sectors like education and healthcare, amplifying their voices and inspiring future generations.
- **Collaborative Multi-Stakeholder Approach** - AI Kiran fosters partnerships between government, corporations, and civil society to create pathways and support for women in AI, hosted on the Manthan Platform.

### **Pregnancy Anaemia and Heart Defects**

*A recent UK study suggests that anaemia in pregnant women may be linked to a 47 percent increased risk of congenital heart conditions in their newborns.*

- **Understanding Anaemia** - Anaemia is characterized by insufficient healthy red blood cells or haemoglobin, hindering oxygen transport to the body's tissues, leading to fatigue and weakness.
- **Haemoglobin's Crucial Role**- Haemoglobin, a protein in red blood cells, is vital for carrying oxygen from the lungs to all organs throughout the body.
- **Global Anaemia Prevalence** - The WHO estimates significant anaemia rates globally: 40% in young children, 37% in pregnant women, and 30% in women of reproductive age.
- **Types and Severity of Anaemia**- Anaemia has various forms, both inherited and acquired, and can range from mild to severe, with severe cases potentially being life-threatening or indicating serious illnesses.
- **Management and Prevention** - Treatment involves supplements or medical procedures. Iron-deficiency anaemia, a common type, is often due to insufficient iron intake or absorption, or blood loss. A healthy diet can help prevent some forms.

### **Sachet App: Real-Time Disaster Alerts**

*National Disaster Management Authority (NDMA) Sachet app enhances disaster preparedness by delivering real-time, geo-tagged alerts for various disasters like floods and cyclones via the Common Alerting Protocol (CAP).*

- **Localized and Comprehensive Coverage** - Users can subscribe to alerts for specific states or districts, receiving localized awareness and covering a wide range of disasters.
- **Key Features** - App provides daily weather updates from IMD, critical information from government sources, Dos and Don'ts for disasters, and helpline numbers. Satellite connectivity ensures communication during network failures.
- **Multi-Language Accessibility** - Supporting 12 Indian languages with translation and read-out options, the app promotes inclusivity and is available on Android and iOS.
- **Operation Brahma: India's Humanitarian Aid** – PM Modi highlighted India's aid to Myanmar post-earthquake through Operation Brahma, showcasing commitment to international disaster response.
- **Empowering Individual Alertness** - The Sachet app empowers citizens with timely information, encouraging proactive measures and safeguarding lives during emergencies.
- The Common Alerting Protocol (CAP) is a standardized message format designed for all media, all hazards, and all communication channels.
- That is, a universal format for emergency alerts, ensuring critical information reaches everyone.

### **Shahid Rajae Port Explosion**

*An explosion recently occurred at Iran's Shahid Rajaee port, the country's largest and most advanced terminal, within the Bandar Abbas Port Complex.*

- **Rocket Fuel Shipment Involved** - The explosion reportedly involved a shipment of "sodium perchlorate rocket fuel," a substance used in missile production.
- **Strategic Location of Bandar Abbas** - Bandar Abbas Port is strategically situated on the Strait of Hormuz in southern Iran, west of the Chabahar port.
- **Global Oil Trade Hub** - Notably, approximately 20 percent of the world's oil trade transits through the Strait of Hormuz, highlighting the port's global significance.
- **Key Persian Gulf Gateway** - The port serves as a crucial maritime link between the Persian Gulf and the Gulf of Oman.
- **Implications of the Incident** - The explosion at this key Iranian port, involving missile fuel, raises concerns about potential disruptions and security in a vital global trade route.

### *Ramanujan's Life in New Book*

*Recently, National Archives of India and Vani Prakashan will launch "Ramanujan: Journey of a Great Mathematician" tomorrow, April 30, 2025.*

- **Significance of the Launch** - The event celebrates Srinivasa Ramanujan, a globally influential Indian mathematician, highlighting his enduring impact and India's archival wealth.
- **Book's Central Theme** - Authored by Arun Singhal and Devendra Kumar Sharma, the book explores Ramanujan's extraordinary life, genius, and significant mathematical contributions despite limited formal education.
- **Key Research Insights** - Based on rare original documents and personal letters, the book offers a deeper understanding of Ramanujan's thinking and achievements.
- **Focus on Struggles and Context** - It also sheds light on his personal challenges and the historical and cultural backdrop that influenced his groundbreaking work.
- **Collaborative Effort** - The National Archives of India, preserving national heritage, and Vani Prakashan, a noted publisher, have collaborated to bring Ramanujan's inspiring story to a wider audience.

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