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INDIA STATE OF FOREST REPORT 2023

Other topics

- SC proceedings on the Places of Worship Act 1991
- China Plus One opportunity
- CPI base year revision
- Generation in fighter jets
- Universal Health Coverage in India

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 CONTENTS

1. POLITY & GOVERNANCE

COULD THE POSH ACT APPLY TO POLITICAL PARTIES? 5

SC PROCEEDINGS ON THE PLACES OF WORSHIP ACT 1991 6

IMPEACHMENT OF JUDGES 8

NATIONAL HUMAN RIGHTS COMMISSION (NHRC) 9

OPEN JAILS IN INDIA 10

SHORT ARTICLES

SIMULTANEOUS ELECTIONS BILLS TABLED IN LOK SABHA 11

GOVERNMENT AMENDS RULE TO RESTRICT ACCESS TO POLLING FOOTAGE 12

ONE-STOP CENTRES (OSCs) 12

POOR ELECTORAL PARTICIPATION OF OVERSEAS INDIAN VOTERS IN LOK SABHA POLLS 2024 13

NATIONAL INVESTIGATION AGENCY (NIA) POWERS EXPANDED 13

EKLAVYA SCHOOLS 14

REMOVAL OF VICE-PRESIDENT 14

NEW UGC GUIDELINES TO PROMOTE 'LIFE-LONG' LEARNING 15

K RADHAKRISHNAN COMMITTEE 15

DOMESTIC MIGRATION IN INDIA 16

NATIONAL PANCHAYAT AWARDS 2024 16

CONSTITUTION DEBATE 17

HENDERSON DOCTRINE 17

PRIOR SANCTION PROVISION 17

2. INTERNATIONAL RELATIONS

TAPPING INTO KAZAKHSTAN'S RARE EARTHS POTENTIAL 20

'CHINA PLUS ONE' OPPORTUNITY 21

INDIA BANGLADESH EXTRADITION TREATY 23

HOW INDIA IS ENGAGING WITH THE NEW DHAKA 24

WHY WILL INDIA'S FOREIGN POLICY BE A TIGHTROPE WALK? 24

WHAT THE SYRIAN CRISIS MEANS FOR THE MIDDLE EAST AND INDIA 25

INDIA-SRI LANKA RELATIONS 27

SHORT ARTICLES

MOLDOVA JOINS INTERNATIONAL SOLAR ALLIANCE (ISA) 29

SWISS REVOKES INDIA'S MFN STATUS 29

UN INTERNAL JUSTICE COUNCIL 30

INDIA KUWAIT RELATIONS 30

MARTIAL LAW IN SOUTH KOREA 31

INTERNATIONAL SOCIAL SECURITY ASSOCIATION (ISSA) 32

AUSTRALIA'S ONLINE SAFETY AMENDMENT 32

INDIA INTERNET GOVERNANCE FORUM 32

INTERNATIONAL ADVISORY BODY FOR SUBMARINE CABLE RESILIENCE 33

UNITED NATIONS (UN) PEACEBUILDING COMMISSION 33

ATHLETE BIOLOGICAL PASSPORT (ABP) 34

UNITED NATIONS DISENGAGEMENT OBSERVER FORCE (UNDOF) 34

COMPREHENSIVE AND PROGRESSIVE AGREEMENT FOR TRANS-PACIFIC PARTNERSHIP (CPTPP) 35

3. ECONOMY

INDIA'S HORTICULTURE SECTOR IN ENERGY-DEPENDENT WORLD, THE ISSUE OF FOOD SECURITY 37

INDIAN ECO GROWTH V/S EMISSIONS 39

Sources



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CPI BASE YEAR REVISION	40	CRIMES AGAINST HUMANITY (CAH TREATY)	62
DRYLAND FARMING	41		
INDIA AS A GLOBAL SKILL SUPPLIER	42	SHORT ARTICLES	
DE-DOLLARISATION	43	INS TUSHIL	64
		UN COMMISSION ON NARCOTIC DRUGS	64
SHORT ARTICLES		CRIME AND CRIMINAL TRACKING NETWORKS AND SYSTEMS (CCTNS)	65
WHY IS THE INDIAN RUPEE FALLING AGAINST THE US DOLLAR?	45	STARLINK DEVICES	65
55TH GST MEETING	45	PROTECTED AREA REGIME	66
ASUSE RESULTS	46	GPS SPOOFING	67
RBI IS LEVERAGING AI TO CRACK DOWN ON 'MULE BANK ACCOUNTS	47		
RBI'S STATE FINANCES: A STUDY OF BUDGETS OF 2024-25	47	5. ENVIRONMENT & ECOLOGY	
OPINION TRADING	47	ISFR REPORT 2023	69
PARLIAMENTARY PANEL ON AGRICULTURE RECOMMENDATIONS	48	DROUGHT ATLAS	70
RIGHT TO DISCONNECT	48	FOREST FIRE	71
COPPER INDUSTRY IN INDIA	49	CLIMATE IMPACT OF SPACE EXPLORATION	73
COMMISSIONER OF RAILWAY SAFETY (CRS)	49	HOW DOES LA NINA AFFECT INDIA'S CLIMATE	74
FEMALE LABOUR FORCE PARTICIPATION RATE ROSE DURING 2017-18 TO 2022-23	49	E-WASTE IN INDIA	75
STRATEGIC RESERVES	50	THE GLOBAL WARMING FIGHT HAS A CHALLENGE FOR INDIA	77
CREDIT GUARANTEE SCHEME FOR E-NWR-BASED PLEDGE FINANCING (CGS-NPF)	50		
INDIA SKILLS REPORT 2025	50	SHORT ARTICLES	
		POLICY TO MANAGE SACRED GROOVES	78
4. DEFENCE & SECURITY			
INDIA'S UNREGULATED AI SURVEILLANCE	55	6. SCIENCE & TECHNOLOGY AND HEALTH	
EXERCISE HARIMAU SHAKTI	56	CHALLENGE OF UNIVERSAL HEALTH COVERAGE IN INDIA	83
GENERATION IN FIGHTER JETS	57	PACKAGED DRINKING WATER CLASSIFIED AS HIGH RISK FOOD	84
WOMEN PERSONNEL IN CAPF	58	MAKING AFFORDABLE GENERICS MORE RELIABLE	86
ISSUE OF SMUGGLING IN INDIA	59		
		SHORT ARTICLES	
		ecDNA	88

NANOBUBBLES	88
ULTRA-PROCESSED FOODS IN US DIETS	89
MALARIA CASES IN INDIA	90
QUANTUM SATELLITES	91
PSLV C60	91

7. CULTURE & HISTORY

C. RAJAGOPALACHARI	107
--------------------	-----

SHORT ARTICLES

INTACH	107
--------	-----

8. GEOGRAPHY & DISASTER MANAGEMENT

ALL IS NOT WELL WITH THE SOIL	112
SILICA MINING	113
WASTE FROM RENEWABLE SOURCES	114
WORLD SOLAR REPORT 2024	115
SHANAN HYDEL PROJECT	116
KEN BETWA RLP	118

SHORT ARTICLES

SILIGURI CORRIDOR	119
LANDFALL OF A CYCLONE	119
SANTA ANA-DRIVEN WILDFIRES	119
PHLEGRAEAN FIELDS	119
ANGAMI TRIBE	120
LONAR LAKE	120
MELYE-AMILEY	120
SARAT	121
BARLEY	121
HYDROTHERMAL VENTS	121

9. GOVERNMENT SCHEMES

SHORT ARTICLES

GOVERNMENT COULD DISCONTINUE THE SOVEREIGN GOLD SCHEME	125
BIMA SAKHI YOJNA	125
YUVA SAHAKAR SCHEME	126
PRAGATI	126
SVAMITVA SCHEME	127
AYUSH OUSHADHI GUNVATTA EVAM	
UTTPADAN SAMVARDHAN YOJANA	127
HOMI BHABHA CHAIR SCHEME	128

1. POLITY & GOVERNANCE

1.1 COULD THE POSH ACT APPLY TO POLITICAL PARTIES?

Context

- The Public Interest Litigation (PIL) filed before the Supreme Court argued that the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013 (POSH Act) should be extended to political parties.

About the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act of 2013

- The Act aims to prevent and address sexual harassment of women in the workplace.
- The POSH Act is **based on the Vishaka Guidelines**, issued by the Supreme Court in 1997 to define sexual harassment and impose prohibition, prevention, and reparation requirements on institutions.
- Sexual harassment is defined as any unwanted sexual act or behaviour, such as physical contact, demands for sexual favours, sexually coloured remarks, the display of pornography, or any other unwelcome sexual physical, verbal, or nonverbal conduct
- It established a Complaints Committee to investigate workplace sexual harassment complaints, making them legally binding.

Main provisions of the PoSH Act

- The Act **applies to all women, regardless of age or employment status**, in both organised and unorganised sectors.
- It applies to workplaces such as offices, factories, educational institutions, and hospitals, as well as public spaces such as transportation and entertainment venues.
- **Every organisation with ten or more employees must form an Internal Complaints Committee (ICC)**. The committee should be at least half female, with a senior female employee serving as the presiding officer, as

well as members with backgrounds in women's rights or non-governmental organisations.

- The **District Officer will form a Local Complaints Committee (LCC) for workplaces with less than ten employees** or when a complaint is filed against the employer. The LCC exercises powers and functions similar to those of the ICC.

How can a complaint be filed under the POSH Act?

- A woman who has been sexually harassed at work can file a **complaint within 3 months of the incident**. Complaints can be filed with the ICC or the LCC, depending on the size and nature of the workplace.

What is the process for investigation and action under the Act?

- **The ICC or LCC must investigate a complaint within 90 days** and submit a report with recommendations to the employer or district officer.
- The employer or district officer must then **act on the recommendations within 60 days** and notify both the complainant and the respondent of the results.

How does the POSH Act define a workplace, and who does it apply to?

- The POSH Act applies to any workplace where women are employed. Section 3(1) of the Act states that no woman shall be subjected to sexual harassment in any workplace.
- **The term "workplace" covers both public and private sector organisations**, hospitals, nursing homes, sports venues, and even locations that employees visit during the job.

Applicability of the POSH Act to political parties

- In the 2022 case Centre for Constitutional Rights Research and Advocacy v/s State of Kerala & Ors, the Kerala High Court ruled that political parties are not required to form ICCs.
- The court stated that there is no employer-employee relationship between party members, and political parties do not meet the definition of a "workplace" under the POSH Act.

Could the POSH Act apply to political parties despite the Kerala High Court ruling?

- While the Kerala High Court decision stated that political parties are not required to establish ICCs, the possibility of the POSH Act applying to them is not entirely eliminated.
- The term "workplace" in the Act could refer to locations visited by party workers while

working. Also, the POSH Act's broad definition of "employee" may include temporary or contract workers, as well as political party volunteers.

How does the POSH Act address the issue of determining who is the "employer" in political parties?

- In political parties, the question of who the "employer" is becomes complicated because party workers usually do not have a clear workplace or employer-employee relationship.
- However, the hierarchy within party constitutions may provide guidance in determining the "employer." For example, while the BJP and Congress have well-defined organisational structures and disciplinary committees, they do not currently mandate ICCs as required by the POSH Act.

The Election Commission of India (ECI) handles the compliance of political parties with various laws

- The ECI has authority under Article 324 of the Constitution to oversee elections, but its role in ensuring compliance with laws such as the POSH Act is unclear.
- The ECI regularly issues advisories to political parties to ensure that they comply with various laws. For example, in advance of the 2024 Lok Sabha elections, the ECI directed parties to ensure that children are not involved in campaigning, in accordance with the Child Labour (Prohibition and Regulation) Act of 1986.

1.2 SC PROCEEDINGS ON THE PLACES OF WORSHIP ACT 1991

Context

- The Supreme Court prohibited civil courts from filing new lawsuits challenging the ownership or title to religious properties. It also prohibits orders to survey disputed religious sites until the next hearing on February 17, 2025.

About the Places of Worship Act 1991?

- The Act was enacted during the Ramjanmabhoomi movement, which aimed to build a Ram temple at the Babri Masjid site

in Ayodhya. The law was enacted to prevent future religious unrest and lawsuits.

- The Act aims to **preserve the religious character of places of worship as they existed on August 15, 1947**, prohibiting the conversion of any place of worship, whether within or between religions, to maintain its original form.
- It states that any existing legal proceedings involving religious conversions that were pending on that date will be suspended, and no new proceedings will be initiated. Section

5 of the Act excludes the Ramjanmabhoomi-Babri Masjid case from its provisions, making it a special exception to the law's application.

explained how religious identities coexist in certain places of worship, recognising "hybrid character" situations to solve disputes.

Current case before the Supreme Court

- The present case involves petitions that challenge the Act's constitutional validity.
- Petitioners claim that it violates judicial review, a fundamental feature of the Constitution, and imposes an arbitrary retrospective cutoff date that limits the religious rights of Hindus, Jains, Buddhists, and Sikhs.

What are the core questions before the Supreme Court?

- The main question is whether district courts hearing civil suits over ownership or title to places of worship compromise the 1991 Act's objective of addressing such disputes and preventing future conversions.

What earlier observations did the Supreme Court make?

- In 2022, the Court clarified that surveying a place of worship does not automatically violate the 1991 Act. The Court also

What was the Supreme Court's initial decision in the recent case?

- The Court asked the Union Government to clarify its position on the constitutional validity of the Act within four weeks.
- The Court also emphasized that lower civil courts must follow the principles laid out in the Ayodhya judgment and the 1991 act, stressing that civil courts should not act in a manner that contradicts Supreme Court rulings.

What are the bigger constitutional questions?

- The Supreme Court stated that even without the Places of Worship Act, constitutional principles may prevent suits attempting to change the religious character of places of worship.
- The petitions questioning whether the Act limits judicial review powers add another layer of constitutional scrutiny.

Some notable pending lawsuits challenging the Places of Worship Act of 1991

- **Gyanvapi Mosque dispute in Varanasi:** Claims the mosque was built on the site of the Kashi Vishwanath Temple. In 2021, Hindu devotees requested permission to worship idols allegedly housed within the mosque. The courts granted partial access to worship.
- **Shahi Idgah Mosque in Mathura:** Claims the mosque was built on the birthplace of Lord Krishna. Petitioners question a 1968 agreement that allowed mosques and temples to coexist. The Allahabad High Court is hearing the case.
- **Teele Wali Masjid in Lucknow:** Claims the mosque was built on Laxman Teela after a Hindu temple was demolished. The case is pending in the Allahabad High Court.
- **Atala Mosque in Jaunpur:** Claims an ancient temple dedicated to Atala Devi once existed on the site of the mosque. A court ordered a survey, but the case is currently being challenged in the Allahabad High Court.
- **Quwwat-ul-Islam Mosque in Delhi:** Claims the mosque in the Qutub Minar complex was built after the destruction of 27 Hindu and Jain temples. The suit was rejected by a lower court, and an appeal is pending before an Additional District Judge.
- **Shamsi Jama Masjid in Sambhal:** Claims the mosque was built on top of a temple dedicated to Lord Kalki. A local court ordered a survey, which was later overruled by the Supreme Court.
- **Ajmer Sharif Dargah:** Alleges the presence of a Lord Shiva temple on the property. Notices have been issued to the appropriate authorities, and the case is ongoing.

1.3 IMPEACHMENT OF JUDGES

Context

- The opposition INDIA bloc parties in the Rajya Sabha moved an impeachment motion against Allahabad High Court judge Justice Shekhar Kumar Yadav for religious comments.

How can a judge be removed from office?

- A judge can be removed from office for "proven misbehaviour or incapacity." Articles 124 and 218 of the Constitution outline the process for removing Supreme Court and High Court judges, respectively. Although the term "impeachment" does not appear in the Constitution.

What is the procedure for removing a judge?

The Judges Inquiry Act of 1968 establishes a specific procedure for the removal of a judge.

- **Step 1:** A motion for impeachment can be introduced in either House of Parliament. To start this, **at least 100 Lok Sabha members or 50 Rajya Sabha members must send a signed notice to the Speaker or Chairman.** Following consultations and an examination of relevant materials, the **Speaker or Chairman may decide whether or not to accept the motion.**
- **Step 2:** Once the motion is approved, the Speaker or Chairman appoints a three-member committee to investigate the matter. This **committee is made up of three members: a Supreme Court judge, a High Court Chief Justice, and a distinguished jurist.** The committee frames charges, which are then shared with the judge, who may present a written defence.
- **Step 3:** After the investigation, the committee submits its report to the Speaker or Chairman, who then presents it to the respective House of Parliament. If the committee finds evidence of misbehaviour or incapacity, the motion for removal is debated.
- **Step 4:** For the motion to pass, it must be **supported by a majority of at least two-thirds of the members present and voting.** If both Houses adopt the motion, it is sent to the President for approval, who issues an order to remove the judge from office.

Why is impeachment difficult to execute?

- The impeachment process is difficult because it requires a high level of support in Parliament. At least two-thirds of those present and voting must approve the motion, which requires political consensus across party lines.
- The Speaker or Chairman of the House also plays an important role in admitting the motion, and the committee's investigation must establish solid evidence of misbehaviour or incapacity.

Attempted impeachments of judges in India (No Judge has been impeached till now)

- **Justice V Ramaswami (1993):** Charged with financial fraud, the motion failed, and he retired.
- **Justice Soumitra Sen (2011):** Charged with corruption, he resigned before the motion could be debated in Lok Sabha.
- **Justice S K Gangele (2015):** Accused of sexual harassment, but the committee cleared him.
- **Justice J B Pardiwala (2015):** Impeachment proposed controversial remarks about reservations, but the motion was dropped after he deleted the remarks.
- **Justice C V Nagarjuna (2017):** Faced impeachment for victimizing a Dalit judge, but the motion failed after MPs withdrew their support.
- **Former Chief Justice of India Dipak Misra (2018):** The

1.4 NATIONAL HUMAN RIGHTS COMMISSION (NHRC)

Context

- V. Ramasubramanian, a former Supreme Court judge, has been appointed as the **9th Chairperson of the National Human Rights Commission**.

About the National Human Rights Commission (NHRC)

- It is an independent **statutory body** established under the Protection of Human Rights Act, 1993.
- The NHRC is a multi-member body with:
 - **Full-Time Members:** A chairperson (retired Chief Justice of India or Supreme Court judge) and five members, including a sitting or retired judge of the Supreme Court, a sitting or retired Chief Justice of a High Court, and three individuals with human rights expertise (at least one being a woman).
 - **Ex-officio Members:** Chairpersons of various national commissions, including those for Minorities, Scheduled Castes, Scheduled Tribes, Women, Backward Classes, Protection of Child Rights, and the Chief Commissioner for Persons with Disabilities.
- The NHRC **submits an annual report to the Central and relevant State Governments**, which must present the reports to each House of Parliament or State Legislature with a memorandum detailing actions taken or proposed in response to the recommendations.

How are the chairperson and members of the NHRC appointed?

- They are **appointed by the President** of India based on the recommendations of a six-member committee headed by the Prime Minister, including the Speaker of the Lok Sabha, Deputy Chairman of the Rajya Sabha,

Leaders of the Opposition in both Houses of Parliament, and the Union Home Minister.

- For a sitting judge of the Supreme Court or a sitting Chief Justice of a High Court, prior consultation with the Chief Justice of India is required.

Tenure and conditions of service

- The chairperson and members serve for a **term of three years or until they reach the age of 70 years**, whichever is earlier.
- They are **eligible for reappointment** but cannot seek further employment with the Central or State governments after their tenure concludes.
- Salaries, allowances, and service conditions are set by the Central government and cannot be altered to their disadvantage after appointment.

What powers does the NHRC have?

- It has the authority to regulate its procedures and possesses all the powers of a civil court. It can call for information or reports from governments and subordinate authorities.
- It has investigative staff for human rights complaints and can use officers or investigative agencies as needed.
- It can recommend compensation or damages, legal proceedings, interim relief, and approach higher courts for directions or orders. However, it **cannot inquire into matters after one year from the date of the alleged human rights violation**.

How can NHRC members be removed?

- The President can remove the chairperson or members under certain circumstances, such as insolvency, engaging in outside paid employment, physical or mental incapacity, being declared of unsound mind, or conviction for a crime.

- For proven misbehaviour or incapacity, the President must refer the matter to the Supreme Court for inquiry. If the Court

confirms the grounds for removal, the President can remove the individual.

1.5 OPEN JAILS IN INDIA

Context

- The Supreme Court has appointed a court commissioner to inspect and report on the Sanganer open prison site in Rajasthan.

What is an open prison?

- According to the Model Prisons and Correctional Services Act of 2023, an **open prison is a facility where prisoners are confined under specific conditions** that give them more freedom to facilitate their rehabilitation after release.
- In these prisons, prisoners can engage in activities such as agriculture and other work that will help them reintegrate into society.

How do open prisons function?

- Open prisons are designed with minimal security, allowing prisoners to participate in activities outside the prison.
- The nature of the crime, behaviour in jail, and time served all play a role in the selection process for these prisons.
- Some open prisons are located within closed prisons, but prisoners in open prisons have the opportunity to participate in community service.
- **These jails help to alleviate overcrowding** and make it easier for prisoners to adjust after being released.

What challenges do open prisons face?

- There is underutilisation, with many open prisons having empty spaces. Many prisoners who could benefit from rehabilitation are denied it due to strict and sometimes **arbitrary eligibility criteria**.
- The **lack of uniformity in rules across states**, resulting from the subject's inclusion on the state list, contributes to inequality. More accountability is needed in prison administration and selection.

How can open prisons in India be improved?

- Improving open prisons in India can involve relaxing eligibility requirements and expanding the number of open prisons.
- The current facilities must be used more effectively.
- To guarantee uniform reforms throughout the nation, the **prison system ought to be included on the Union list**.
- Introducing semi-open prisons may benefit mentally disturbed prisoners.

Open jails in India

- India currently has 91 open jails spread across 17 states, with a capacity to hold up to 6,043 inmates. Rajasthan has the most open jails (41), followed by Maharashtra (19).
- The first open jail in independent India was founded in 1949 in Lucknow.
- Sanganer open jail in Rajasthan, established in 1963, allows prisoners to live with their families, including children, and features a self-governing system and a primary school for both prisoners and children.

- Increasing prisoners' awareness about their rights and the selection process would encourage better behaviour and rehabilitation.

Way Forward

- Open prisons are essential for reformative justice because they allow prisoners to reconnect with society and prepare for their release.
- They mitigate the negative effects of imprisonment by providing a place for prisoners to work, live with their families, and engage in social activities.
- The current system requires improved implementation and reform.
- Expanding and improving open prisons across states would help to reduce overcrowding, improve prisoner rehabilitation, and ultimately lower custodial death rates.

1.6 SHORT ARTICLES

Simultaneous Elections Bills tabled in Lok Sabha

Context

- The government introduced Bills in the Lok Sabha to allow for simultaneous elections.

About the Constitution (129th Amendment) Bill 2024

- It aims to **allow simultaneous elections to the Lok Sabha and state assemblies**.
- It proposes amendments to three articles of the Constitution and **introduces Article 82A** to allow for the coordination of election dates for the central and state legislatures.
- The Bill allows for simultaneous elections to be held for the Lok Sabha and all state assemblies, starting with the **2034 election cycle**, considering the 18th and 19th Lok Sabhas complete their full terms.

The Bill amends Articles 83, 172, and 327 of the Constitution:

- **Article 83:** It modifies the duration of the Lok Sabha. If the Lok Sabha is dissolved before completing its full term, the next Lok Sabha will serve only the remaining term. For example, if the Lok Sabha is dissolved after 3 years, the next Lok Sabha will serve for the remaining 2 years.
- **Article 172:** It adjusts the duration of state assemblies. If a state assembly is dissolved early, the next election will be for the

unexpired period, ensuring it aligns with the Lok Sabha's term.

- **Article 327:** It empowers Parliament to conduct simultaneous elections for the Lok Sabha and state legislatures.

Introduces Article 82A in the Constitution

- Article 82A introduces a provision for the **President to notify the implementation of the amendments after the first sitting of the Lok Sabha following a general election** to ensure that the terms of state assemblies align with the five-year term of the Lok Sabha.
- It also empowers the Election Commission of India (ECI) to conduct simultaneous elections and gives it the authority to postpone assembly elections if necessary, without affecting the assembly's term.

What will happen if an assembly election cannot be conducted simultaneously?

- If the Election Commission of India (ECI) specifies that an assembly election cannot be conducted at the same time as the Lok Sabha election, it may recommend postponing that assembly election.
- However, even if the election is deferred, the term of the assembly will still end with the completion of the full term of the Lok Sabha elected in the general election.

Why are municipal elections excluded from the simultaneous elections proposal?

- Municipal elections are excluded from the simultaneous elections proposal because **including them would require ratification by at least half of the state legislatures**, a complex process.

Government amends rule to Restrict Access to Polling Footage

Context

- The Union Government amended the Conduct of Election Rules to limit public access to specific election documents.

Details

- The Union Government recently **amended Rule 93 of the Conduct of Election Rules, 1961 to limit public access to certain election-related documents**, mainly electronic records such as CCTV footage, webcasting clips, and video recordings.
- The new rule restricts access to only those documents explicitly mentioned in the rules, unlike the previous rule, which allowed access to all "papers" related to elections.

What are the arguments in favor of this amendment?

- Supporters argue that the **amendment is necessary to protect voter privacy and safety**, especially in sensitive areas like Jammu and Kashmir or regions affected by Naxal violence.
- They highlight the need to protect sensitive information while maintaining public access to essential documents like election results and nomination forms.

What criticisms have been raised against this amendment?

- Critics believe that limiting access to records such as observer reports, voter turnout data, and presiding officer diaries **prevents proper scrutiny and undermines election fairness**.
- Many activists see the exclusion of electronic records as a setback for transparency and democracy.

Way Forward

- The government and the Election Commission should implement transparency measures to maintain public trust in the electoral process, they should strike a balance between protecting voter privacy and ensuring accountability of the electoral process.

One-Stop Centres (OSCs)

Context

- The Ministry of Women and Child Development's Empowered Committee has approved the Ministry of External Affairs' proposal to establish nine One-Stop Centres (OSCs) to assist vulnerable women.

About the One-Stop Centres (OSCs) program

- The Ministry of Women and Child Development (MWCD) launched the One-Stop Centres (OSCs), also known as the Sakhi program, in 2015.
- In 2022–2023, it was **integrated into Mission Shakti's Sambal sub-scheme**.
- The scheme is **funded by the Nirbhaya Fund**, with 100% financial assistance provided by the Central Government.

Objectives of the One-Stop Centres (OSCs)

- To provide comprehensive support to women affected by violence, whether in private or public spaces.
- To offer both emergency and non-emergency services, including medical, legal, psychological, and counselling support—all under one roof.
- It includes services for minors in accordance with the Juvenile Justice (Care and Protection of Children) Act of 2000 and the Protection of Children from Sexual Offences Act of 2012.

What services are offered by the One-Stop Centres (OSCs)?

- **Emergency response and rescue services:** Provided in collaboration with the National Health Mission (NHM), police, and ambulances.

- **Medical assistance:** Includes referrals to the nearest hospital, as per Ministry of Health and Family Welfare guidelines.
- **Legal assistance:** This includes help with filing FIRs and NCRs and legal aid through appointed lawyers or legal service authorities.
- **Psychosocial support/counselling:** Skilled counsellors provide counselling to women affected by violence.
- **Temporary shelter:** Women and children who have been victims of violence are provided shelter.
- **Video conferencing facilities:** This helps facilitate smooth police and court proceedings.

Poor Electoral Participation of Overseas Indian Voters in Lok Sabha Polls 2024

Context

- Kerala had the most overseas Indian voters (89,839) in 2024.

What is the trend of overseas Indian voter participation in the 2024 Lok Sabha elections?

- In the 2024 Lok Sabha elections, nearly 1.2 lakh overseas Indians registered as electors, showing an increase from 99,844 registrations in 2019. However, the **actual voter turnout was very low, with only 2,958 overseas electors casting their votes.**
- Kerala contributed the majority, with **2,670 votes.** States like Karnataka, Uttar Pradesh, Tamil Nadu, Assam, Bihar, and Goa saw no participation, while Gujarat and Maharashtra recorded minimal turnout, with only 2 and 17 votes, respectively.

Current voting rights and processes for overseas Indian voters

- They can register as electors if they haven't acquired foreign citizenship. They are allowed to vote only in the constituency listed on their passport.
- To vote, they must travel to India and cast their vote in person at the polling station.

Voters are required to show their original passport for identity verification.

- **Voting rights for NRIs were introduced in 2011** through an amendment to the Representation of the People Act, 1950.

Why does the participation remain so low despite their registration?

- The low participation can be the result of various **logistical and financial challenges. Overseas voters need to travel to India to vote, which can be expensive.**
- Many NRIs face employment or educational commitments that make it difficult to return to India for the elections.

How can the participation of overseas Indian voters be improved?

- There have been proposals to allow overseas Indians to vote by proxy or through postal ballots. While a bill for proxy voting was passed in the Lok Sabha in 2018, it is still pending in the Rajya Sabha.
- The Election Commission has suggested extending the Electronically Transmitted Postal Ballot System (ETPBS) to overseas voters, allowing them to vote from abroad, however, the government has yet to take the decision on the proposals.

National Investigation Agency (NIA) powers expanded

Context

- The Supreme Court expanded the NIA's jurisdiction.

Highlights of the Supreme Court Judgment

- The Supreme Court expanded the NIA's jurisdiction by allowing it to investigate non-scheduled offences linked to scheduled offences under the NIA Act.
- The Court clarified that **Section 8 permits the NIA to investigate any offences the accused may have committed**, as long as those offences are connected to the Scheduled Offence being investigated.

About National Investigation Agency (NIA)

- The NIA is a counter-terrorism law enforcement agency **established under the NIA Act of 2008**, in response to the 26/11 Mumbai terror attacks, which highlighted the need for a specialised agency to combat terror-related crimes.
- It is **part of the Ministry of Home Affairs** and can investigate terrorism-related cases throughout the country, including funding, attacks, and other associated crimes.

What distinguishes the NIA from the Central Bureau of Investigation (CBI)?

- The NIA is responsible for terrorism-related crimes and reports to the Ministry of Home Affairs. The CBI investigates a broader range of crimes, including corruption, economic crimes, and organised crime, and reports to the Ministry of Personnel, Public Grievances, and Pensions.
- The NIA has the authority to investigate terrorism cases without state consent, whereas the CBI must obtain state approval unless ordered by the courts.

Eklavya Schools

Context

- The government is struggling to fill the 5% sub-quota for Particularly Vulnerable Tribal Groups (PVTGs) in admissions to Eklavya Model Residential Schools.

About Eklavya Model Residential Schools (EMRS)

- It was **launched in 1997-98 to provide quality education to Scheduled Tribe (ST) children** in remote areas.
- **Non-ST students can be admitted to these schools, but only up to 10% of the available seats.**
- They are established in states and union territories through grants under Article 275(1) of the Indian Constitution.
- **They follow the CBSE curriculum**, and the education is entirely free. These schools are co-educational residential institutions for students in grades VI through XII.

- Each school can accommodate 480 students, with an equal number of seats for boys and girls.
- The National Education Society for Tribal Students (NESTS), an autonomous body under the Ministry of Tribal Affairs, manages the establishment and operation of EMRS throughout India.

Sub-quota for PVTG students in EMRS

- In 2019, the government established the National Education Society for Tribal Students (NESTS), and its guidelines included the **5% sub-quota for PVTG (Particularly Vulnerable Tribal Groups) students**. Currently, only 3.4% of the students in these schools come from PVTG communities.
- Infrastructure gaps, teacher shortages, the pressure to work for a living, and concerns about the quality of education have contributed to a higher dropout rate among PVTG students.

Removal of Vice-President

Context

- Opposition parties in the INDIA bloc have moved a notice to remove the Chairman of the Rajya Sabha from his office.

About the Vice-President of India

- The **Vice-President of India is the second-highest constitutional office** after the President, and he serves as the Rajya Sabha's ex-officio chairman.
- Under Article 66 of the Constitution, a candidate must:
 - Be a citizen of India.
 - Be at least 35 years old.
 - Be qualified for election to the Rajya Sabha.
 - Not hold any profit-making positions in the Union or state governments.
- He is **elected by an electoral college consisting of members of both Houses of Parliament** through a system of proportional representation by means of a single transferable vote.

- The Vice-President's Electoral College includes both elected and nominated members of Parliament, whereas the President's Electoral College only includes elected members.
 - Members of the state legislative assembly do not participate in the Vice President's electoral college, but they do participate in the President's electoral process.
- He serves a five-year term and is eligible for reelection.

Roles and powers of the Vice-President

- Acts as the **Rajya Sabha's Ex-Officio Chairman**, presiding over sessions, ensuring smooth proceedings, and voting only to break a tie.
- Performs the President's functions when they are absent, resigned, removed, or died until a new President is elected.
- Represents the office's dignity and neutrality without engaging in daily governance.

How can the Vice-President of India be removed from office?

- According to Article 67(b), the **Vice-President can be removed by a resolution passed by a majority of all Rajya Sabha members, with the approval of the Lok Sabha by a simple majority.**
- The resolution requires at least 14 days' notice before it can be moved.
- There have been resolutions against Lok Sabha Speakers G V Mavalankar (1951), Sardar Hukam Singh (1966), and Balram Jakhar (1987). However, these resolutions were debated and rejected by the House.

New UGC Guidelines to promote 'Life-Long' Learning

Context

- The University Grants Commission (UGC) has finalized the 'Draft Guidelines for Implementation of Recognition of Prior Learning (RPL) in Higher Education' to increase educational access and promote the concept of lifelong learning.

What is Recognition of Prior Learning (RPL)

- It is a **formal mechanism for evaluating and recognizing an individual's previous skills, knowledge, and experience** gained through informal, non-formal, or experiential learning.
- The UGC guidelines **support the National Education Policy (NEP) 2020** vision by allowing individuals to obtain formal recognition for skills acquired through informal or non-formal learning to improve their career opportunities and employability.

What is the expected long-term outcome of the RPL guidelines?

- The guidelines aim to create a **more equitable, capable, and skilled workforce** that can meet the challenges of a rapidly changing job market by promoting lifelong education and recognizing diverse learning experiences

K Radhakrishnan Committee

Context

- The Ministry of Education received a report from a high-level committee led by former ISRO Chairman Dr K Radhakrishnan.

What was the purpose of the Dr. K Radhakrishnan Committee?

- The committee was **formed in June 2024 following a NEET-UG exam paper leak** that indicated serious shortcomings in exam security.
- The Ministry of Education tasked the committee to recommend reforms for the examination process, strengthening data security protocols, and improving the structure and operation of the National Testing Agency (NTA).

What reforms did the committee suggest for conducting exams?

- Conduct entrance exams online wherever feasible.
- Transmit question papers digitally while allowing answers on paper.
- **Allocate exam centres in the candidate's district of residence** to reduce travel burdens.

- Establish secure testing centres in every district, with mobile testing units for remote areas.
- Introduce multi-session and multi-stage exams for enhanced fairness and flexibility.
- Use Aadhaar biometrics for multi-stage identity verification.
- Train question-paper teams and implement strict guidelines for question setting.

Domestic Migration in India

Context

- The report "400 Million Dreams!" was recently published by the Economic Advisory Council to the Prime Minister (EAC-PM).

Highlights of the EAC-PM report on domestic migration

- According to the report, **India's domestic migration rate has decreased**, with the total number of migrants falling from 45.57 crore in 2011 to 40.20 crore in 2023, an 11.78% decrease. In 2023, the migration rate is 28.88%, down from 37.64% in 2011.
- The report highlighted that migration trends are estimated using three datasets: district-level banking data on remittances, Telecom Regulatory Authority of India (TRAI) mobile roaming data, and Indian Railway Unreserved Ticketing System (UTS).

What are the reasons for the slowdown in migration?

- **Better economic opportunities and living conditions in smaller cities and towns**, and improved services, including healthcare, education, infrastructure, and connectivity in these areas have reduced the need for people to relocate to larger cities.
- The availability of jobs and improved local economies in areas near traditional migration hubs also contribute to the slowdown in migration.

Top recipient states of migrants

- **West Bengal, Rajasthan, and Karnataka have seen the greatest increase in the percentage share of arriving passengers**, while

How has the government responded to the committee's recommendations?

- The Ministry of Education requested state and UT approval to implement these reforms.
- It has also created 16 permanent positions for the NTA, reducing its dependence on contract employees.
- A high-powered steering committee was formed to oversee the implementation of these reforms.
Maharashtra and Andhra Pradesh have a lower percentage of total migrants.

What are the broader implications of the findings?

- The slowdown in migration can be interpreted as a sign of overall economic development. As smaller cities improve their infrastructure and provide better opportunities, people are less likely to migrate to larger cities.
- The expansion of smaller cities can contribute to more balanced regional development and help address disparities in economic opportunities across the nation.

National Panchayat Awards 2024

Context

- The President of India awarded the National Panchayat Awards 2024 on 11th December at Vigyan Bhawan, New Delhi.

About the National Panchayat Awards

- The awards were **introduced in 2022** to recognize and encourage Panchayats for their work and to inspire rural local governments to perform better and contribute to sustainable and inclusive development.
- The Ministry of Panchayati Raj (MoPR) **aligned the awards to the SDGs** by categorising the 17 goals into nine Local Sustainable Development Goals (LSDG) themes.
- The awards recognise Panchayats based on their performance in; Poverty-Free and Improved Livelihoods Panchayat, Healthy

Panchayat, Water-Sufficient Panchayat, Clean and Green Panchayat, and others.

Constitution Debate

Context

- The Constitution Debate was held on November 26 to mark the 75th anniversary of the adoption of the Indian Constitution. The Prime Minister proposed 11 resolutions to provide a vision for the future.

11 resolutions by the Prime Minister

- **Citizen Duties:** Both individuals and the government must fulfil their duties for the nation's progress.
- **Inclusive Development:** Focus on regional and community-based growth aligned with the vision of "Sabka Saath, Sabka Vikas."
- **Zero Tolerance for Corruption:** Reject the social acceptance of corruption.
- **Pride in Laws and Traditions:** Respect India's laws, heritage, and shed colonial mindsets.
- **Opposition to Religion-Based Quotas:** Commitment to existing reservations, but no religion-based quotas.
- **Women-Led Development:** Vision of India as a leader in empowering women.
- **Regional Growth for National Development:** Advocate for "Development of the nation through the development of states."
- **Respect for the Constitution:** Protect the Constitution from political misuse.
- **Dynastic Politics and Meritocracy:** Shift from nepotism to merit-based governance.
- **Pride in Indian Heritage:** Promote pride in India's cultural legacy.
- **Unity in Diversity:** Reaffirm the vision of "Ek Bharat, Shrestha Bharat."

Henderson Doctrine

Context

- The Supreme Court recently clarified the Henderson doctrine, which is a logical extension of the Indian concept of constructive Res Judicata.

What is the Henderson Doctrine?

- The Doctrine derives from the English case Henderson v/s Henderson (1843), which states that all issues arising from the same subject matter in litigation should be resolved in a single suit.
- It **prevents parties from revisiting issues that could or should have been addressed earlier.**
- Any issue related to that matter that could have been raised previously cannot be raised again in future proceedings unless there are exceptional circumstances.

What is the principle of Res Judicata?

- The principle **prohibits litigants from filing another lawsuit on the same issue after it has already been decided by an appropriate court.**
- The central idea is that once a court has ruled on an issue involving the same parties, it cannot be reopened in any other court.
- Res Judicata **applies to both civil and criminal cases.**

How does the Henderson Doctrine relate to the Indian doctrine of constructive Res-judicata?

- Both doctrines aim to prevent the same issues from being raised in multiple courts to ensure finality and reduce unnecessary legal battles.

Prior Sanction Provision

Context

- The Supreme Court ruled that the Enforcement Directorate (ED) must obtain prior sanction before prosecuting public servants on money laundering charges.

What is the "prior sanction" provision?

- The "prior sanction" provision, as per Section 197 of the Code of Criminal Procedure (CrPC), mandates that **government permission must be obtained before prosecuting public servants** for actions committed while performing their official duties.
- It protects public employees from unnecessary legal action, except in cases

involving serious crimes like sexual harassment or human trafficking.

Supreme Court rule regarding the prior sanction for public servants under the PMLA

- The Supreme Court ruled that Section 197(1) of the CrPC applies to cases under the Prevention of Money Laundering Act (PMLA).
- Even though **PMLA doesn't explicitly mention prior sanction**, the Court found that its provisions align with those of the CrPC, making prior sanction necessary before prosecuting public servants.

When can an accused public servant raise the issue of lack of prior sanction?

- An accused public servant can raise the issue of lack of prior sanction at any point during the trial, even after conviction.
- **In the case of P K Pradhan v/s State of Sikkim (2001)**, the Supreme Court allowed the issue to be raised at any stage, and the accused must prove the alleged offence occurred during the performance of official duties.

1.7 SNIPPETS

Topics	Details
National Council For Vocational Education And Training (NCVET)	<ul style="list-style-type: none"> • The National Council for Vocational Education and Training (NCVET) has officially designated the Indian National Space Promotion and Authorisation Centre (IN-SPACE) as an Awarding Body. • The Ministry of Skill Development and Entrepreneurship (MSDE) established NCVET in 2018. • It establishes standards, creates regulations, and oversees the quality of skill-building initiatives across the country.
Joint Committee Of Parliament	<ul style="list-style-type: none"> • The "One Nation, One Election" bills to be sent to a Joint Parliamentary Committee (JPC) for more scrutiny. • It is a special committee set up by Parliament to thoroughly investigate a particular issue or Bill. • It is formed when one House of Parliament passes a motion and the other House approves it. • Members of the JPC are selected by Parliament, with the number of members varying according to the nature of the issue under consideration. They are from both the ruling parties and the opposition. • After its review or investigation is completed, the JPC is dissolved.
PM Poshan	<ul style="list-style-type: none"> • The central government has revised the prices of food items provided to children as part of the Pradhan Mantri Poshan Yojana. • It is a centrally sponsored scheme that provides one hot cooked meal to 11.70 crore students in Balvatika and classes I to VIII at 10.24 lakh Government and Government-aided schools on all school days. • The Material Cost was increased by 13.70% beginning December 1, 2024. • The Labor Bureau creates the inflation index based on the Consumer Price Index - Rural Laborers (CPI-RL).
Veer Bal Diwas	<ul style="list-style-type: none"> • Veer Bal Diwas is observed annually on December 26th to mark the martyrdom of Guru Gobind Singh Ji's two younger sons, Sahibzada Baba Zorawar Singh Ji and Baba Fateh Singh Ji.

	<ul style="list-style-type: none"> The Prime Minister declared the day on January 9, 2022, during Sri Guru Gobind Singh Ji's Prakash Purab, to honour their courage and martyrdom. Baba Zorawar Singh Ji and Baba Fateh Singh Ji were captured after the Battle of Chamkaur in 1705. They were brought to Sirhind, where Nawab Wazir Khan sentenced them to death. On December 12, 1705, they were sealed alive within a wall.
Pradhan Mantri Rashtriya Bal Puraskar	<ul style="list-style-type: none"> The President of India awarded the Pradhan Mantri Rashtriya Bal Puraskar to 17 children for achievements in various fields, celebrating innovation, courage, and creativity. It is the highest civilian honour presented to children in India. It recognises outstanding achievements in various fields, including art, culture, bravery, innovation, science, technology, social service, sports, and the environment. The award is organised by the Ministry of Women and Child Development.
Tata Institute Of Social Sciences (TISS)	<ul style="list-style-type: none"> The Tata Institute of Social Sciences (TISS) is set to name a permanent vice-chancellor after a delay of over a year. The Sir Dorabji Tata Graduate School of Social Work in Mumbai was established in 1936 by the Sir Dorabji Tata Trust. It was renamed the Tata Institute of Social Sciences (TISS) in 1944. It was recognised as a deemed university by the Government of India in 1964 under the University Grants Commission Act of 1956.

1.8 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
States And The Challenge Before The Finance Commission	7th December, 2024
The Missing Spotlight On Urban Local Government Polls	14th December, 2024
Food Safety And Standards In India	17th December, 2024
Can The Constitution Protect Individual Dignity?	20th December, 2024
The Constitution On Minority Rights	20th December, 2024



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2. INTERNATIONAL RELATIONS

2.1 TAPPING INTO KAZAKHSTAN'S RARE EARTHS POTENTIAL

Context

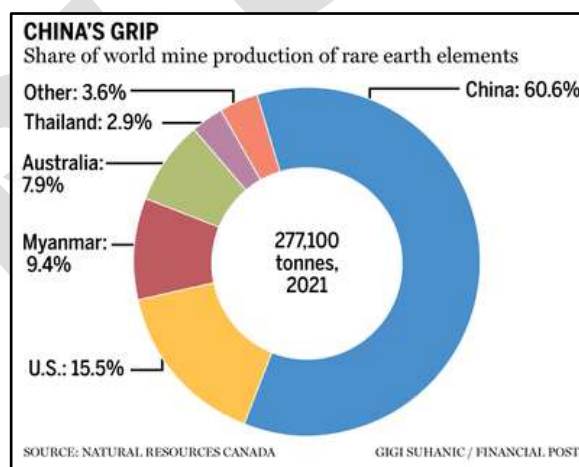
- India diversifies its sources of rare earth elements (REEs) to combat geopolitical tensions and supply chain disruptions.

Details

- India, the **world's third-largest carbon emitter**, is becoming more dependent on rare earth elements (REEs) as it transitions to renewable energy.
- Despite being the **fifth-largest REE holder**, India is highly dependent on imports from China due to a lack of domestic extraction technologies.

The Rare Earth Monopoly in China: A Strategic Challenge

- China frequently uses its monopoly on rare earth elements to promote its strategic goals. During diplomatic standoffs, it imposed export restrictions or bans, which disrupted supplies.
- China's dominance stems from its vertically integrated supply chain. It mines, processes, and produces high-value products such as permanent magnets, which are required for wind turbines, electric vehicles, and defence technologies. This integrated system limits options for countries that rely on imports.
- Concentrated supply chains increase global reliance on China, making countries vulnerable during geopolitical crises. For example, during the Russia-Ukraine conflict, reduced Russian ore supplies increased reliance on Chinese sources, emphasising the dangers of overdependence.



How does China's monopoly impact India's renewable energy goals?

- India's renewable energy transition depends heavily on rare earth elements like neodymium and dysprosium for wind turbines and EV motors.
- Over-dependence on Chinese imports risks supply disruptions**, which could risk India's goal of achieving 500 GW of renewable energy capacity by 2030.
- China's control over rare earth elements and strategic use of supply chains pose challenges to global trade, renewable energy transitions, and geopolitical stability. It stresses the urgent need for countries like India to diversify their sources and reduce dependence on Beijing.

Kazakhstan as a strategic alternative to China in rare earth supplies

- Kazakhstan possesses 15 of the 17 known rare earth elements (REEs), including critical elements like dysprosium, neodymium, and terbium, which are important for manufacturing wind turbines, electric vehicle motors, and military equipment.

- It has full-cycle facilities for processing beryllium and scandium, essential for aerospace and telecommunications. It also leads to the production of tantalum and niobium, used in nuclear reactors and clean energy technologies.
- **The geographical proximity to India and shared strategic interests strengthen their partnership.** Projects like the 'Connect Central Asia' policy and the International North-South Transport Corridor simplify trade and reduce costs.



India's renewable energy goals and the challenges it faces in achieving them?

- India aims to achieve 500 GW of renewable energy by 2030 as part of its COP29 commitments, however, this ambitious goal presents challenges, especially in securing critical materials like rare earth elements (REEs).
- **India's current extraction capacity is limited, and the government plans to increase mining output by 400% over the next decade.** Establishing relationships with resource-rich regions like Kazakhstan is another challenge in securing these resources.

How is India addressing the challenges in rare earth extraction?

- India has proposed the 'India-Central Asia Rare Earths Forum' during the second India-Central Asia Summit to promote bilateral cooperation in mining, training, and geological expertise to enhance efficiency in extracting rare earths, reduce dependence on China, and potentially create a regional market for critical minerals.
- India's partnership with Kazakhstan supports India's renewable energy objectives and reduces its dependency on China, diversifying sources of rare earths will ensure a more stable supply chain.

2.2 'CHINA PLUS ONE' OPPORTUNITY

Context

- According to the NITI Aayog report, India has had "limited success so far" in capturing the 'China Plus One' strategy. This strategy helps multinational companies reduce dependence on China by diversifying their supply chains and shifting production to other countries.

What is the 'China Plus One' strategy?

- It refers to the **global trend of companies diversifying their manufacturing and supply chains by setting up operations in countries**

other than China to reduce dependence on a single country, especially due to geopolitical risks and supply chain disruptions.

What are the key growth drivers for India?

- The Indian population of 1.4 billion, with a **young demographic and increasing incomes**, creates a large consumer base.
- Indian labor and capital costs are lower than other competitors like Vietnam.

- Reforms like the Production Linked Incentive (PLI) scheme and the Make in India initiative attract foreign investment.
- Partnerships like the India-UAE Comprehensive Economic Partnership Agreement (CEPA) boost trade and reduce dependence on any one economy.
- India's active involvement in global forums strengthens diplomatic and economic ties.

Which sectors in India could benefit from the 'China Plus One' strategy?

- **Pharmaceuticals:** India is the world's third-largest pharmaceutical producer, providing 70% of WHO's vaccine needs and offering lower manufacturing costs.
- **Metals and Steel:** India's natural resource wealth and government incentives position it as a leading steel exporter.
- **Information Technology (IT/ITeS):** India's strong IT services sector attracts global technology firms.

Why has India seen "limited success"?

- India's limited success is due to several factors, including competitive disadvantages and regulatory challenges.
- Countries like Vietnam, Thailand, and Malaysia attract multinational corporations with cheaper labour, simplified tax laws, and lower tariffs.
- **India's complex regulations**, high labour costs, and bureaucratic hurdles deter investment.
- **Inconsistent policies and corruption** also erode investor confidence, increasing transaction costs and lowering India's appeal.

How do Free Trade Agreements (FTAs) affect India's trade strategy?

- South-East Asian nations have proactively signed FTAs, boosting their export shares. **India's slower pace in finalizing Free Trade**

Agreements (FTAs) has put it at a disadvantage in accessing new markets and expanding trade.

How do geopolitical tensions and market share limitations impact India?

- Geopolitical tensions like the **US-China trade war present opportunities for India** to emerge as a neutral alternative, however, they also create uncertainty.
- India's limited share in global trade highlights untapped potential, and its complex geopolitical environment complicates trade strategies.

What steps can India take to enhance its position in the 'China Plus One' strategy?

- **India can mitigate the challenges by improving infrastructure, enhancing logistics capabilities**, and ensuring policy consistency.
- The government should address land acquisition issues and provide quicker clearances for industrial projects.
- Strengthening diplomatic ties and increasing participation in global forums will also help attract more investments.

How can India position itself as a viable alternative to China in global supply chains?

- India must **build its demographic advantage**, improve infrastructure, and create a favourable business environment through consistent policy reforms.
- **Focusing on sectors where India already holds a competitive edge**, such as pharmaceuticals, steel, and IT services, will make it an attractive destination for global companies seeking alternatives to China.
- A proactive approach to signing more FTAs and strengthening global diplomatic and economic ties will enhance India's appeal as a reliable trade partner.

2.3 INDIA BANGLADESH EXTRADITION TREATY

Context

- Bangladesh has asked India to extradite former Prime Minister Sheikh Hasina, who fled to India on August 5 after massive protests that ended her 16-year rule.

Details

- Bangladesh stressed the need for Hasina to face legal action for alleged crimes against humanity and genocide. The International Crimes Tribunal (ICT) in Dhaka has issued arrest warrants for Hasina and a number of her former ministers and government officials.

About the Extradition treaty between India and Bangladesh

- The extradition treaty was **signed in 2013** to address the issue of criminals operating across both countries' borders.
- It was **amended in 2016 to simplify the extradition process**, removing the requirement to provide evidence of the offence and requiring only an arrest warrant from a competent court.

What are the key provisions of the extradition treaty?

- The treaty requires **both countries to extradite individuals charged with, found guilty of, or wanted for committing an extraditable offence**, as determined by a court in the requesting country.
- Extraditable offences must **carry a minimum sentence of one year in prison**, and the **principle of dual criminality applies**, meaning

the crime must be punishable in both countries.

Can India refuse to extradite someone under the treaty?

- India can refuse extradition under certain circumstances. If the offence is political in nature, India may deny the request.
- Crimes such as murder, enforced disappearance, and torture are not considered political offences.
- Extradition may also be denied if the accusation is not made in good faith or if the crime is a military offence that does not fall under general criminal law.

What is India's response to the extradition request from Bangladesh?

- The Ministry of External Affairs confirmed receiving Bangladesh's extradition request. However, Indian officials have not commented further on the situation.

How has Sheikh Hasina's presence in India affected bilateral relations?

- Sheikh Hasina accused Bangladesh's interim government of genocide and persecution of minority groups, causing diplomatic tension. Bangladesh's interim government has urged India to help ease tensions.
- If India decides to extradite Hasina, it may stress bilateral relations, particularly with Bangladesh's new government. Contrarily, if India refuses to extradite her, diplomatic relations may deteriorate.
- The situation must be handled carefully to avoid escalating tensions.

2.4 HOW INDIA IS ENGAGING WITH THE NEW DHAKA

Context

- The Foreign Secretary of India visited Bangladesh to meet with the interim government, demonstrating New Delhi's willingness to maintain a strong partnership with Bangladesh despite recent tensions.

Significance of the recent visit

- During the meeting, both agreed to work jointly to settle tensions and address shared concerns, such as security, development, and regional cooperation.
- India is more focused on engaging with Bangladesh's new leadership and managing concerns about minorities' treatment and promoting inclusive governance.

What caused recent tensions between India and Bangladesh?

- The fall of Prime Minister Sheikh Hasina's government in August 2024 provoked widespread unrest in Bangladesh.
- Protests in both India and Bangladesh fueled anger over issues such as minority treatment and allegations of interference in internal affairs.
- The **diplomatic relationship was weakened following violent attacks on Indian institutions in Dhaka** and charges from Bangladesh that India was interfering in its internal affairs.

What challenges lie ahead for India-Bangladesh relations?

- **India needs to accept Bangladesh's new political realities** while addressing security concerns and religious tensions.
- The collapse of Hasina's government and the emergence of a new political landscape have complicated India's traditional alliances.
- **India needs to establish a balance** between promoting Bangladesh's democratic processes and addressing issues of religious freedom and regional stability.

Way Forward

- India should increase its bilateral economic links with Bangladesh regardless of recent political shifts by highlighting cooperative relations and avoiding characterizing political transitions as anti-Indian or anti-Hindu is crucial.
- Joint task forces comprising law enforcement agencies from both countries should be established to combat illegal immigration, human trafficking, and cross-border drug smuggling.
- India needs to focus on long-term benefits for both countries by strengthening engagement with Bangladesh's interim government and extending cooperation in areas such as trade, energy, and connectivity.

2.5 WHY WILL INDIA'S FOREIGN POLICY BE A TIGHTROPE WALK?

Context

- India's foreign policy in 2025 must strike a balance between global disputes including China, the United States, West Asia, Bangladesh, and Russia, as regional dynamics change.

What were the major highlights in India's foreign relations in 2024?

- One of the key achievements was the successful **disengagement at the Line of Actual Control (LAC) with China**. While trust-building with China will take time, the meeting between Prime Minister Modi and

Chinese President Xi Jinping at the BRICS summit in Russia was a crucial turning point.

- India made progress in trade relations, **finalizing a free trade agreement with the European Free Trade Association (EFTA), marking its first deal with a European bloc.** However, progress on other FTAs, like those with Australia and the UK, remained slow
- In terms of neighbourhood diplomacy, India hosted leaders from Bhutan, Sri Lanka, and the Maldives, reinforcing ties. However, India's relationship with Pakistan remained weakened.

What challenges did India face with Bangladesh in 2024?

- **Bangladesh presented one of the biggest diplomatic challenges in 2024.** The unexpected political shift, including the removal of Prime Minister Sheikh Hasina, led to a weakening of bilateral ties.
- **Bangladesh distanced itself from its pro-India stance,** which posed diplomatic hurdles for India.

How did India handle its relations with Canada and the United States in 2024?

- India faced challenges with Canada after Canadian authorities accused India of being involved in the killing of Sikh leader Hardeep Singh Nijjar. This led to a diplomatic standoff, and India responded by restricting interactions with Canadian Prime Minister Justin Trudeau. India hopes to see a change in Canada's leadership in 2025.
- With the United States, tensions rose over legal actions targeting Indian businesses,

including the Adani Group. The U.S.'s involvement in South Asia, especially regarding Bangladesh and China's influence in Nepal, kept India on alert.

- **The pro-India stance of President Trump's administration could bring a positive shift in relations.**

How did India navigate global conflicts in 2024?

- India **adopted a neutral stance in global conflicts,** including the Russia-Ukraine war and the Israel-Gaza conflict.
- India **condemned the violence, but it abstained from taking sides,** reflecting its position at the United Nations.
- India's diplomatic efforts included visits to both Russia and Ukraine, placing itself as a possible mediator in the ongoing tensions.
- India continued its engagement with West Asian nations, maintaining balanced ties in the region.

What lies ahead in India's foreign policy in 2025?

- Looking ahead to 2025, India will prioritize strengthening ties with the U.S., especially with President Trump's visit for the Quad Summit. PM Modi is likely to meet him before that.
- India will work to strengthen its relationship with Iran, with a ministerial visit expected early in the year.
- Indian foreign policy will face the complex task of balancing relations between Iran and the Israel-U.S. bloc, a diplomatic challenge that will require careful navigation.

2.6 WHAT THE SYRIAN CRISIS MEANS FOR THE MIDDLE EAST AND INDIA

Context

- The Syrian Prime Minister confirmed that he would hand over power to rebel forces after President Bashar al-Assad left Syria.

About the Syrian Civil War

- The Syrian Civil War **started in 2011 when peaceful protests against President Bashar al-Assad's regime turned violent.**

- The protests were part of the broader Arab Spring movement, which called for greater democracy. The Assad regime responded with a brutal crackdown, escalating tensions.



Which countries have influenced the Syrian Civil War?

- The **United States** has supported the rebels against Assad, especially due to Assad's pro-Iran and anti-Israel stances.
- **Russia** has provided military aid to Assad and maintained strategic interests, particularly in the port city of Latakia.
- **Saudi Arabia** and **Turkey** have supported opposition forces, complicating the conflict.
- **Iran** has used Syria as a strategic ally to strengthen its position against Israel.
- **Hezbollah**, backed by Iran, has supported Assad, extending Iranian influence into Lebanon.

What led to the fall of Bashar al-Assad's regime in Syria?

The fall of Bashar al-Assad's regime in Syria resulted from prolonged civil war, widespread discontent over his authoritarian rule, and advances by rebel forces. Key factors included:

- Assad's domestic legitimacy eroded due to corruption, human rights abuses, and the oppression of disagreement, fueling rebellion.
- The revival of opposition forces, such as Hayat Tahrir al-Sham (HTS), allowed the military to gain against Assad's army.
- Assad faced international censure, sanctions, and isolation, undermining his regime's position.
- Russia, Iran, and Hezbollah's influence weakened, and regional powers like Turkey provided support to opposition forces.

India's stance on the Syrian crisis

- **India has always taken a neutral stance on the Syrian conflict.** India supports a political solution to the crisis, advocating for a Syrian-led political process in line with UN Security Council Resolution 2254.
- India has highlighted the need to preserve Syria's sovereignty, independence, unity, and territorial integrity.
- India does not engage in military actions and urges all parties to focus on diplomacy and peaceful resolution.
- India continues to assist Syrian nationals through its embassy and offers humanitarian aid, including food and medical support.
- After the collapse of Assad's regime, India issued a travel advisory urging its nationals to leave Syria and continues to monitor the situation closely.

How has the fall of Assad's regime impacted the Middle East?

- The fall of Assad's regime has **weakened Iran's influence**, a key ally of Syria, and disrupted the "Shia Crescent," which linked Lebanon, Syria, and Iraq.
- The **withdrawal of Iranian and Russian influence allowed the United States and Israel to assert their interests more assertively**, with Israel potentially adjusting its military strategies in response.

- This event has also fuelled competition for influence among regional powers such as Turkey and Saudi Arabia.

How has the collapse of Assad's regime affected India?

- It may lead to a rise in extremist groups like Hayat Tahrir al-Sham (HTS) and ISIS remnants. These groups may target Indian nationals and increase the threat of radicalization.
- Instability in Syria could also disrupt regional security, endangering India's energy supply lines and the safety of its diaspora in the Middle East.
- It impacts India's relations with Middle Eastern countries by shifting regional power dynamics, which may challenge India's traditional support for regional stability.
- Instability in Syria could hinder India's economic and strategic initiatives, like the India-Middle East-Europe Economic Corridor (IMEEC), which requires regional stability.

Way Forward for India

- India should take a comprehensive approach to navigate the complexities of the Syrian Civil War, which includes increasing diplomatic engagement, focussing on counterterrorism cooperation, diversifying energy security, providing humanitarian aid, tracking geopolitical shifts, investing in infrastructure and trade initiatives, and strengthening regional alliances.
- India should maintain open communication with key stakeholders such as the United States, Russia, Iran, and Arab nations to strike a delicate balance and provide humanitarian assistance to mitigate the effects of any negative shifts in Syria's geopolitics.
- India should strengthen its regional alliances through economic partnerships, trade agreements, and one-on-one interactions. By remaining proactive, flexible, and strategic, India can continue to protect its interests while also contributing to Middle Eastern stability.

2.7 INDIA-SRI LANKA RELATIONS

Context

- The Prime Minister of India and the President of Sri Lanka met in New Delhi, indicating a significant step towards improving relations between the two neighbours.

Highlights of the Joint Statements

- They agreed to explore opportunities to expand the India-Sri Lanka Free Trade Agreement (ISFTA) and enhance connectivity, especially in digital, energy, and physical infrastructure.
- The leaders discussed growing security concerns in the Indian Ocean, especially China's increasing presence. The Sri Lankan President assured India that Sri Lanka's territory would not be used against India's security.
- They also agreed to increase defence cooperation through joint exercises, intelligence sharing, and maritime security initiatives.
- India promised to assist Sri Lanka in strengthening its maritime surveillance by supplying offshore patrol vessels and setting up a Maritime Rescue and Coordination Centre.
- Both leaders acknowledged the challenges faced by the fishermen and committed to finding a long-term solution that would protect the livelihoods of affected communities.

India-Sri Lanka relations

- India and Sri Lanka share a deep-rooted historical and cultural bond, especially in terms of Buddhism, which originated in India and significantly influenced Sri Lankan culture.
- Relations have seen ups and downs, especially during the ethnic conflict in Sri Lanka. India intervened in 1987 with the Indo-Sri Lanka Agreement and the deployment of the Indian Peacekeeping Force (IPKF). However, this intervention ended tragically with the assassination of Indian Prime Minister Rajiv Gandhi by LTTE members in 1991.
- India played a key role in trying to mediate the conflict, supporting Sri Lanka's right to resist terrorism while expressing concerns over the humanitarian situation. The civil war lasted for nearly three decades before ending in 2009.

Trade and commerce

- Total value of merchandise trade reaching **\$5.5 billion in 2023-24**.
- India is Sri Lanka's one of the largest foreign direct investment (FDI) contributors, with investments amounting to \$2.2 billion by 2023.
- The ISFTA, which came into effect in 2000, has boosted trade, and the countries are negotiating an Economic and Technology Cooperation Agreement (ETCA) to enhance trade and services further.
- **India has extended a \$61.5 million grant for the development of Sri Lanka's KKS port** and is exploring additional connectivity projects, including a multi-product pipeline and power grid interconnection.

Development projects in Sri Lanka

- **India has committed over \$5 billion in development assistance to Sri Lanka**, funding various projects.
- Some key initiatives include the construction of 60,000 houses under the Indian Housing Project, the restoration of the Thiruketheeswaram Temple, and the establishment of a Cultural Centre in Jaffna.
- India has provided vital support during Sri Lanka's economic crisis in 2022, offering nearly \$4 billion in aid to help stabilize its economy.

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What are the challenges faced in India-Sri Lanka relations?

- The Tamil ethnic issue remains sensitive, especially due to India's historical involvement during the civil war.
- The maritime boundary dispute often leads to clashes between Indian and Sri Lankan fishermen.
- Economic concerns, such as trade imbalances, may strain ties.
- **China's growing influence in Sri Lanka**, particularly the Hambantota Port lease, poses a strategic challenge for India.

How can India-Sri Lanka relations improve in the future?

- Joint ventures in sectors like pharmaceuticals, textiles, and IT can create jobs and promote economic growth.
- Expanding joint naval exercises and enhancing training modules can improve coordination between the two nations' navies.
- **Establishing a collaborative fisheries management structure** and designated fishing zones can help address the maritime boundary disputes.
- India can assist Sri Lanka in sectors like digital payments and e-governance, improving public service delivery.
- **India needs to balance its strategic interests by offering competitive investments and infrastructure development projects to Sri Lanka** to maintain close ties and also address Sri Lanka's concerns about becoming too dependent on Chinese investments.

2.8 SHORT ARTICLES

Moldova joins International Solar Alliance (ISA)

Context

- Moldova signed the ISA Framework Agreement for expanding renewable energy and solar initiatives globally.

What is the International Solar Alliance (ISA)?

- The ISA is a global initiative that promotes solar energy solutions to address climate change.
- It was **formed as a collaboration between India and France following the COP21 conference in Paris in 2015.**
- It is a treaty-based intergovernmental organization with over 120 countries (104 member countries and 16 signatory countries).
- The ISA's Framework Agreement came into force in 2017 and was amended in 2020, which allowed **all United Nations member states to join**, including those not in the Tropics, who can enjoy the same benefits as other members, except for voting rights.
- The headquarters of the ISA is located in Gurugram, Haryana, India.



Swiss revokes India's MFN status

Context

- Switzerland revokes India's "Most Favoured Nation" (MFN) status.

Why did Switzerland revoke India's MFN status?

- Switzerland revoked India's MFN status following a ruling by the Indian Supreme Court in the Nestlé case. The court stated that the MFN clause does not apply automatically when a country joins the OECD, especially if a prior tax agreement exists.
- This court judgment contradicted Switzerland's interpretation of the Double Taxation Avoidance Agreement (DTAA) with India, resulting in the suspension of the MFN clause.

What is the MFN clause?

- The MFN clause ensures that **if one country provides a trade or tax benefit to another, that benefit must be extended to all other countries in a similar agreement.**
- It eliminates discrimination and makes the trading environment more equitable and predictable.

How will this affect Indian companies operating in Switzerland?

- Indian companies with subsidiaries in Switzerland may face **increased financial burdens** due to the higher withholding tax on dividends.
- This could result in higher tax liabilities, affecting the financial viability of operations and leading to complex tax planning requirements for Indian firms.

Organisation for Economic Co-operation and Development (OECD)

- It is a global **organisation of 38 countries** dedicated to promoting democracy and market economies.
- It was **founded in 1960** by 18 European nations, the United States and Canada.
- Its headquarters is in Paris, France.
- **India is not a member of the OECD, but it collaborates with the organisation** and other non-member economies.

UN Internal Justice Council

Context

- Former Supreme Court Justice Madan B. Lokur has been appointed Chairperson of the United Nations Internal Justice Council.

About United Nations Internal Justice Council (IJC)

- It was **established by the United Nations General Assembly** as part of the reformed internal justice system.
- Its mission is to **ensure accountability, independence, and professionalism in the UN's internal justice systems.**
- It aims to improve the administration of justice within the UN by ensuring that the dispute resolution process between staff and management is equitable and transparent.
- It is **managed by the UN Secretary-General**, with additional supervision provided by the UN General Assembly.

Powers and Functions of the IJC

- It identifies and interviews candidates for positions at the UN Dispute Tribunal (UNDT) and the UN Appeals Tribunal (UNAT).
- It recommends two or three candidates for each vacancy to the General Assembly to ensure geographical diversity.
- It provides the General Assembly with recommendations on how to implement the justice system and monitors the independence and accountability of the UN's internal justice mechanisms.

India Kuwait relations

Context

- The Prime Minister of India received Kuwait's highest honour, the Order of Mubarak Al-Kabeer.

Details

- The Order of Mubarak Al-Kabeer is a prestigious award presented by the Kuwaiti government to heads of nations, sovereigns of foreign countries, and members of foreign royal families.
- It was established in 1974 to commemorate Mubarak Al Sabah, also known as Mubarak Al-Kabeer, who played a key role in Kuwait's independence from the Ottoman Empire and in shaping the country's future.

India-Kuwait Relations

- Diplomatic relations between India and Kuwait started in 1962 with the appointment of the first Kuwaiti Ambassador to India. **Until 1961, the Indian rupee was Kuwait's official currency.**

Year	FY 2019-20	FY 2020 -21	FY 2021 -22	FY 2022 -23	FY 2023-24
INDIA'S EXPORT TO KUWAIT	1,286.55	1,054.20	1,241.93	1,560.45	2,103.22
INDIA'S IMPORT FROM KUWAIT	9,573.80	5,214.15	11,001.76	12,247.37	8,375.97
TOTAL TRADE	10,860.36	6,268.34	12,243.68	13,807.82	10,479.19

(Source: M/o Commerce & Industry, India)

- Before the discovery of oil, Kuwait's economy depended on maritime activities such as shipbuilding, pearl diving, and fishing.
- Kuwait has a rich, relatively open, petroleum-based economy with significant crude oil and natural gas reserves. **Oil revenues constitute approximately 94% of the state's revenues.**
- **Trade between the two countries reached \$10.47 billion in 2023-24.** Kuwait is India's sixth-largest crude oil supplier, playing a crucial role in India's energy security.
- India's main exports to Kuwait included cereals, organic chemicals, electrical machinery & equipment, vehicles, and ceramic products. The main imports from Kuwait included mineral fuels, organic chemicals, aircraft & parts, plastics, and iron and steel (scrap).



Martial Law in South Korea

Context

- The President of South Korea declared 'emergency martial law' accusing the opposition of sympathizing with North Korea.

What is martial law?

- Martial law is the **act of replacing civilian government with military rule** and suspending civilian legal processes in favour of military ones.
- During martial law, civil liberties such as free speech, the press, and assembly may be suspended, and the military assumes control to ensure public safety and order.

Article 34 of the Indian Constitution

- Under Article 34, martial law can be declared in extraordinary circumstances such as war, invasion, rebellion, riot, or any violent resistance to the law.
- The President has the authority to declare martial law under these conditions.
- Martial law can be imposed for up to 60 days during severe civil unrest and can be extended under specific conditions.

Article 77 of the South Korean Constitution

- Article 77 of the South Korean Constitution empowers the President to declare martial

law in times of military necessity, armed conflict, or other national emergencies.

How will martial law in South Korea be repealed?

- According to South Korean law, martial law must be lifted if a majority of the National Assembly requests it. This requires a vote from lawmakers. However, with reports of lawmakers being barred from entering the National Assembly, it is unclear how or when this vote will take place.

International Social Security Association (ISSA)

Context

- Employees' State Insurance Corporation (ESIC) was awarded at the Regional Social Security Forum for Asia and the Pacific (RSSF Asia-Pacific) in Riyadh, Saudi Arabia.

About International Social Security Association (ISSA)

- It was established in 1927 under the mandate of the International Labour Organization.
- It promotes excellence in social security administration by providing professional guidelines, expert knowledge, services, and support to help its members create flexible social security systems.
- India is a member country of the ISSA.
- Its headquarters is in Geneva, Switzerland.

What is the governance structure of the ISSA?

- The General Assembly is the highest statutory body, consists of all directly represented members and meets every three years.
- The council is an electoral body made up of delegates from each country with at least one affiliate member.
- The administrative authority consists of the President, Secretary General, and elected members from various geographical regions.
- The Control Commission examines the ISSA's financial records and ensures all financial transactions comply with financial regulations.

Australia's Online Safety Amendment

Context

- The Australian House of Representatives recently passed the Online Safety Amendment (Social Media Minimum Age) Bill, 2024.

About the Amendment

- The Bill mandates that certain social media platforms take "reasonable steps" to stop users under 16 from creating accounts.
- Age-restricted Social Media Platforms (ARSMPs) like TikTok, Facebook, Snapchat, and Instagram will be required to enforce these new age restrictions. They must verify users' ages, though the specific methods have not been detailed yet. **Non-compliant platforms could face civil penalties of up to \$49.5 million.**
- The eSafety Commissioner will provide guidelines for platforms to take "reasonable steps" including using age verification technologies to prevent minors from creating accounts.

International Context

- Australia is the first country to introduce such legislation on a national level. In the past, the US attempted similar laws, but acts like the Communication Decency Act (1996) and the Children's Online Protection Act (1998) were overturned by the Supreme Court.

Indian Context

- India has laws to punish online child abuse, but it doesn't have specific laws preventing children from creating social media accounts.

India Internet Governance Forum

Context

- The India Internet Governance Forum 2024 was organised on December 9-10, 2024, at the Bharat Mandapam Convention Center in New Delhi.

About India Internet Governance Forum (IIGF)

- It was established in 2021 as India's contribution to the United Nations Internet Governance Forum (UN IGF), to promote collaborative discussions among various stakeholders.
- It is supported by the Ministry of Electronics and Information Technology (MeitY) and the National Internet Exchange of India (NIXI).
- It is managed by a 14-member multi-stakeholder committee, which encourages collaboration among government, civil society, industry, technical communities, and think tanks.
- The theme for the IIGF 2024 is "Innovating Internet Governance for India."

International Advisory Body for Submarine Cable Resilience

Context

- The International Advisory Body for Submarine Cable Resilience launched an initiative to strengthen the resilience of submarine cables.

About the International Advisory Body for Submarine Cable Resilience?

- It is a collaborative effort between the International Telecommunication Union (ITU) and the International Cable Protection

Committee (ICPC) to improve the durability of submarine cables; essential for global communication and the digital economy.

- ITU was established in 1865 with the initial goal of connecting international telegraphic networks, it signed an agreement with the United Nations in 1947 to become a specialised agency within the UN system.
- The ICPC was established in 1958 as a global forum to improve the security of undersea cables by providing a platform for exchanging technical, legal, and environmental data.

About Submarine Cables

- They are the backbone of global communication, delivering about 99% of internet traffic and supporting critical services such as commerce, finance, government operations, digital health, and education.
- These cables are vulnerable to damage, with an estimated 150-200 faults occurring globally each year due to factors such as fishing, anchoring, natural hazards, and equipment failure.
- India is a major player in the global submarine cable network, with 17 international subsea cables and 14 landing stations in cities including Mumbai, Chennai, Cochin, Tuticorin, and Trivandrum.

United Nations (UN) Peacebuilding Commission

Context

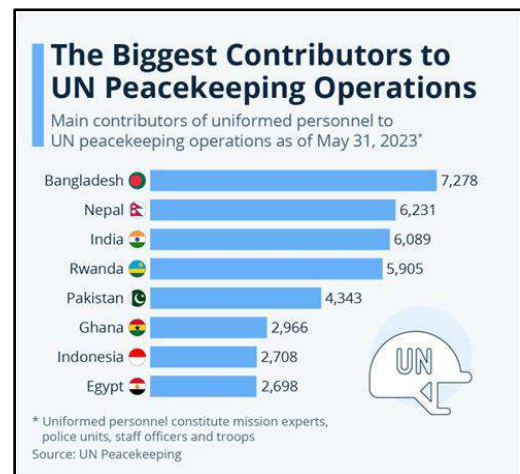
- India has been re-elected to the United Nations Peacebuilding Commission (PBC) for 2025-2026.

About U.N. Peacebuilding Commission (PBC)

- It is an intergovernmental advisory body established in 2005 by the General Assembly and Security Council through resolutions A/RES/60/180 and S/RES/1645 to support peace efforts in conflict-affected countries.
- It is made up of 31 Member States elected by the General Assembly, the Security Council, and the Economic and Social Council.

What is the mandate of the U.N. Peacebuilding Commission (PBC)

- The PBC's mandate is to bring together relevant actors to



mobilise resources and propose comprehensive post-conflict peacebuilding and recovery plans.

- It recommends strategies to improve coordination among major stakeholders and ensure consistent funding for early recovery efforts.
- It concentrates on the reconstruction and institution-building efforts required for post-conflict recovery.

India's contribution to U.N. Peacekeeping operations

- **After Bangladesh and Nepal, India is the third largest contributor** to UN peacekeeping, with nearly 6,000 military and police personnel currently deployed to various UN operations around the world.
- Nearly 180 Indian peacekeepers have died in the line of duty, the highest number of any troop-contributing country.

Athlete Biological Passport (ABP)

Context

- The World Anti-Doping Agency (WADA) has approved the National Dope Testing Laboratory (NDTL) to manage the Athlete Biological Passport (ABP).

What is the Athlete Biological Passport (ABP)?

- It is an **advanced anti-doping tool that monitors an athlete's biological markers over time.**
- By analyzing variations in parameters such as blood and steroid profiles, it helps to ensure fair play in sports and protect clean athletes.
- It contributes to anti-doping efforts by detecting doping substances through examining variations in an athlete's biological markers.
- It **promotes anti-doping by conducting targeted testing, investigations, deterrence,** and providing indirect evidence of prohibited methods or substances.

What significance does the approval have for India and the NDTL?

- This approval adds the National Dope Testing Laboratory (NDTL) to the list of 17 Athlete Passport Management Units (APMU) approved by the World Anti-Doping Agency (WADA) worldwide.
- This recognition strengthens NDTL's position as a global player in the fight against doping and increases its credibility in managing anti-doping initiatives.

What is the World Anti-Doping Agency (WADA)?

- **WADA was initiated by the International Olympic Committee (IOC)** and formally established in Lausanne, Switzerland, in 1999 after the "Declaration of Lausanne."
- Its main objective is to promote, coordinate, and monitor global efforts to combat doping in sports.
- In 2002, its headquarters was shifted to Montreal, Quebec, Canada.

United Nations Disengagement Observer Force (UNDOF)

Context

- UN Secretary-General Antonio Guterres has paid tribute to Brigadier General Amitabh Jha of India.

Details

- **Brigadier General Amitabh Jha** was an Indian Army officer who served the United Nations Disengagement Observer Force (UNDOF) in the Golan Heights.

About the United Nations Disengagement Observer Force (UNDOF)

- It was **established in 1974 through UN Security Council Resolution 350.**

- Its main objective is to monitor the ceasefire between Israel and Syria, ensuring that the demilitarized buffer zone and the area of limitation in the Golan Heights remain free from conflict.
- The mission is extended every six months and has been authorized until June 2025.



- UNDOF is financed through a separate UN account approved by the General Assembly annually, and its headquarters is located at Camp Faouar in the Golan Heights.

Where is the Golan Heights

- It is a strategically important region located in the Middle East, specifically in Syria. It has been occupied by Israel since 1967.
- The area is bordered by the Jordan River and the Sea of Galilee to the west, Mount Hermon to the north, the Wadi Al-Ruqqād River to the east, and the Yarmūk River to the south.

Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

Context

- The United Kingdom has officially joined the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP) as the 12th member.

About Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

- The CPTPP is a free trade agreement that was signed by 11 countries in 2018. These countries include Australia, Japan, Brunei, Canada, Chile, Malaysia, New Zealand, Mexico, Peru, Singapore, and Vietnam.

- The United Kingdom recently became the 12th member.
- **Initially known as the Trans-Pacific Partnership (TPP)**, the agreement was renamed after the United States withdrew from it in 2017 under President Donald Trump.

What are the main objectives of the CPTPP?

- The CPTPP seeks to **reduce or eliminate tariffs, open markets for services and investment**, and establish rules around competition, intellectual property rights, and foreign company protections.
- It is also seen as a countermeasure to China's growing influence in the region, although China has applied to join the agreement, alongside Taiwan, Ukraine, Costa Rica, Uruguay, and Ecuador.

What are the expected economic benefits for the UK from joining the CPTPP?

- Although the UK already has trade agreements with nine of the 11 members, joining the CPTPP is expected to boost the UK's economy by £2 billion per year, which is about 0.08% of GDP.
- The agreement is also expected to offer better trade terms than current arrangements. As the CPTPP expands with more members, the UK will gain access to more trading opportunities.



2.9 SNIPPETS

Topics	Details
Fide World Championship	<ul style="list-style-type: none"> Gukesh has officially become the world's youngest chess champion at the age of 18. The Candidates Tournament is the final stage of the World Chess Championship cycle before the World Championship match. It determines who will compete against the current World Champion in the World Championship match. The International Chess Federation (FIDE) is the governing body for international chess competitions. It was founded in Paris in 1924 and is based in Switzerland. In 1999, FIDE was recognized by the International Olympic Committee (IOC).
India and France Sign MoU for New National Museum	<ul style="list-style-type: none"> India and France signed a memorandum of understanding (MOU) to create the world's largest National Museum, Yuga Yugeen Bharat. Yuge Yugeen Bharat is an under-construction museum in New Delhi that will be the world's largest, with 117,000 square meters and 950 rooms. It will be located in the existing Secretariat buildings, both north and south blocks, and will serve as India's national museum.
International Fund for Agricultural Development (IFAD)	<ul style="list-style-type: none"> The Odisha government plans to take an international loan from the International Fund for Agricultural Development (IFAD). It is an international financial institution and a UN-specialised agency. It was founded in 1977 to address a global food crisis. It offers grants and low-interest loans to support a variety of projects that benefit rural economies, agriculture, and food systems. Its headquarters is in Rome, Italy.
Authorised Economic Operator (AEO) Programme	<ul style="list-style-type: none"> The Central Board of Indirect Taxes and Customs (CBIC) hosted a two-day global India Authorised Economic Operator (AEO) programme in New Delhi in collaboration with the World Bank. An AEO is a business entity that participates in the international movement of goods and is required to follow provisions of national customs law and be approved by or on behalf of the national administration to comply with the World Customs Organization (WCO). It aims to secure and facilitate global trade by improving international supply chain security and facilitating the movement of legitimate goods.

2.10 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
Why the Paris Agreement looks more fragile than ever	14 th December, 2024
India's firmer attempts at Mineral Diplomacy	18 th December, 2024
How Trump's 'America First' Policy threatens global trade	24 th December, 2024

3. ECONOMY

3.1 INDIA'S HORTICULTURE SECTOR

Context

- The Indian government and the Asian Development Bank (ADB) have signed a \$98 million loan agreement to assist horticultural crop producers by constructing clean plant centres

About Clean Plant Programme (CPP)

- The Programme aims to **promote plant health management by encouraging the establishment of clean plant centres** to provide disease-free planting materials and to increase the productivity of horticulture farmers through disease control measures.
- The **Clean Plant Certification Scheme will recognise and certify private nursery planting materials**, ensuring that they are disease-free and suitable for horticultural production. This will help to keep crops healthy and improve the overall quality of horticultural products.
- Clean Plant Centres will have modern laboratories with advanced diagnostic testing capabilities, provide trained professionals to work on disease-free planting material, ensuring plant health and increasing horticultural productivity.

Horticulture

- It is the process of cultivating plants such as fruits, vegetables, spices, and medicinal herbs. Horticulture contributes significantly to the country's agricultural Gross Value Added (GVA) and also provides job opportunities.
- **India is the world's second-largest producer of fruits and vegetables.** The sector accounts for about 33% of India's agricultural GVA while covering only 13.1% of cropped land.
- From 2013-14 to 2023-24, the area under horticultural crops increased from 24 million

hectares to 28.63 million. Horticultural crops yield greater production per hectare than food grains.

Challenges faced by the sector

- The sector faces challenges such as pests and diseases, small landholdings, poor irrigation infrastructure, and inadequate post-harvest management.
- **Poor storage results in 30-35% of fruits and vegetables to perish**, and there is a lack of adequate processing and marketing infrastructure that limits the sector's potential for export.

Steps taken by the Government

- The **Mission for Integrated Development of Horticulture (MIDH)** to promote sectoral growth.
- The National Horticulture Board (NHB) has implemented the Horticulture Cluster Development Programme.
- The Clean Plant Programme (CPP) to ensure disease-free mother plants.
- **Operation Greens** focuses on the development of key crops like tomatoes, onions, and potatoes.

Way Forward

- The horticulture sector can be improved by adopting climate-smart methods, enhancing water management, implementing integrated pest management, and investing in infrastructure and value chain development. These measures will ensure that horticulture exports grow sustainably and compete globally.

3.2 IN ENERGY-DEPENDENT WORLD, THE ISSUE OF FOOD SECURITY

Context

- According to the World Bank's most recent climate and development report, "addressing food insecurity and energy poverty is essential for achieving global stability, but tackling these issues independently is no longer sufficient."

Why is agriculture's reliance on fossil fuels a vulnerability?

- Agriculture dependence on fossil fuels for mechanisation, irrigation, fertiliser production, and transportation **results in an unsustainable cycle of environmental degradation**. This dependency exposes food systems to fluctuations in energy prices, risking global stability.
- **Rising temperatures and unreliable weather patterns have hampered agricultural production**. Between 2020 and 2023, nearly 11.8% of the world's population experienced severe food insecurity, and this number is expected to rise to 956 million in 2028.

Renewable energy reduces agriculture's dependency on fossil fuels

- **Renewable energy investments surpassed \$500 billion in 2022; however, fossil fuel consumption remains high**. Countries such as the United States, Brazil, and Guyana continue to boost oil and gas production.
- Switching to renewable energy can help to reduce dependence on carbon-intensive energy, especially in areas with limited access to reliable energy.
- Renewable energy offers a ray of hope, despite its uneven deployment. **In 2022, high-income countries installed 83% of new renewable capacity**, while low-income countries used outdated, carbon-intensive systems.

- Solar-powered irrigation and biomass energy solutions have the potential to transform agriculture, but the high costs and inadequate infrastructure make implementation difficult.

What are the financial costs of addressing global food and energy insecurity?

- Addressing food and energy insecurity has a high financial cost. **Meeting the most vulnerable populations' basic caloric needs will cost \$90 billion per year by 2030**.
- Combating malnutrition among women and children will cost an additional \$11 billion per year.
- Transforming global food systems may cost \$300 billion to \$400 billion per year, or 0.5% of global GDP.
- These costs can exceed 95% of GDP in low-income countries, creating an unbearable financial burden.

Moral dilemma associated with agriculture and biofuel production

- Agriculture must feed a growing global population while also contributing to the energy transition through biofuel production.
- Biofuel production requires a lot of land and water, and it competes with food production. This raises ethical concerns about resource allocation, particularly since nearly 12% of the world's population is hungry.

Way Forward

- The world needs to prioritise investments in renewable energy and sustainable farming methods, especially in low-income countries.
- International collaboration, financial aid, and technology transfer are critical to ensure that solutions are accessible to the most vulnerable in a more equitable and effective manner.

3.3 INDIAN ECO GROWTH V/S EMISSIONS

Context

- According to the Indian Economic Survey (2023-24), India has decoupled its economic growth from greenhouse gas emissions. Between 2005 and 2019, India's GDP expanded at a compound annual growth rate (CAGR) of 7%, while emissions increased at a slower CAGR of 4%.

"Decoupling" means in the context of economic growth and environmental degradation

- The term "decoupling" refers to the disconnection between economic growth and environmental degradation.
- Historically, economic growth has been linked to environmental damage, particularly greenhouse gas (GHG) emissions.
- Decoupling aims to **promote economic growth while reducing or eliminating negative environmental impacts**, mainly in the form of emissions.

Significance of decoupling economic growth from GHG emissions

- Decoupling is essential for long-term development because it enables countries to maintain high living standards and economic growth while addressing climate change.
- It **provides a path for growth that is not harmful to the environment**, promoting long-term sustainability and addressing the conflict between economic growth and the urgent need to combat climate change.

Types of decoupling

- **Absolute decoupling occurs when the economy grows while emissions decrease.** It indicates the ideal form of decoupling, in which economic growth occurs without increasing environmental harm.

- **Relative decoupling occurs when both GDP and emissions increase, but GDP growth exceeds emissions growth.** This indicates progress, but emissions continue to rise, however at a slower rate than GDP.

What type of decoupling has India achieved?

- The Economic Survey suggests that **India has probably achieved relative decoupling.** Since 1990, GDP growth has exceeded emission growth, but emissions continue to rise, although at a slower rate than GDP. This suggests that **India's economic growth has resulted in a slower increase rather than a decrease in emissions.**

Why is achieving absolute decoupling important?

- Absolute decoupling is required for India to **meet its long-term climate commitments**, especially in the context of global climate change mitigation efforts.
- It is significant because it represents an ideal scenario in which economic growth continues while emissions fall. Achieving complete decoupling requires significant policy changes and technological advances.
- If emissions continue to rise despite economic growth, meeting international climate targets like those set by the Paris Agreement will be challenging. To meet its climate commitments and ensure a sustainable future, India must move towards complete decoupling.

Way Forward

- Investing in clean technologies, increasing energy efficiency, and strengthening emission-reduction measures are essential for ensuring that economic growth does not come at the expense of environmental degradation.

- Though relative decoupling is a positive step, absolute decoupling requires more significant

effort, especially in emissions-intensive sectors.

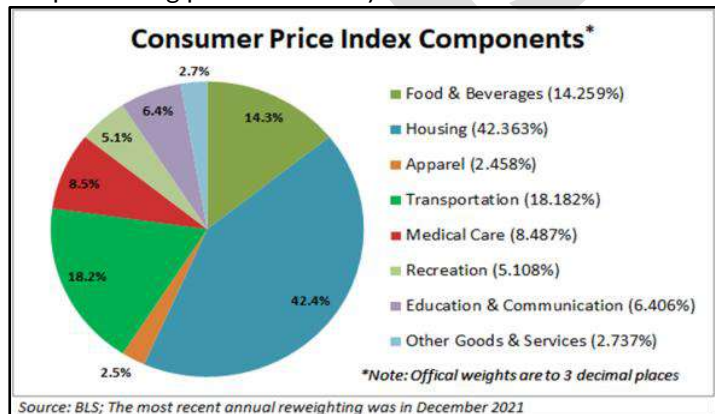
3.4 CPI BASE YEAR REVISION

Context

- The Ministry of Statistics is revising the CPI base year to 2024 and seeking feedback on including free PDS items in inflation calculations.

What is the Consumer Price Index (CPI)?

- It measures the **average change in the prices of goods and services commonly consumed by households**. It measures inflation and adjusts the purchasing power of money over time.
- There are four consumer price index numbers calculated in India:
 - CPI for Industrial Workers (IW)
 - CPI for Agricultural Labourers (AL)
 - CPI for Rural Labourers (RL)
 - CPI for Urban Non-Manual Employees (UNME)
- The **Ministry of Statistics and Programme Implementation (MoSPI)** collects CPI (UNME) data and compiles it, while the **Labour Bureau in the Ministry of Labour** collects the remaining three.



Why is MoSPI revising the CPI base year to 2024?

- The current base year (2012) no longer accurately reflects India's changing consumption patterns.
- The update to 2024 aims to provide a more accurate measure of inflation and improve the CPI's ability to guide monetary policy and economic decisions.
- The revised CPI series is scheduled to be implemented by the end of FY26.

What are the potential benefits of including free PDS items in the CPI?

- Including free PDS items in the CPI may **provide a more accurate picture of consumer spending**, particularly during economic downturns when such distributions are expanded.

- This will allow policymakers to better understand the true impact of inflation on households, particularly those who benefit from government programs such as the National Food Security Act (NFSA).

What are the issues with including free PDS items in the CPI?

- Including free PDS items **complicates CPI calculation by resulting in a mismatch between consumer spending and inflation measurement**. These items have no direct impact on household spending because they are given away for free.
- Redistributing the weights of these items in the CPI basket may distort inflation measurement, potentially **resulting in lower inflation figures and limiting the index's ability to capture true price movements in consumer goods and services**.

Way forward

- The Ministry of Statistics (MoSPI) should seek feedback from stakeholders to improve the CPI revision process; a transparent methodology for free PDS items is required to avoid distortion in inflation measurement.
- Technology advancements, such as big data analytics or real-time data collection methods can improve the accuracy and efficiency of CPI calculations.
- Regular reviews of the CPI base year and its components will ensure the index's relevance and accuracy over time.

3.5 DRYLAND FARMING

Context

- CGIAR (Consultative Group for International Agricultural Research) launched the 2030 Global Strategy for Resilient Drylands (GSRD) to transform agriculture in arid regions.

About 2030 Global Strategy for Resilient Drylands (GSRD)

- It is an initiative launched to transform agriculture in arid regions. It was introduced at the 16th Conference of Parties to the United Nations Convention to Combat Desertification (COP16) in Riyadh, Saudi Arabia.
- It redefines drylands as hubs of untapped potential for resilience, particularly in the face of climate change, rather than areas of scarcity.
- The initiative is led by the International Center for Agricultural Research in the Dry Areas (ICARDA) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

Drylands are warming at rates 20-40% faster than other regions. Transforming dryland agriculture is essential for addressing global food insecurity, as 70% of the world's hungry people live in environmentally sensitive and conflict-affected areas.

What is dryland farming?

- Dryland farming is the practice of growing crops in areas that largely depend on natural rainfall and have little or no irrigation.
- It is a specialized practice used in regions with limited water resources, such as semiarid and arid areas with low annual precipitation.

Five Pillars of the GSRD

Climate-Smart Agrifood Systems: Developing climate-resilient crops, livestock, and aquaculture.

Biodiversity Conservation: Supporting ecosystem resilience through mixed cropping and Indigenous knowledge, especially from women.

Sustainable Land and Water Management: Promoting regenerative agriculture and solar-powered irrigation.

Access to Nutritious Diets: Enhancing food security with nutrient-dense crops like sorghum, pulses, and millet.

Inclusive Development: Ensuring equity, safety, and peace for marginalized communities.

What is the role of dryland farming in the Indian economy?

- Dryland farming is critical to India's economy, producing almost 80% of sorghum and maize, 90% of pearl millet, 75% of oilseeds, and about 95% of pulses.
- It sustains livelihoods in arid and semi-arid regions and supports agro-based industries and small-scale farmers.

What government initiatives support dryland farming?

- Rainfed Area Development Programme (RADP) to improve productivity and sustainability.
- National Food Security Mission, National Horticulture Mission, and National Mission on Micro Irrigation to improve crop yields, food security, and water management.
- Integrated Watershed Management Programme (IWMP) using rainwater harvesting and drip/sprinkler irrigation techniques.

Significance of dryland farming

- **Dryland farming boosts soil fertility, reduces greenhouse gas emissions,** and increases organic matter in the soil, leading to increased food production.
- It helps reduce hunger and malnutrition by increasing the yield of climate-smart crops such as pulses, especially in disadvantaged rural communities.
- Conserving water resources through effective methods like mulching and rainwater harvesting.
- Reducing soil erosion and improving soil health with cover crops and integrated farming practices.
- Mitigating climate change by promoting climate-resilient crops and organic soil management.

3.6 INDIA AS A GLOBAL SKILL SUPPLIER

Context

- The Prime Minister expressed confidence that India's skilled workforce will play a significant role in the global labour market.

strengthen its position in the global labour market.

What factors contribute to India's potential as a leading global supplier of skilled workers?

- **India has 554 million people between the ages of 15 and 64,** making it a large and youthful workforce that can meet the global demand for skilled labour.
- The government has launched several programs, including the Skill India Programme, providing resources for skill training and internships in collaboration with leading companies.
- **Due to demographic shifts and technological advancements,** there is an increasing need for skilled workers in industries like information technology, healthcare, construction, and logistics in regions like the Gulf Cooperation Council, Europe, and North America.
- **India has also signed bilateral agreements** with countries such as Japan and France to promote skilled worker mobility and

How is India preparing its workforce to meet global skill demands?

- The Ministry of Skill Development and Entrepreneurship provides skills training to meet global standards through a network of over 15,000 Industrial Training Institutes (ITIs).
- **India is integrating globally applicable skills into educational curricula,** with a special emphasis on introducing programs at International Skill Centres to meet the precise needs of destination countries.
- The National Education Policy (NEP) 2020 promotes critical thinking and digital literacy to ensure a comprehensive approach to education and skill development.
- Short-term training programs customized to specific countries help workers prepare for international job markets and effectively address skill gaps.

What challenges does India face in becoming a global skill hub?

- India lacks a comprehensive policy on international labour mobility, and current policy interventions are fragmented and frequently lack evidence-based support.
- Return migrants' skills developed abroad are frequently not recognised or certified in India, resulting in missed opportunities for both individuals and the economy.
- For Indian workers to remain competitive in the global market, **skill development programs must be of higher quality and meet international standards.**

Way Forward

- India must identify and anticipate the skills in demand in specific destination countries and emerging skill gaps across key sectors

through skill forecasting, data analysis, and real-time job vacancy insights from destination countries.

- India should systematically map its current skill development efforts and follow-up actions, including integrating global skills into curricula, reorienting skill programs at International Skill Centres, and developing short-term training programs aimed at specific destination countries.
- **The quality of skill development must align with international standards.** There is a need for a skill-centered international labour migration information system to collect, analyze, and report on key skills and migration indicators, promoting evidence-based interventions, encouraging skill partnerships with destination countries, and improving migration and development outcomes.

3.7 DE-DOLLARISATION

Context

- The Reserve Bank of India Governor denied plans to de-dollarize in response to US President-elect Donald Trump's threat to impose a 100% tariff on BRICS nations aiming to establish a common currency to challenge the US dollar's global trade dominance.

What is De-dollarisation?

- It is the process by which countries reduce their dependence on the US dollar as a reserve currency, medium of exchange, and unit of account. A reserve currency is a foreign currency held by central banks to facilitate international trade, stabilize exchange rates, and boost financial confidence.

What factors contribute to the US dollar's dominance in global trade?

- In the 1920s, the US dollar replaced the British pound as the world's reserve currency.

- Following World War II, the Bretton Woods Agreement strengthened the dollar's position as the United States emerged as the world's economic superpower.
- The dollar is in high demand worldwide because central banks hold US dollars to support their currencies and encourage international trade.
- The dollar is a widely used currency in international financial markets because it is regarded as stable and liquid.
- **The US economy, the world's largest, encourages the widespread use of the dollar** in international trade, especially for the trade of goods and services.
- The dollar is the default currency for many global commodities, including oil, resulting in a self-sustaining cycle of its use in international transactions.

What did the RBI Governor say about de-dollarisation?

- The RBI Governor mentioned that India is prioritizing trade risk reduction over de-dollarisation. By entering into agreements with specific countries for local currency trade, India hopes to reduce its dependence on US dollar fluctuations. This is part of a risk-management strategy in international trade.

What was the BRICS currency idea discussed by the RBI Governor?

- Russia and China proposed the idea of a BRICS currency, which was then discussed among the group, however, no decision has been made regarding it.
- The RBI Governor explained that the geographical spread of BRICS countries,

What are the global efforts towards de-dollarisation?

- China, Russia, and Brazil are actively pursuing de-dollarisation. For example, Russia and Iran announced a joint cryptocurrency backed by gold to facilitate international trade. China and Brazil agreed to settle trades in their respective currencies.
- India has also taken steps to move away from the US dollar. It started paying for oil imports from Russia in rupees. The Reserve Bank of India (RBI) permitted international payment settlements in rupees, and 18 countries, including Sri Lanka, the United Kingdom, Germany, and Russia, now settle transactions in rupees.

What challenges exist towards de-dollarisation?

- Countries that stop using the US dollar will see changes in their reserve assets, which may cause fluctuations in capital flows and

compared to the Eurozone's unified currency and geographical continuity, makes adopting a common currency challenging.

Why are there calls for de-dollarisation?

- The United States imposed sanctions on countries such as Iran and Russia, cutting them off from dollar-based systems like SWIFT. The sanctions have been seen as an attempt to weaponize the dollar.
- Overdependence on the dollar has exposed vulnerabilities in the global financial system, prompting countries to seek alternatives for a more stable and diverse economic framework.
- Emerging markets are looking for a more resilient financial system and advocating for de-dollarisation to reduce their dependence on the US dollar. possibly lead to global financial systems becoming unstable.
- There is currently no currency that can match the US dollar's stability, liquidity, and global acceptance. While the euro and Chinese yuan have made progress, they do not yet meet all the requirements for replacing the dollar.
- The shift away from the dollar may result in currency exchange rate volatility, particularly in the early stages, which could have the greatest impact on developing countries.

Way Forward

- The US dollar remains an important component of the current global financial system because there is no viable alternative at this time.
- The US economy may be struggling and its dominance declining, but it retains a commanding position in the financial markets.
- The world will likely continue to depend on the US dollar as long as it provides consistency, credibility, and appealing opportunities in comparison to other options.

3.8 SHORT ARTICLES

Why is the Indian Rupee falling against the US Dollar?

Context

- The value of the Indian rupee in relation to the US dollar has surpassed 85.

Why is the Indian rupee falling against the US dollar?

- **India imports more than it exports**, driving up demand for US dollars. This leads to a weaker rupee because more rupees are required to purchase dollars.
- When **foreign investors withdraw money from India** due to factors like higher inflation or better returns in the United States, demand for the rupee falls, causing the currency to depreciate.
- **Tariffs and trade restrictions can significantly impact currency demand.** For instance, if the US imposes high tariffs on Indian goods, demand for Indian goods—and thus Indian rupees—decreases, leading to a fall in the rupee's value.
- **Inflation reduces the purchasing power of a currency.** If inflation in India exceeds that in the US, it raises the cost of Indian goods and services, reducing global demand and consequently reducing demand for the rupee, leading to its devaluation against the dollar.

What are the effects of a weakening rupee on the Indian economy?

- The **depreciation requires the government to increase subsidies for essential goods like energy and fertilizer to protect citizens from inflation.** While this benefits consumers, it also increases the budget deficit and slows economic growth.
- Import-dependent industries such as electronics, automobiles, and pharmaceuticals will face higher production costs as the rupee falls. This will lower profit margins and potentially lead to higher consumer prices or even production cuts.
- As the currency depreciates, **interest rates on foreign loans increase, makes it more difficult for businesses to secure new credit.** This can lower capital expenditure and delays in infrastructure projects.

55th GST Meeting

Context

- The GST Council chaired by the Union Finance Minister has reviewed tax changes.

What changes have been made to the GST rates on goods?

- **Fortified Rice Kernel (FRK)** now has a reduced GST rate of 5%.
- Gene therapy has been exempt from GST.
- The 5% GST rate applies to food inputs used in food preparations that are distributed free to economically disadvantaged people through government programs.
- **GST on old vehicles has been raised from 12% to 18% for the sale of old and used vehicles**, including electric vehicles (EVs). However, GST is only charged on the margin (the difference between the purchase and selling prices).
- Autoclaved Aerated Concrete (ACC) blocks containing more than 50% fly ash will now be charged 12% GST.
- Popcorn mixed with salt and spices is subject to 5% GST if not pre-packaged and labelled, or 12% if it is. However, caramel popcorn mixed with sugar will be subject to 18% GST.
- No GST will be levied on penalty charges collected by banks and NBFCs for noncompliance with loan terms.

What changes have been made to the GST rates on services?

- General insurance companies will be exempt from paying GST on contributions to the Motor Vehicle Accident Fund for victims of road accidents, including hit-and-runs.
- The GST rate for restaurant services in hotels will now be determined by the 'value of supply' of accommodation in the previous fiscal year.
- Taxpayers under the composition levy scheme will be exempt from the reverse charge mechanism for renting commercial properties from unregistered persons to registered persons.

ASUSE Results

Context

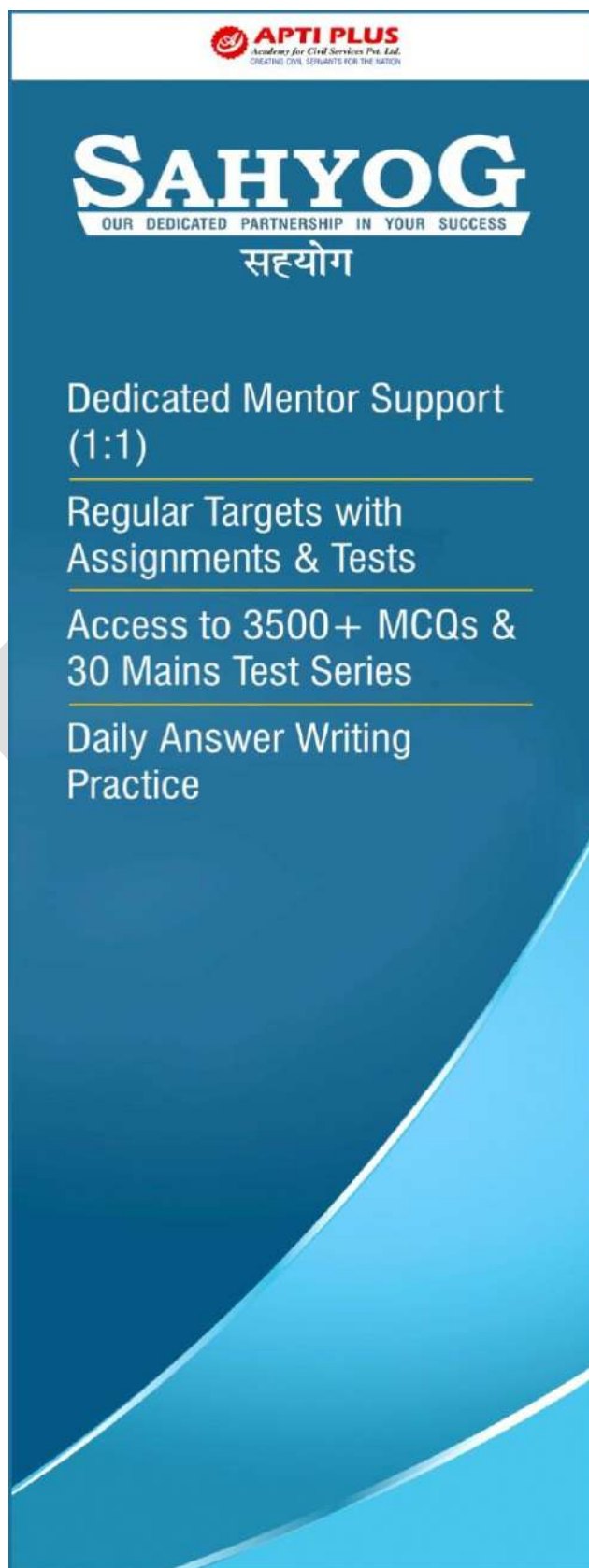
- The Ministry of Statistics and Programme Implementation (MoSPI) has released the 2023-24 Annual Survey of Unincorporated Sector Enterprises (ASUSE).

About Annual Survey of Unincorporated Sector Enterprises (ASUSE)

- The **survey** assess the economic and operational characteristics of unincorporated non-agricultural establishments in sectors such as manufacturing, trade, and other services, but not construction.
- Unincorporated establishments are **non-agricultural enterprises that have not been registered under the Companies Act 1956 or the Companies Act of 2013.**

Highlights of the ASUSE 2023-24

- **Labour Market Performance:** More than 12 crore workers were employed in the sector. The "Other Services" sector experienced the greatest increase in employment, at 17.86%, followed by the manufacturing sector at 10.03%.
- **Digital Adoption:** The percentage of businesses using the Internet increased from 21.1% in 2022-23 to 26.7% in 2023-24, indicating a shift towards digital business operations.
- **Women Entrepreneurship:** The percentage of female-owned proprietary businesses increased from 22.9% to 26.2%, indicating a trend towards greater gender inclusivity and empowerment.



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- The report predicts a positive future for the Indian economy. The increase in establishments, employment, and productivity indicates that the unincorporated sector is recovering rapidly.

RBI is leveraging AI to crack down on 'Mule Bank Accounts'

Context

- The Reserve Bank of India created Mule Hunter, an AI-powered model to assist banks in addressing the issue of "mule" bank accounts.

What is a mule bank account?

- A mule bank account is a bank account used by criminals to carry out illegal activities, primarily money laundering.
- A "money mule" is someone whose bank account is used by criminals to launder illegal funds. The money mule is often an innocent victim who is unaware of the illegal activities taking place on their behalf.
- When the crime is discovered, the money mule becomes the focus of police investigations, while the real mastermind of the fraud goes undetected.
- Mule bank accounts are a common component of online financial fraud in India. The government has frozen around 4.5 lakh mule accounts used to launder cybercrime proceeds.

RBI's State Finances: A study of Budgets of 2024-25

Context

- According to the Reserve Bank of India, popular state schemes such as farm loan waivers, free power, and transport may reduce the resources available for social and economic infrastructure.

Key Highlights of the Report

- According to the RBI's 'State Finances: A Study of Budgets for 2024-25', state governments have made significant progress towards fiscal consolidation.
- States have kept their aggregate gross fiscal deficit below 3% of GDP for three years in a row (2021-2024).

- States have also kept their revenue deficits low, at 0.2% of GDP in 2022-23 and 2023-24, allowing them to increase capital spending while improving the quality of expenditure.
- While state debt as a percentage of GDP has decreased from 31% in 2021 to 28.5% in 2024, it still exceeds the pre-pandemic level of 25.3% in 2019.

RBI recommendations to improve state finances

- Prioritise more productive areas, such as education, healthcare, and infrastructure, over large subsidies.
- Create a clear and transparent strategy for debt reduction in accordance with the Fiscal Responsibility and Budget Management (FRBM) guidelines.
- Implement outcome budgeting to link spending to measurable results, ensuring accountability and focussing on high-impact projects.
- Include climate action in the budgets to ensure long-term growth.
- Increase fiscal data reporting and transparency to improve risk assessment and reduce borrowing costs.

Opinion Trading

Context

- Despite an estimated 5 crore users and rapid investment growth, India's opinion trading industry has remained largely unreported and unnoticed.

What is opinion trading and how does it work?

- Opinion trading is a platform where users can bet real money on the outcome of future events such as sports scores, election results, or cryptocurrency prices.

What are the legal challenges that opinion trading platforms face in India?

- There is no specific legislation governing these platforms, these platforms frequently

operate in a legal grey area due to ambiguities in the Information Technology Rules.

- It is **not clear whether they should be classified as skill or chance games**. In India, games of skill are permitted, but games of chance, such as traditional betting, are not.
- The lack of regulation raises issues of user safety and fairness.

Way forward for regulating opinion trading platforms in India

- India can **learn from countries such as the United States and Australia**, where opinion trading platforms are regulated as securities.
- There is a need for a clear, comprehensive regulatory framework to address user safety concerns and ensure transparency and fairness.
- A balanced regulatory approach is required to protect users while encouraging innovation and continued growth in the online gaming industry.

Parliamentary Panel on Agriculture Recommendations

Context

- The Standing Committee on Agriculture, Animal Husbandry, and Food Processing recommended establishing a legally binding Minimum Support Price.

Key Highlights of the Standing Committee Report

Agricultural Procurement Process

- The Committee reported that agricultural procurement levels were extremely low. It was found that **only 0.5% of agricultural produce was purchased**.
- The Minimum Support Price (MSP) system is limited in its effectiveness due to low procurement.

Comment on PM-KISAN scheme

- The committee questioned whether the PM-KISAN scheme would be linked to inflation, pointing out that it has been in operation for five years. The agriculture department

responded that no plans exist to tie the program to inflation.

- The committee recommended **increasing the annual PM-KISAN support from Rs 6,000 to Rs 12,000**.

Government's allocation to agriculture

- The committee observed that the Central Government's agriculture fund allocation had decreased from 3.5% in 2020-21 to 2.5% in 2024-25. It called for an increase in agricultural budget allocations to ensure the sector's growth and sustainability.

Contradiction between government schemes

- The committee discovered a contradiction between promoting natural farming and the Namo Drone Didi program, which uses fertilisers and pesticides. It questioned how the government would promote harmony between conventional and natural farming, as these initiatives appeared to contradict one another.

Right to Disconnect

Context

- According to The Hindu report, Indian women in professional jobs such as auditing, information technology, and media work more than 55 hours per week on average.

What does the "Right to Disconnect" mean?

- It **allows employees to disconnect from work-related contact**, such as phone calls, emails, or messages, during working hours. It ensures that employees are not forced to respond to work demands during their personal time.
- Several nations have recognised this right. For example, France passed the El Khomri Law in 2017, which states that employees are not required to work beyond office hours. Countries such as Spain, Australia, and Ireland have enacted similar legislation.

Does India have any laws that recognize the Right to Disconnect?

- **There are no laws in India that specifically recognise this right**. However, the Directive

Principles of State Policy—Articles 38 and 39(e)—are concerned with worker welfare, especially the promotion of health and decent working conditions.

Copper Industry in India

Context

- The Quality Control Order (QCO) has resulted in a shortage of copper in India.

Details

- The order requires refined copper to have Bureau of Indian Standards (BIS) certification before it can be imported. As a result, **Japanese suppliers, which account for 80% of India's copper imports**, are facing delays in certification, this has disrupted industries that depend on copper.

About Copper

- It is widely used in various industries due to its malleability, ductility, corrosion resistance, and excellent conductivity.
- It is the second most conductive metal after silver and is used in almost all electrical wiring.
- It is **100% recyclable without any loss of quality**, making it environmentally friendly.
- **India produces only about 2% of the global copper output.** Despite its limited reserves, India remains one of the world's top 20 copper producers. However, the country is also a major copper importer.
- The top five global copper producers in 2023 are Chile, Peru, the Democratic Republic of the Congo, China, and the United States. **Chile is the world's largest producer and exporter of copper.**

Commissioner of Railway Safety (CRS)

Context

- The Commissioner of Railway Safety (CRS) identified "glaring lapses" in the planning and construction of the new Pamban rail bridge, connecting Rameswaram on Pamban Island with Mandapam on mainland India

About Commissioner of Railway Safety (CRS)

- The CRS is in charge of ensuring the safety of rail travel and operations **under the Railways Act of 1989.**
- It **investigates serious train accidents** and makes safety recommendations to the government.
- It is headquartered in Lucknow, Uttar Pradesh.
- It **became independent following the Government of India Act of 1935**, which required that railway safety functions be carried out by an independent body.
- In 1941, the Railway Inspectorate was separated from the Railway Board and moved to the Department of Posts and Air.
- In 1961, it was **renamed as the Commissioner of Railway Safety** and moved to the Ministry of Civil Aviation.

Female Labour Force Participation Rate rose during 2017-18 to 2022-23

Context

- The Economic Advisory Council to the Prime Minister (EAC-PM) has issued a working paper highlighting the increase in female labour force participation rate (LFPR) between 2017-18 and 2022-23.

Key Highlights of the Report

- **From 2017-18 to 2022-23, the female LFPR in India increased**, the LFPR increased from 24.6% to 41.5% in rural areas and 20.4% to 25.4% in urban areas.
- Bihar, Punjab, and Haryana have consistently reported low female LFPR rates. Despite differing economic conditions—Bihar is the poorest, while Punjab and Haryana are among the wealthiest—the female LFPR remains low in these areas.
- **Married women, especially in urban areas, have a lower LFPR than men.** This trend is common across states and age groups.

Strategic Reserves

Context

- The bitcoin market has surged in response to US President-elect Donald Trump's proposal to establish a strategic reserve of the cryptocurrency.

How would a U.S. strategic Bitcoin reserve work?

- A US strategic Bitcoin reserve includes **holding a large amount of Bitcoin for use during recessions or to establish dominance in the global Bitcoin market.**
- The United States could instruct its Treasury's Exchange Stabilisation Fund to purchase or hold Bitcoin. It may use seized illegal assets as part of this reserve.

What would be the benefit of U.S. Bitcoin reserves?

- Supporters believe that a Bitcoin reserve will help the US to dominate the global Bitcoin market. Bitcoin's value may rise in the long run, potentially reducing the US deficit without raising taxes.
- A strong Bitcoin reserve could also strengthen the US dollar, giving it an economic edge over countries such as China and Russia.

What are the potential risks of a U.S. bitcoin reserve?

- Critics argue that **Bitcoin's volatility and lack of intrinsic value make it a risky asset.**
- Its price can fluctuate greatly, which could destabilise markets if the United States purchases or sells large amounts.
- Securing a reserve would be difficult due to the threat of cyberattacks on Bitcoin wallets.

Credit Guarantee Scheme for E-NWR-based Pledge Financing (CGS-NPF)

Context

- The Union Food and Consumer Affairs Minister has announced the Credit Guarantee Scheme for e-NWR-based Pledge Financing (CGS-NPF).

About Credit Guarantee Scheme for e-NWR-based Pledge Financing (CGS-NPF)

- **It provides Rs. 1,000 crore in funding**, which farmers can access in exchange for electronic negotiable warehouse receipts.
- **Farmers receive receipts when they deposit their commodities in authorized warehouses** licensed by the Warehousing Development and Regulatory Authority (WDRA).

Who are the key beneficiaries of the CGS-NPF scheme?

- It mainly targets small and marginal farmers, women, SC/ST farmers, and Divyangjan (PwD) farmers by providing a low guaranteed fee.
- It helps small businesses, MSMEs, Farmers' Producer Organisations (FPOs), and farmer cooperatives.
- Small and marginal farmers can borrow up to Rs. 75 lakhs, whereas MSMEs, FPOs, and traders can borrow up to Rs. 200 lakhs.

How much loan guarantee coverage is available under the scheme?

- Small and marginal farmers, women, and SC/ST/PwD farmers are eligible for 85% coverage on loans of up to Rs. 3 lakh.
- **80% coverage is available for loans ranging from Rs. 3 lakh to Rs. 75 lakh.**
- MSMEs, traders, and FPOs are eligible for 75% coverage on loans up to Rs. 200 lakhs.

India Skills Report 2025

Context

- The India Skills Report 2025 is a detailed study conducted by the Confederation of Indian Industries (CII) in partnership with Wheebox and the All India Council for Technical Education.

About India Skills Report 2025

- It is based on data from over 6.5 lakh people who took the Global Employability Test (G.E.T.) and over 1,000 organisations in 15 industries.

- **Almost 55% of Indian graduates are expected to be employable by 2025**, up from 51.2% in 2024.
- **Maharashtra leads with 84% employability**, followed by Delhi (78%) and Karnataka (75%).
- Management graduates are the most employable, with 78%, followed by engineering (71.5%) and Master of Computer Applications (71%), and science graduates (58%).
- Men's employability is expected to increase from 51.8% in 2024 to 53.5% in 2025. However, women's employability is expected to decline from 50.9% in 2024 to 47.5% in 2025.
- By 2025, 50% of secondary and university students are projected to have received vocational training.

3.9 SNIPPETS

Topics	Details
Coconut Oil	<ul style="list-style-type: none"> • The Supreme Court ruled that coconut oil should be classified as an edible oil under the Goods and Services Tax (GST) regime and taxed at 5%, rather than the 18% tax rate applied to products classified as "preparations for use on the hair."
RBI MPC Highlights	<ul style="list-style-type: none"> • The Reserve Bank of India (RBI) reduced the Cash Reserve Ratio (CRR) by 50 basis points (bps) to 4% from 4.5% to boost financial system liquidity. • The CRR is a percentage of a bank's deposits required to be held in liquid cash at the Reserve Bank of India (RBI). • The CRR cut increases liquidity in the banking system, allowing banks to use the freed-up funds to lend, which could accelerate economic growth. • The Monetary Policy Committee (MPC) decided to keep the repo rate at 6.5%. The RBI Governor cited ongoing food inflation as a key factor in the decision.
National Housing Bank (NHB)	<ul style="list-style-type: none"> • The National Housing Bank (NHB) is an apex agency set up in 1988 to promote housing finance companies (HFCs) in India. • It is an All-India Financial Institution (AIF) that is entirely owned by the Government of India. • The NHB supervises HFCs, while the Reserve Bank of India (RBI) regulates them. • NHB RESIDEX is the country's first official housing price index (HPI). It tracks price movements in residential real estate.
AIMC System	<ul style="list-style-type: none"> • The Ministry of Road Transport and Highways implementing Automated & Intelligent Machine-aided Construction (AIMC) to address delays in national highway projects. • The AIMC system integrates real-time data sharing with intelligent machines. It collects data specific to a project and transmits it to stakeholders instantly.
SVAGRIHA	<ul style="list-style-type: none"> • The GRIHA council has given the Inland Waterways Authority of India (IWAI) a five-star SVAGRIHA rating for its Intermodal Terminal (IMT) in Kalughat, Bihar. • SVAGRIHA (Simple Versatile Affordable GRIHA) promotes the concept


	<p>of green buildings and sustainability to reduce environmental impact.</p> <ul style="list-style-type: none"> The rating system is applicable to projects with a built-up area of less than 2500 square meters. The rating system consists of 14 criteria organised into five broad sub-groups: architecture and energy, water and waste, materials, landscape, and lifestyle.
<p>Social Dialogue Report</p>	<ul style="list-style-type: none"> The International Labour Organisation (ILO) released the Social Dialogue Report. The report shows a 7% decrease in compliance with freedom of association and collective bargaining rights between 2015 and 2022, mainly due to increased violations of civil liberties and worker and employer bargaining rights.
<p>Consumer Confidence Survey</p>	<ul style="list-style-type: none"> The Consumer Confidence Survey (CCS) is a tool used by the Reserve Bank of India (RBI) to assess consumer sentiment towards the economy. The Current Situation Index (CSI) fell 0.7 points, from 94.7 in September 2024 to 94 in November 2024. This indicates a slight decrease in consumer confidence in the current economic situation. The Future Expectations Index (FEI) rose by 0.5 points to 121.9 in November 2024. This suggests that, while current sentiments are lower, households are more optimistic about the future.
<p>Road Accidents in India</p>	<ul style="list-style-type: none"> The Union Minister of Road Transport and Highways stated that more than 4.80 lakh road accidents occurred in 2023. India had 1,317 road crashes and 474 fatalities per day, or 55 crashes and 20 fatalities per hour. The fatality rate per 100 accidents decreased slightly, from 36.5 in 2022 to 36 in 2023. Uttar Pradesh has the highest number of road accident fatalities. Over speeding was the leading cause of traffic accidents and deaths, accounting for 68.1% of all fatalities. Two-wheeler drivers accounted for 44.8% of fatalities and roughly 20% of all road crash fatalities.
<p>Milkweed Fibre</p>	<ul style="list-style-type: none"> The Union Ministry of Textiles promotes research and development of new natural fibres, including milkweed fibre. Milkweed fibre is derived from the seeds of the milkweed plant, Asclepias syriaca L., it is commonly referred to as a stubborn weed. It is native to southern Canada and much of the United States, the plant prefers sunny locations with sandy soil. In India, milkweed grows wild in Rajasthan, Karnataka, and Tamil Nadu. It contains oily materials and its surface is hydrophobic and oleophobic due to natural waxes; it repels both water and oil. The plant's latex also contains toxic compounds, so older parts of the plant are toxic to humans and large animals.
<p>Energy Conservation Day</p>	<ul style="list-style-type: none"> National Energy Conservation Day 2024 was celebrated on 14th December 2024. The day is celebrated by the Bureau of Energy Efficiency (BEE), under the

	<p>Ministry of Power.</p> <ul style="list-style-type: none"> The theme for 2024 is "Powering Sustainability: Every Watt Counts."
Directorate Of Revenue Intelligence (DRI)	<ul style="list-style-type: none"> DRI was established in 1957 by the Central Board of Indirect Taxes and Customs (CBIC), under the Ministry of Finance for anti-smuggling intelligence and investigations. It gathers and analyses intelligence to aid investigations and track smuggling patterns. The agency also monitors seizures and market prices to identify legal gaps.
Proudhon's Theory of Mutualism	<ul style="list-style-type: none"> Proudhon's theory of mutualism advocates for free will, reciprocal conduct, and equitable exchange of goods and services. It advocates for a society where individuals and communities work together to manage resources for the benefit of all, free from central authority and capitalist exploitation. Mutualism is considered a radical alternative to capitalism and state socialism, proposing a decentralized system where communities manage resources collectively and economic relations based on fairness and cooperation.
Rambhog Paddy	<ul style="list-style-type: none"> Rambhog paddy has been revived in 60 villages in the Terai region of Uttar Pradesh. Rambhog cultivation is much less expensive than hybrid paddy farming. It needs homemade compost and organic fertilizers, making the farming process both cost-effective and environmentally friendly. The paddy straw is soft and fragrant, and the quality of the straw has led to increased milk production in their buffaloes.
Free AI Committee	<ul style="list-style-type: none"> The Reserve Bank of India has set the committee to develop a Framework for Responsible and Ethical AI Adoption in the Financial Sector. It consists of eight members, including Pushpak Bhattacharyya from IIT Bombay as the chairperson.
Household Consumption Expenditure Survey (HCES)	<ul style="list-style-type: none"> The National Sample Survey Office (NSSO), under the Ministry of Statistics and Programme Implementation (MoSPI) released the Household Consumption Expenditure Survey 2023-24. The Monthly Per Capita Expenditure (MPCE) in rural areas rose by 3.53%, reaching ₹2,079, while in urban areas, it rose by 3.48%, reaching ₹6,996. The urban-rural gap in MPCE decreased to 70% in 2023-24, compared to 84% in 2011-12. In 2023-24, non-food items accounted for 53% of MPCE in rural areas and 60% in urban areas.
Windfall Tax	<ul style="list-style-type: none"> The government removed the windfall gains tax on domestic crude oil production, as well as the export of diesel, petrol and aviation turbine fuel. It is a tax imposed by the government on industries that generate unexpected and significant profits as a result of extraordinary circumstances, such as geopolitical disruptions or natural disasters.

- It may also apply to individuals who receive a large sum of money as a gift, inheritance, or from winnings in a game show, gambling, or lottery.
- The tax was introduced in 2022 in response to the sharp increase in global crude oil and fuel prices resulting from Russia's invasion of Ukraine.

3.10 ADDITIONAL TOPICS FOR READING FROM IAS GYAN WEBSITE

TOPIC	UPLOADED ON IAS GYAN WEBSITE ON
Seeds Bill	3 rd December, 2024
Stress in India's Microfinance Institutions, Small Finance Lenders, and Unsecured Personal loans	4 th December, 2024
Deregulation	7 th December, 2024
Gamify India's Skilling Initiatives	11 th December, 2024
Government vs RBI Governor tussle	15 th December, 2024
Agricultural Carbon Markets	20 th December, 2024
India's FDI journey	25 th December, 2024
Economy Overview 2024	26 th December, 2024
The Gatt-Ification of The World Trade Organization	26 th December, 2024
Should the Wealth Tax be Reinstated in India?	28 th December, 2024
Domestic Manufacturing of IT Hardware	28 th December, 2024



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4. DEFENSE & SECURITY

4.1 INDIA'S UNREGULATED AI SURVEILLANCE

Context

- In 2019, the Indian government made headlines by announcing its intention to create the world's largest facial recognition system for policing.

India's Current Position

- In 2019, India announced plans** to create the world's largest facial recognition system for police.
- Over the next five years, AI-powered surveillance systems were deployed at railway stations and the **Delhi Police integrated AI for crime patrols.**
- Plans include the launch of 50 artificial intelligence-powered satellites** and further improvements to the surveillance infrastructure.
- Technologies such as those implemented in **Delhi and Hyderabad** are integrated into police systems without publicly available rules regarding data collection, processing or storage.
 - This lack of regulation leaves room for data misuse and raises national security concerns.
- As of now, AI remains largely unregulated in India.** In 2022, the government announced plans to regulate AI technologies under the upcoming **Digital India Act**, but the proposed legislation has yet to materialize.

Issues in AI-Powered Surveillance

Positive Impacts	Negative Impacts
Development of innovation policy - Artificial intelligence is increasingly used in innovation policy, such as former US Congress bills.	Promoting "Liar's Dividend" through Deepfakes - Deepfakes are used to dismiss truth as fake news, undermining reality.
Enhanced political messaging - AI creates resonant political messaging through advanced analytics, transforming campaign strategies.	Undermining trust in democratic processes - AI-edited content can mislead public perception, creating a democratic deficit.
New political platforms - AI is used for political engagement and ideological development, like the Danish Synthetic party.	Risks of manipulation - AI can influence elections and public opinion through the spread of false narratives.
Economic benefits - AI-driven fundraising and ventures bring significant shifts in political financing.	Ethical and legal challenges - AI-generated political contributions or parties raise complex ethical and legal issues.
Campaign strategy - Generative AI aids election campaigns, such as live translation of speeches into various languages.	Risks of using artificial intelligence in defiance of the law - Even well-intentioned surveillance laws can lead to overreach and violation of citizens' rights, as shown by Section 702 of the Foreign Intelligence Surveillance Act (FISA) in the United States.

Way Forward

- Adopt transparent data collection practices, including disclosure of what data is collected, its purpose, and how long it is stored.

- Ensure independent judicial oversight of exceptions to data processing.
- Retroactive fixes to privacy issues are costly and inefficient.
- Transparent rules, consent mechanisms, and accountability can prevent abuse.
- Addressing the loopholes in the DPDPA and enacting the Digital India Act are urgent to protect privacy and civil liberties.

Case Studies

The Telangana Police Data Breach:

- Reports revealed unauthorized access to databases from welfare schemes like 'Samagra Vedika'. The breach raised serious questions about the extent of data collection and the lack of transparency in its use.

Global Approaches to Tackling AI

- **Risk-based framework:** The EU AI law adopts a risk-based approach to AI activities, dividing them into unacceptable, high, transparent, and minimal risk levels.
- **Prohibitions and exemptions:** Activities such as real-time remote biometric identification for law enforcement purposes are prohibited under EU law due to their unacceptable risk.
- **Transparency and minimal risk:** Provisions are in place to ensure transparency for certain activities, while minimal-risk AI technologies face fewer restrictions.

Conclusion

- The problem is not the use of artificial intelligence in driving, but rather its uncontrolled application without adequate guarantees. A comprehensive regulatory framework is urgently needed to protect citizens' rights and ensure responsible use of technology.

4.2 EXERCISE HARIMAU SHAKTI

Context

- The 4th edition of India- Malaysia Joint Military Exercise HARIMAU SHAKTI commenced at Pahang district, Malaysia.

About Exercise HARIMAU SHAKTI

- An annual joint military exercise between the Indian and Malaysian Armies, alternately conducted in India and Malaysia. The 2023 edition was held at **Umroi Cantonment, Meghalaya**.
- **Objective:** Enhance interoperability for sub-conventional operations under the UN Chapter VII mandate, focusing on counter-insurgency in jungle terrain.
- **Significance:** Facilitates sharing of tactics and techniques, boosts interoperability, and strengthens defense cooperation and bilateral relations.

About India-Malaysia defense relations:

- **India established diplomatic relations with the Federation of Malaya (predecessor state of Malaysia) in 1957.** There is considerable goodwill for India in Malaysia at the people-to-people level, which hosts approximately 2.75 million Persons of Indian Origin (PIO)'s, which is the second-largest PIO community in the world after the US and the third-largest Indian diaspora in the world.
- **India-Malaysia defense relations have steadily grown over the years.** The MoU on Defence Cooperation signed in 1993 is the cornerstone of defence relations between the two countries which allows for widening the scope of existing bilateral cooperation to include joint ventures, joint development projects, procurement, logistic and maintenance support, and training.

- **Regular Staff Talks between the services at the apex level** have been extremely successful. Indian Navy ships regularly pay port visits to Malaysia, which provides an opportunity for both navies to interact and engage with each other and also foster bonds of lasting friendship.
- **Malaysia-India Defence Cooperation Committee (MIDCOM)** meets regularly to review the progress in defence cooperation on an annual basis.
- India has been a regular participant at the **Langkawi International Maritime and Aerospace Exhibition (LIMA)** and **Defence Services Asia (DSA)** Exhibition in Malaysia.

4.3 GENERATION IN FIGHTER JETS

Context

- Fighter jets are loosely classified in terms of generations, which indicate when they were developed and their technological capabilities.

The five generations (so far)

- There are currently five generations of fighter jets that are (or were in the past) in active service, with sixth-generation jets currently in development. According to the classification presented by aviation expert **David Baker** in *Fifth Generation Fighters* (2018).

What does "generation" mean

- The term "aircraft generation" appeared in the **1990s** and refers primarily to fighters. Each generation represents a significant leap in fighter technology.
- There is **no strict definition of what constitutes a generation**, and these generations serve as a general guide for comparing aircraft technology, not as an exact measure of their capabilities.
- **Generational shifts typically occur when new technological innovations** are too significant to be integrated into existing designs through upgrades.
- There are currently five generations of fighters that are (or have been) in active service, with a sixth generation currently in development.

First generation (1943 to 1955)

- **The first generation of fighters** appeared during the last years of World War II.
- Early jet fighters, faster than piston engine fighters but still subsonic.
- **Basic avionics, no self-defense systems**, and armed with machine guns or cannons.
- These aircraft were deployed as interceptors and could engage in close-range combat.
- **Examples:** Messerschmitt Me 262, Mikoyan-Gurevich MiG-15.

Second generation (1955-1970)

- The **introduction of afterburners and swept wings** enabled second-generation aircraft to reach transonic and supersonic speeds in level flight.
- Fire control radars were introduced, along with the first semi-active radar-guided missiles.
- Radar warning receivers were added, opening the way for countermeasures.
- **Examples:** MiG-21, Lockheed F-104 Starfighter.

Third generation (1960s to 1970s)

- Integrated designs, multi-role capabilities (fighter-bombers and interceptors), visual range warfare, **pulse Doppler radar**, and **electronic warfare systems**.
- The aircraft featured more powerful turbofan engines for superior range, maneuverability and sustained supersonic flight.

- **Examples:** McDonnell Douglas F-4 Phantom, MiG-23, Hawker Siddeley Harrier.

Fourth generation (1970-2000)

- **Fly-by-Wire (FBW) technology:** The introduction of FBW systems allowed for better maneuverability and more stable flight at high speeds using computers to mediate pilot input and aircraft control surfaces.
- **Introduction of advanced avionics, including head-up displays (HUDs) and improved electronic warfare systems.**
- **Stealth (ability to be invisible to radar systems):** Composite construction materials, radar absorbing paints, etc.
- **Examples:** F-16 Fighting Falcon, Sukhoi Su-30, Dassault Rafale.

Fifth generation (2000–present)

- **Fifth-generation fighter jets** are the most advanced aircraft in service today. They feature stealth technology, integrated systems that give pilots a full view of the battlefield, and networked communications that allow them to act as a coordinated team.

- **Advanced computer systems** help automate many functions, reducing pilot workload and increasing operational efficiency.
- **Introduced in 2005, the Lockheed Martin F-22 Raptor** was the first of its kind. It remains unrivaled in stealth and long-range combat, with a radar signature as small as a bird and advanced systems to detect and kill enemies before they are detected.
- **Currently, only the USA (F-22, F-35), Russia (Sukhoi Su-57) and China (Chengdu J-20)** operate fifth-generation fighters.
- **India is developing its own** but is still a long way from creating a prototype.

Sixth generation (under development)

- **Speculated Features:** May include optionally manned or unmanned capabilities, hypersonic speeds, advanced AI, directed energy weapons (eg lasers) and possibly suborbital flight.
- **Potential examples:** Tempest (UK, Italy, Japan), FCAS (Future Combat Air System) (France, Germany, Spain)

4.4 WOMEN PERSONNEL IN CAPF

Context

- Recently, the Minister of State for Home Affairs informed Lok Sabha that 4,138 women personnel are likely to be recruited in the CAPFs and Assam Rifles in 2025.

What is the current strength of women in the Central Armed Police Forces (CAPFs)?

- **Women make up 4.4% of the 9.48 lakh-strong CAPFs**, including the Assam Rifles. The **Central Industrial Security Force (CISF)**, which guards public spaces such as airports, the Delhi Metro, and important government buildings such as the Parliament Complex, has the **highest representation of women – 7.02% of the total force strength of around 1.51 lakh.**

- The representation of women in the other forces is lower – 4.43% in SSB, 4.41% in BSF, 4.05% in ITBP, 4.01% in the Assam Rifles, and 3.38% in the **Central Reserve Police Force (CRPF).**
- It is noteworthy that the number of women in CAPFs has gone up from 15,499 in 2014 to 42,190 in 2024. 835 women personnel have been recruited in CAPF and Assam Rifles in 2024, while 5,469 are in the process of recruitment.

How have the efforts to recruit women in CAPFs progressed so far?

- **2016:** The central government decided to reserve a third of all constable-level positions in the CRPF and CISF for women, and 14-

15% in the border guarding forces – the BSF, SSB, and ITBP.

- **2022:** Parliamentary Committee on Home Affairs expressed disappointment over the “abysmally low” number of women CAPF personnel. **Women constituted only 3.68% of the strength of the forces** at the time. Despite efforts of the Home Ministry to encourage the recruitment of women in the CAPFs and Assam Rifles, the strength of women is abysmally low.

Committee Recommendations to the Government

- To take concrete steps to increase the representation of women in CAPFs. Phase-wise recruitment drives for women should be put on fast track, particularly in the CISF and CRPF, and steps should be taken to create a conducive environment in the border outposts so that the women are motivated to join security forces.
- **2022 Report:** The Ministry should strive to identify the factors preventing women from joining the forces, and to come up with practical solutions to encourage their participation.
- **2023:** The Standing Committee on Personnel, Public Grievances, Law and Justice, suggested “soft postings” for women in order to incentivise them to join the CAPFs.

Concerns

- A major constraint that prevents women from joining forces is the difficult terrain and conditions in which they might have to work. So, a policy may be explored for women officers to be given soft postings and not subjecting them to extremely strenuous and difficult working conditions unless required in extreme circumstances **like war, armed rebellion etc., and that too when there is an absolute shortage of males who can be deployed by the forces.**

Current Status

- **2024:** The government had taken several steps to encourage women to join the CAPFs and Assam Rifles, including application fee waivers and relaxations in the **Physical Standard Test (PST) and Physical Efficiency Test (PET) in comparison to male candidates.**
- Central government facilities such as **Maternity Leave and Child Care Leave were also applicable to CAPFs, creches and Day Care Centres were provided by the CAPFs to women employees,** and committees were constituted at all levels to check sexual harassment and to expeditiously deal with the complaints of women personnel.

4.5 ISSUE OF SMUGGLING IN INDIA

Context

- Recently the Directorate of Revenue Intelligence (DRI) ‘Smuggling in India’ report highlighted inventive methods of smuggling and maps key geographic routes.

Definition of Smuggling

- **The World Customs Organization (WCO)** has defined smuggling as, “Customs offence consisting in the movement of goods across a Customs frontier in any clandestine manner, thereby evading Customs control.”
- **In the Indian context, the Customs Act, 1962** has provided for an inclusive definition of the term smuggling. Smuggling has been defined as “any act or omission which will render such goods liable for confiscation under Sections 111 or 113 of the said Act”.

The provisions of the Customs Act, 1962 provide for confiscation of goods in the following conditions.

- (a) imported/exported illegally or without following proper procedure as laid down,
- (b) attempted to import/export illegally,
- (c) goods that are misdeclared
- (d) goods that are brought into the country in concealment
- (e) goods that are prohibited under various laws
- (f) goods used to conceal smuggled goods;

The landscape of smuggling in India

- India has been plagued by the scourge of smuggling for a very long time. A huge populace, porous borders, insufficient **enforcement apparatus**, and a **perceived lack of coordination** among different agencies have led to multiple instances of apprehension of attempts of smuggling. **Gold, Drugs, electronic goods, and foreign currency remain the main items smuggled.** The **Directorate of Revenue Intelligence (DRI)** is the premier intelligence agency responsible for counter-smuggling operations.
- The DRI seized **1,319 kg of gold in 2023-24**, highlighting the scale of this problem.

Challenges in Controlling Smuggling

Transnational Organized Crime:

- Smuggling involves transnational organized crime syndicates with intricate networks spanning multiple countries.
 - The DRI reported a significant increase in drug seizures in FY24, with cocaine seizures more than doubling from the previous year and cocaine smuggling rising by 9%.

Lack of International Cooperation:

- Effective coordination between countries is essential to combat smuggling, but differing priorities and legal frameworks can hinder cooperation.

Sophisticated Techniques:

- Smugglers employ increasingly sophisticated techniques, such as using drones, dark web marketplaces, and encrypted communication to evade detection. E.g., employing "mules" and using

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Adaptability:

- Smuggling networks are highly adaptable and can quickly adjust their methods to circumvent border controls and law enforcement efforts.

Land Borders:

- Long and porous land borders, especially in regions with difficult terrain, make it challenging to monitor and control smuggling activities. **E.g., methamphetamine smuggling in northeastern states like Assam and Mizoram.**

Maritime Routes:

- Vast maritime zones and the increasing use of sea routes for smuggling pose significant challenges. According to the Smuggling of India report of the Directorate of Revenue and Intelligence (DRI) report, "Cocaine trafficking has seen a marked increase in India, particularly through direct routes from South America and via African countries."
 - The agency recorded 47 cases in 2023-24 of smuggling of cocaine through the air route, against 21 cases the previous year.

Government Initiatives

Narcotic Drugs and Psychotropic Substances Act, 1985:

- Legislation prohibiting the manufacture, possession, sale, and consumption of illegal drugs, with penalties for violations.

Narcotics Control Bureau (NCB):

- Nodal agency for drug law enforcement, coordinating efforts to combat trafficking and abuse.

Anti-Drug Task Force (ANTF):

- State-level task forces to strengthen drug law enforcement.

National Action Plan for Drug Demand Reduction (NAPDDR):

- A Ministry of Social Justice and Empowerment initiative focused on prevention, treatment, rehabilitation, and education to reduce drug demand.

Way forward

Countering internal demand:

- Constitute an institution that specializes in this task with a specific mandate of regulating market demands for smuggled goods.

Technological upgradation:

- X-ray machines, container scanners, dual-use goods detectors (like nuclear material detectors), etc. should be deployed at busy ports and airports.
- **Increasing the capacity of ports** to handle bigger and bulkier consignments with a reduced turnaround time.

Coordination among agencies to break the backbone of syndicates:

- The government should groom specialists to aid border agencies who are also deployed at major ports.

Zero tolerance policy:

- There should be a zero-tolerance policy for offenses related to certain goods which are extremely harmful from the point of view of

national or social security-like arms and ammunition, drugs, nuclear materials, etc.

Directorate of Revenue Intelligence (DRI)

- It is an **Indian intelligence agency**. It is India's apex anti-smuggling intelligence, investigations and operations agency. The Directorate is run by officers from the **Central Board of Indirect Taxes and Customs (CBIC)** who are posted in its various Zonal Units as well as in Indian embassies abroad as part of the Customs Overseas Intelligence Network.

- It is headed by a **Director General of the rank of Special Secretary to the Government of India**.
- The Agency works to secure India's national and economic security by preventing the outright smuggling of contraband such as **firearms, gold, narcotics, fake Indian Currency notes, antiques, wildlife and environmental products**.
- **Functions:** DRI is the major intelligence agency that enforces the prohibition of the smuggling of items including drugs, gold, diamonds, electronics, foreign currency, and counterfeit Indian currency.

4.6 CRIMES AGAINST HUMANITY (CAH TREATY)

Context

- The UN General Assembly (UNGA) adopted a resolution approving the text of a proposed treaty governing the prevention and punishment of crimes against humanity (CAH treaty).

What is the CAH Treaty?

- It is a proposed international treaty aimed at preventing and punishing crimes against humanity, which was approved by the **UN General Assembly**.
- **CAH includes specific crimes** such as murder, extermination, enslavement, deportation, torture, imprisonment, and rape when committed as part of a large-scale or systematic attack against a civilian population.

Historical Evolution

- The **historical development of Crimes against Humanity (CAH)** in international law began with the 1945 Charter of London, which established the Nuremberg Tribunal for prosecuting WWII crimes.
- In **1948, the Genocide Convention** recognized genocide as an international crime.

- The **1949 Geneva Conventions** addressed war crimes, and CAH was later incorporated into the Statutes of the International Criminal Tribunals for Yugoslavia and Rwanda.
- The **Rome Statute of the International Criminal Court (ICC)** became the primary legal framework for CAH, defining acts such as murder, torture, and rape committed as attacks against civilians.
- In **2019, the Gambia vs. Myanmar case** at the ICJ highlighted gaps in the CAH framework, prompting the 2024 UN General Assembly resolution to adopt a proposed CAH treaty.

The treaty would impose obligations on member states to:

- Take administrative, legislative, and judicial measures to prevent CAH
- Being responsible under international law for failing to prevent CAH
- Allow cases to be brought to the International Court of Justice
- Unlike genocide and war crimes, which have dedicated treaties (the 1948 Genocide Convention and the 1949 Geneva Conventions), CAH currently lacks a specific treaty and is only covered by the Rome Statute.

There are proposals to expand the remit of the CAH to include:

- Starvation of the civilian population
- Gender apartheid
- Forced pregnancy
- Use of nuclear weapons
- Terrorism
- Use of natural resources
- Crimes against Indigenous peoples

The treaty aims to address the limitations of the International Criminal Court, whose jurisdiction extends only to member states and focuses exclusively on individual criminal responsibility rather than state responsibility.

About the Accountability Gap in International Law

Missing legal framework

- **Crimes against humanity (CAH) are among the most egregious violations of international law**, but the legal framework governing these crimes lacks the comprehensiveness and clarity afforded to other international crimes such as genocide and war crimes.
- This gap stems from the **absence of a specific treaty specifically addressing CAH**, unlike the 1948 Genocide Convention and the 1949 Geneva Convention, which provide clear mandates and obligations for the prevention and prosecution of these crimes.
- **The CAH, although codified in the Rome Statute of the International Criminal Court (ICC)**, suffers from limitations in enforcement and scope.
- **Adopted in 1998, the Rome Statute is the treaty that established the ICC to prosecute individuals for genocide, war crimes, crimes against humanity, and aggression.**
- It aims to ensure **accountability for serious international crimes** and promote global justice.

ICC Jurisdiction Challenge

- One of the main problems of accountability lies in the limited jurisdiction of the ICC.

- As a treaty-based institution, the ICC can **only exercise jurisdiction over crimes** committed on the **territory of its member states or by their nationals**, unless the UN Security Council refers a case to it.
- This limitation excludes a significant number of states, including major global players, from the reach of the ICC
- It creates a jurisdictional void where perpetrators in non-member states can evade justice.
- Without a specialized treaty binding broader state cooperation, many CAH cases remain unresolved.

Responsibility of the individual versus the state

- **Another problem is the focus of the Rome Statute on individual criminal responsibility**, which, although essential, does not take into account the responsibility of the state.
- **Genocide and war crimes treaties establish state obligations to prevent and punish these crimes**, allowing for legal action at the state level.
 - **For example, the 2019 case of Gambia v. Myanmar at the International Court of Justice (ICJ)** was possible because the Genocide Convention contains provisions on state responsibility.
- **Similarly, the CAH Treaty could empower states and international bodies to hold governments accountable for failing to prevent CAH**, thereby reinforcing the principle that states share the responsibility to protect human rights.

Conclusion

- The adoption of the **CAH treaty resolution is a milestone in the international community's efforts** to combat impunity for crimes against humanity. While India's reservations reflect legitimate concerns, its lack of domestic legislation dealing with international crimes undermines its position.

- By enacting comprehensive anti-CAH laws, India can not only address this disparity but

also pioneer the global quest for justice and embody the role of a true global leader.

4.7 SHORT ARTICLES

INS Tushil

Context

- The Indian Navy is set to commission its latest multi-role stealth guided missile frigate, INS Tushil, at Kaliningrad, Russia.

About INS Tushil

- INS Tushil is part of the **upgraded Krivak III class of Project 1135.6 frigates**. It is the seventh ship in this series and the first of two additional frigates being built under a 2016 agreement between India and Russia.
- The frigate features a **length of 125 metres and a displacement of 3,900 tonnes**. It incorporates both Indian and Russian technologies, with Indian components accounting for 26 percent of its construction.
- Indian firms such as **BrahMos Aerospace, Bharat Electronics Limited, and Nova Integrated Systems** have contributed to the ship's development.
- Named Tushil, meaning "protector shield," the ship's motto is "Nirbhay, Abhedya aur Balsheel" (Fearless, Indomitable, Resolute).

Significance

- INS Tushil will become part of the Western Fleet under the Western Naval Command. It is expected to bolster the Navy's operational capabilities and further the strategic partnership between India and Russia.

UN Commission on Narcotic Drugs

Context

- India has been chosen to Chair the 68th Session of the Commission on Narcotic Drugs (CND).

About the Commission on Narcotic Drugs (CND):

- It was established by the **Economic and Social Council (ECOSOC) resolution 9(I) in 1946**.
- The CND is the **principal policy-making body of the United Nations** on drug-related

matters. It is mandated to monitor global drug trends, support Member States in formulating balanced policies, and oversee the implementation of the major international drug conventions.

- The CND is **one of the functional commissions of the United Nations Economic and Social Council (ECOSOC) and a Governing Body of the United Nations Office on Drugs and Crime (UNODC)** which is headquartered in Vienna.

The CND's agenda has two distinct segments:

- A normative segment for discharging treaty-based and normative functions; and an operational segment for exercising the role as the governing body of UNODC.

Events:

- The CND **meets annually** and adopts a range of decisions and resolutions. Intersessional meetings are convened throughout the year.

Membership:

- The CND has 53 member states that are elected by ECOSOC. It is chaired by a Bureau including one member per Regional Group.

Policy on Drug:

- The CND adopted the 2019 Ministerial Declaration to accelerate the implementation of joint commitments to address and counter the world drug problem.

Subsidiary bodies:

- The CND has **five subsidiary bodies**: the Heads of National Drug Law Enforcement Agencies in Europe, Latin America and the Caribbean, Asia and the Pacific and Africa, and the Sub-commission in the Near and Middle East.

2030 Agenda:

- The Commission actively contributes to the implementation of the 2030 Sustainable Development Agenda, as sustainable

development and the mandates of the Commission are interrelated and mutually reinforcing.

Crime and Criminal Tracking Networks and Systems (CCTNS)

Context

- The Crime and Criminal Tracking Network and Systems allow police across the country to file first information reports, charge sheets, and investigation reports.

About CCTNS

- The **Crime and Criminal Tracking Network and Systems (CCTNS)** is a centralized online platform conceived under the **Ministry of Home Affairs**.
- It was launched in **2009** with a **budget of ₹2,000 crore** and is part of **India's National e-Governance Plan**.
- Its goal is to create a comprehensive and integrated system for increasing the efficiency and transparency of police operations at the level of police stations.

Objectives:

- **Provide citizen-oriented police services** through a web portal.
- Enable pan-India searches of the **National Crime and Criminal Records Database**.
- **Create state and central-level criminal complaints** and criminal complaints.
- Automate police processes for better coordination and accountability.
- **Classified as a Mission Mode Project (MMP)**, the system provides law enforcement with tools for investigation, data analysis, policy development, and citizen-focused service delivery.

Key features of CCTNS

- **Nationwide Integration:** It connects all 17,130 police stations in 28 states and 8 union territories. Recently, 100% deployment has been achieved, even in remote areas like **Manipur, Nagaland and Lakshadweep**.
- **Comprehensive Crime Database:** Maintains records of accused persons, habitual

offenders, declared offenders, and crime-related data such as missing persons and stolen vehicles.

- **Analytical Tools:** Generates crime statistics and detailed reports for analysis at the police station level.
- **Citizen Services:** Enables tracking of complaints, verification requests, and case updates, making police processes more accessible.
- **Expanded scope:** Integration with the **Integrated Criminal Justice System (ICJS)**, linking police data with courts, prisons, prosecution, forensic and fingerprint databases.

Significance:

For Police Department and NCRB:

- Enhanced investigative tools and centralized criminal data (images, fingerprints).
- Improved crime analysis and reduced back-office workload.
- Better coordination with external stakeholders through electronic information exchange.
- Scalable crime systems for future growth.

For Citizens:

- Multiple channels for accessing police services.
- Simplified processes for petitions, certificates, and authorizations.
- Streamlined case tracking and accurate progress updates.
- Easy reporting of unclaimed/claimed vehicles and assets.
- Simplified complaint registration and improved victim-witness management.

Starlink Devices

Context

- SpaceX founder **Elon Musk** said Starlink satellite beams were turned off over India, reacting to claims that its device was being used in restive Manipur.

What is Starlink and how does it work?

- Starlink is SpaceX's satellite internet service, leveraging a constellation of low-earth orbit (LEO) satellites to provide high-speed, low-latency broadband globally. Each satellite uses phased-array and parabolic antennas to enhance capacity. SpaceX aims to deploy up to 42,000 satellites for global coverage.

Starlink and Terrorism Concerns

- The Indian Army reportedly seized Starlink devices labeled "RPF/PLA" in Manipur, linked to a militant group. This raised concerns about misuse by non-state actors to bypass geographic restrictions. Elon Musk denied these claims, stating Starlink is not operational in India.

Regulatory Status in India

- Starlink lacks regulatory approval in India due to restrictions on foreign satellite communication services. However, it operates in over 60 countries and plans to expand to neighboring regions like Bhutan by 2025.

Protected Area regime

Context

- The Manipur government has held alleged illegal immigration from Myanmar as one of the prime factors responsible for the ongoing conflict in the state.

What is a Protected Area Permit (PAP)?

- PAP is a special permit required by foreign nationals to visit certain areas in India that are considered sensitive due to their proximity to international borders. These areas fall between the "internal line" and the international boundary as defined in the **Foreigners(Protected Areas) Order 1958**.

Covered area:

- **Before 2010:** Applies to all regions of Arunachal Pradesh, Sikkim, Manipur, Mizoram, Nagaland and parts of Jammu and Kashmir, Rajasthan, Himachal Pradesh and Uttarakhand.

- **2010 Relaxation:** The regime was relaxed for Manipur, Mizoram and Nagaland, allowing foreigners to visit these areas without special permits.
- **2024 Reintroduction:** The regime was reintroduced in these states, mainly due to security concerns related to illegal immigration and border management.

The primary objectives of the PAP are:

- **National Security:** Regulate the entry of foreigners into sensitive areas near international borders.
- **Protecting local communities:** To protect indigenous peoples and their unique cultural heritage.
- **Environmental protection:** minimize ecological disruption in unstable areas.

Applicable laws and regulations

- **Foreigners (Protected Areas) Order, 1958** - defines areas as protected and prescribes the requirement to obtain a PAP.
- **Foreigners (Restricted Areas) Regulations, 1963** -specify restricted areas (such as the Andaman and Nicobar Islands and parts of Sikkim) that require a Restricted Area Permit (RAP).

Mandate:

- **Mandate:** Foreign nationals must apply for a Protected Area Permit (PAP) through the Ministry of Home Affairs (MHA) or state authorities to enter these areas.
- **Implementation:** PAPs specify the length of stay and movement routes. Unauthorized extension or deviation from the routes is prohibited. The scheme is administered under the Aliens (Protected Areas) Regulations 1958.
- **Exemptions:** Some countries may have exemptions and Indian citizens generally do not need a PAP to travel in these areas.

Key Features:

- **Eligibility:** Foreigners (except Bhutanese) need a Protected Area Permit (PAP) for entry.

- **Visits Allowed:** Group tourists (minimum two people) can visit specified hiking circuits/routes.
- **Validity & Compliance:** Valid only for specified area, route, and time; photocopies must be submitted at entry/exit.
- **Limitations:** Citizens of Afghanistan, China, Pakistan require MHA approval; diplomats need instructions from Ministry of Foreign Affairs.
- **Registration:** Foreigners must register with the Foreigners Registration Officer (FRO) within 24 hours of arrival.

GPS spoofing

Context

- As per the recent report of OPSGROUP, globally, instances of spoofing have increased from 300 flights impacted daily in January to 1,500 flights impacted daily by August.

What is GPS interference and spoofing?

- **GPS Interference:** Disrupting the accuracy of GPS signals used for navigation.
- **Spoofing:** A cyber-attack in which fake GPS signals are transmitted to misleading navigation systems.
- An attacker mimics legitimate GPS signals. It tricks systems into sensing false positions, speeds, or altitudes.

Impacts

- Impaired navigation accuracy for aircraft and drones. It can trigger an incorrect speed or

terrain warning. It is used in modern war and conflict zones to deceive enemies.

Examples

- Common on India-Pakistan and India-Myanmar borders. Contributed to aviation incidents such as the Azerbaijan Airlines crash.

Affected regions

- Identified from September 2023, with new hotspots in 2024, including:
 - Northern Iraq (Baghdad area).
 - Black Sea region.
 - Western Russia and the Baltics.
 - The border areas of North and South Korea.
 - India-Pakistan and India-Myanmar borders.

Inertial Reference System (IRS)

- A standalone navigation system that provides position, speed and orientation without external signals such as GPS.

Components:

- **Gyroscopes:** Measurement of angular velocity.
- **Accelerometers:** Track linear acceleration.
- Integrated to calculate position relative to a known starting point.
- It acts as a redundant mechanism to maintain navigation accuracy.
- It ensures the safety of the aircraft during GPS jamming or spoofing attacks.

4.8 SNIPPETS

Topic Name	Details
Satan 2 (RS-28 Sarmat)	A next-generation Russian ICBM designed to replace the R-36. It can carry up to 15 nuclear warheads, with a range of 6,200–11,180 miles, enabling global strike capabilities.
CINBAX	The first Indo-Cambodian Army joint exercise, focusing on counter-terrorism operations under the UN Charter. It emphasizes intelligence, cyber warfare, logistics, and peacekeeping to enhance interoperability and trust.
Exercise AGNI WARRIOR	The 13th edition of the India-Singapore joint military exercise held in Devlali, Maharashtra. Launched in 2004. It focused on joint firepower planning, coordination, and the integration of advanced equipment for enhanced

	interoperability.
Voronezh Radar	India is finalizing a \$4 billion deal with Russia for the Voronezh long-range early warning radar system. With an 8,000 km range, it will significantly boost India's missile detection and air defense capabilities.
Desert Knight	A trilateral air combat exercise involving India, France, and the UAE over the Arabian Sea. It highlights strategic defense partnerships and addresses regional security in the Indo-Pacific and Persian Gulf.
Dark Eagle	A U.S. hypersonic missile system with a range exceeding 2,775 km and speeds of 3,000–3,700 m/s. It challenges advanced air defense systems, including Russia's S-400.
INS Nirdeshak	A survey vessel under the Indian Navy's SVL project, built by GRSE. It conducts hydrographic and oceanographic surveys, bolstering India's maritime capabilities in the Indo-Pacific.
Speed Guns	Electronic devices utilizing the Doppler effect to measure object speed, widely used in law enforcement and sports for monitoring movement.
Exercise Surya Kiran	An annual joint military exercise between the Indian and Nepalese Armies, focusing on interoperability in counter-terrorism, disaster relief, and jungle warfare. The 18th edition, held in Saljhandi, Nepal. It fosters operational coordination, skill enhancement, and the exchange of best practices.
Ghost guns	are untraceable firearms assembled from kits or 3D-printed parts, bypassing regulations and background checks, posing significant safety and legal risks. Their lack of serial numbers makes it difficult for law enforcement to trace them in criminal investigations.

4.9 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
Hybrid warfare	3 rd December 2024
India's undersea warfare power	24 th December 2024
What are the new interception rules and safeguards?	24 th DECEMBER 2024
Dark Patterns	26 th December 2024

5. ENVIRONMENT & ECOLOGY

5.1 ISFR REPORT 2023

Context

- India State of Forest Report (ISFR) 2023 released by the Minister for Environment, Forest and Climate Change (MoEFCC).

About India State of Forest Report (ISFR)

- It has been published by the Forest Survey of India (FSI) every two years since 1987.
- It conducts an in-depth assessment of the country's forest and tree resources based on the interpretation of remote sensing satellite data and field-based National Forest Inventory (NFI).
- The State of India's Forest Report 2023 is the 18th such report in a row.

Key Highlights of the Report

- Forest and Tree Cover:** The total forest and tree cover in the country is 8,27,356.95 km² which is 25.17% of the country's Geographical Area (GA). The total forest cover is 7,15,342.61 km² (21.76%), while tree cover is 1,12,014.34 km² (3.41%).

Class	Area (km ²)	Percentage of Geographical Area (GA)
Forest Cover	7,15,342.61	21.76%
Tree Cover	1,12,014.34	3.41%
Total Forest and Tree Cover	8,27,356.95	25.17%
Scrub	43,622.64	1.33%
Non-Forest	24,16,489.29	73.50%
Geographical Area of the Country	32,87,468.88	100.00%
Category	Details	
Increase in Forest and Tree Cover	Total increase: 1,445.81 km ² Forest cover increase: 156.41 km ² (compared to 2021)	
Maximum Increase (Forest and Tree Cover)	Chhattisgarh: 684 km ² Uttar Pradesh: 559 km ² Odisha: 559 km ² Rajasthan: 394 km ²	
Maximum Increase (Forest Cover)	Mizoram: 242 km ² Gujarat: 180 km ² Odisha: 152 km ²	
Biggest Decline (Forest Cover)	Madhya Pradesh: 612.41 km ² Karnataka: 459.36 km ² Ladakh: 159.26 km ² Nagaland: 125.22 km ²	
Top Three States (Forest Area Coverage)	Madhya Pradesh: 77,073 km ² Arunachal Pradesh: 65,882 km ² Chhattisgarh: 55,812 km ²	
Top States (% Forest Cover to GA)	Lakshadweep: 91.33%	

	Mizoram: 85.34% Andaman & Nicobar Islands: 81.62%
High Forest Cover States/UTs	19 states and UTs have more than 33% forest cover of their geographical area.
	Eight states and UTs (Mizoram, Lakshadweep, Andaman and Nicobar Islands, Arunachal Pradesh, Nagaland, Meghalaya, Tripura, Manipur) have over 75% forest cover.
Forest Carbon Stock	Total: 7,285.5 million tonnes Increase: 81.5 million tonnes (compared to 2021)
Top States (Forest Carbon Stock)	Arunachal Pradesh: 1,021 Mt Madhya Pradesh: 608 Mt Chhattisgarh: 505 Mt Maharashtra: 465 Mt
India's Carbon Stock (CO2 Equivalent)	Total: 30.43 billion tonnes Increase since 2005 base year: 2.29 billion tonnes
WGESA (Western Ghats Ecologically Sensitive Areas)	Total area: 60,285.61 km ² Forest coverage: 44,043.99 km ² (73%)
Northeastern Region Forest and Tree Cover	Total: 1,74,394.70 km ² Percentage of geographical area: 67%
Mangrove Cover	Total: 4,991.68 km ² (0.15% of GA) Decrease: 7.43 km ² (compared to 2021)
State wise Mangrove Changes	Decrease: Gujarat (36.39 km ²) Increase: Andhra Pradesh (13.01 km ²), Maharashtra (12.39 km ²)
Forest Fires (2023 24 Season)	Top three states: Uttarakhand, Odisha, Chhattisgarh

5.2 DROUGHT ATLAS

Context

- According to the **World Drought Atlas** launched by the **United Nations Convention to Combat Desertification (UNCCD)** and the **European Commission Joint Research Centre**, around 75 percent of the population will be affected by drought by 2050.

Key Highlights of the Atlas

- India has the highest number of people (more than 25 million) employed in the agricultural sector.** The atlas predicted a huge loss of soybean yield due to droughts in India.
- Between 2020 and 2023**, India has been the hub of riots and tensions due to mismanagement of water. There is need for

an immediate and urgent call for action at the policy level.

- Data sharing will be key in the fight to reduce drought damage.** Early warnings for droughts will also play a crucial role in bringing down risks and moving towards resilience.
- According to the **International Drought Resilience Alliance (IDRA)**: Appropriate soil and agronomical management practices are powerful tools to reduce the risk of impacts posed by droughts on crops.
- Case Study:** 'Day Zero' in Chennai in 2019- A mismanagement of water resources and rampant urbanization has resulted in a water crisis in the city, which receives more than 1,400 millimeters of rainfall annually on average.

- **Definition of Droughts:** It is a prolonged dry period in the natural climate cycle that can occur anywhere in the world. It is a slow-onset disaster characterized by the lack of precipitation, resulting in a water shortage.

Impact of Drought

- **Water Supply:** Droughts threaten water availability, affecting community health and safety.
- **Agriculture:** Reduced water availability impacts farm productivity, causing economic losses.
- **Public Health:** Drought leads to poorer water quality, increased illness, and mental health issues.
- **Wildfires:** Dry conditions elevate the risk of wildfires due to increased flammability.
- **Hazard Planning:** Droughts can trigger cascading disasters like wildfires and extreme heat events.

Measures taken for Drought management

- The Integrated Drought-Management Program (IDMP) emphasizes developing national drought policies through early-warning systems, improved forecasts, water conservation, and enhanced institutional capacity. It promotes water supply augmentation, recycling, reservoirs, and community preparedness.

Drought policy should emphasize four principal components during the development process:

1. risk and early warning, including vulnerability analysis, impact assessment, and communication;
2. mitigation and preparedness, including the application of effective and affordable practices;
3. awareness and education, including a well-informed public and a participatory process;
4. good governance and an effective policy framework, including political commitment and responsibilities.

What is the United Nations Convention to Combat Desertification?

- It is a **Convention to combat desertification and mitigate** the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.
- It is the **only convention stemming from a direct recommendation of the Rio Conference's Agenda 21**, which was adopted in **Paris, France, on 17 June 1994** and entered into force in **December 1996**. It is the **only internationally legally binding framework** set up to address the problem of desertification.

5.3 FOREST FIRE

Context

- Forest and land fire management learnings from Indonesia and Peru that included community empowerment will pave way for new guidelines of tropical forest fire management.

What is a forest fire?

- A **wildfire, forest fire, or bushfire** is an unplanned, uncontrolled and unpredictable fire in an area of combustible vegetation.

- Depending on the type of vegetation present, a **wildfire may be more specifically identified as a bushfire (in Australia), desert fire, grass fire, hill fire, peat fire, prairie fire, vegetation fire, or veld fire. Some natural forest ecosystems depend on wildfire.**
- Wildfires are different from controlled or prescribed burning, which are carried out to provide a benefit for people. Modern forest management often engages in prescribed

burns to mitigate fire risk and promote natural forest cycles.

Causes of forest fire

Natural causes:

- Natural occurrences that can ignite wildfires without the involvement of humans include lightning, volcanic eruptions, sparks from rock falls, and spontaneous combustions.

Human activity:

- Sources of human-caused fire may include arson, accidental ignition, or the uncontrolled use of fire in land-clearing and agriculture such as the slash-and-burn farming in Southeast Asia. In the tropics, farmers often practice the slash-and-burn method of clearing fields during the dry season.

Vulnerability of India's forest to wildfires (Data as per Forest Survey of India (FSI))

- **Around 50% of India's forest area is fire-prone**, with some states reporting up to 90% vulnerability. An estimated 3.73 million hectares are affected annually.
- **Moderately dense forests account for 43% of fire incidents**, predominantly in tropical dry deciduous forests, followed by tropical moist deciduous and semi-evergreen forests.
- **Approximately 15% of the country's land is susceptible to fires**. Madhya Pradesh (38 districts), Uttar Pradesh (28), and Maharashtra (26) are the most vulnerable states.

Status of forest fire in the world (Using data from researchers at the University of Maryland)

- Record-setting Forest fires are becoming the norm, with **2020, 2021, and 2023 marking the fourth, third, and first worst years for global forest fires, respectively**. Nearly **12 million hectares** – an area roughly the size of Nicaragua – burned in 2023, topping the previous record by about 24%. Extreme wildfires in **Canada accounted for about two-**

thirds (65%) of the fire-driven tree cover loss last year and more than one-quarter (27%) of all tree cover loss globally.

How can forest fire risks be mitigated?

- **Defensible Space:** Create a buffer zone around homes by clearing vegetation and combustible materials to slow or stop wildfire spread.
- **Firebreaks and Vegetation Gaps:** Use natural features (rivers) or man-made features (roads) to interrupt wildfire progress.
- **Building Design:** Use fire-resistant materials and implement fire-safe landscape designs to reduce fire spread.
- **Early Detection Systems:** Improve systems to detect wildfires early, enabling rapid response to limit their impact.

Case Study: Best practices of Forest Fire Management

- Two forest fire management projects, funded by Japan, provided valuable insights into sustainable practices in tropical forests. These initiatives were presented during the 60th ITTO Council in Japan.
- **Indonesia:**
The project focused on South Sumatra, South Kalimantan, and Central Kalimantan.
- **Key activities included:**
 - Training local communities in zero-burning methods.
 - Establishing eight demonstration sites for clearing farmland without burning.
 - Enhancing the capacity of local fire brigades.
 - Developing a nationwide monitoring and reporting system for fire prevention patrolling.
- **Peru:**
- **Implemented across five departments, the project involved:**
 - Training over 200 volunteer fire brigade members.

- Improving coordination among national, regional, and local authorities.
- Empowering indigenous and local communities as agents of change.
- Enhancing government agencies' forest fire management capacity.

Conclusion

- Incorporating forest fire risk mitigation into forest management strategies in fire-prone regions would help protect forest carbon, create jobs, and support rural communities at the same time.

5.4 CLIMATE IMPACT OF SPACE EXPLORATION

Context

- The rapid growth of space exploration has raised concerns about its environmental impact, particularly its overlooked climate footprint, warranting closer scrutiny.

The Environmental Cost of Space Exploration

Pollution from rocket emissions

- When it comes to the atmosphere, rocket launches emit various gases and particles that pollute the atmosphere. **CO₂, water vapor, and black carbon are released when rocket propellants are burned**; these will contribute to climate change.
- In particular, solid rocket fuels have been shown to **produce chlorine gas**, which destroys the ozone layer in the **stratosphere and exposes the Earth's surface** to greater amounts of ultraviolet radiation.

Impact on the Ozone Layer

- The ozone layer remains crucial to protecting life on Earth's surface from dangerous ultraviolet radiation. Studies show that rocket emissions can cause major ozone losses.
- **The chlorine involved in the launches attacks ozone molecules** and reduces the concentration of this gas; however, it can have long-term effects on the environment.

How do Rockets affect the environment?

Greenhouse gas emissions

- Rockets release **carbon dioxide and water vapor**, which contribute to global warming.

Water vapor is a greenhouse gas that traps heat from the sun.

Depletion of the ozone layer

- Rockets can release **soot and aluminum oxides**, which can destroy the ozone. **Ozone is a protective gas** that prevents dangerous ultraviolet radiation from reaching the earth's surface.

Warming of the stratosphere

- Rockets can heat the stratosphere, which can degrade the ozone layer. One study found that increasing the number of rocket launches by a **factor of 10 could warm the stratosphere by up to two degrees Celsius**.

Atmospheric holes

- Missiles can punch holes in the **upper ionosphere**, which is the part of the atmosphere **where gas ionization occurs**.

Space tourism

- Space tourism flights can be **50-100 times worse** for the atmosphere than **long-haul air travel**.

Challenges of Space Sustainability

Impact on the environment

- Space activities can negatively affect Earth's atmosphere and environment, causing **air acidification, smog, toxic waste releases, water pollution**, and more.

Space junk

- Space debris, such as malfunctioning satellites and **spent rocket stages**, can threaten the safety and **operation of missions**. It can also lead to **legal and insurance conflicts**.

International cooperation

- The sustainability of outer space requires international cooperation, discussion and agreements to ensure that **outer space is safe, secure, and peaceful**.

Smarter space traffic management

- With the exponential growth of global launch activities, smarter management of space traffic is vital.

Innovative Solution

Reusable rockets

- Rockets like those from **SpaceX and Blue Origin** **reduce manufacturing waste**. However, they require heavier components, which increases fuel consumption.

Cleaner fuels

- Switching to **liquid hydrogen and biofuels** can minimize emissions. However, current hydrogen production relies on non-renewable energy sources.

Biodegradable satellites

- Designing satellites with materials that naturally break down during re-entry can reduce waste, but **lifetime and cost remain** challenges.

Global traffic monitoring

- A system to track **satellites and debris in real-time** can **reduce collisions**, but requires overcoming resistance to data sharing and creating a unified authority.

Conclusion

- The future of space exploration depends on balancing technological progress with environmental responsibility. **Immediate and collective action** is necessary to ensure that space remains a shared and sustainable resource.

5.5 HOW DOES LA NINA AFFECT INDIA'S CLIMATE

Context

- The India Meteorological Department now expects a La Niña to set in by late 2024 or early 2025, plus a milder winter due to this delay.

About La Nina

- La Niña means **little girl in Spanish**. La Niña is also sometimes called **El Viejo, the anti-El Niño, or simply the "cold event."** La Niña has the opposite effect of El Niño. During La Niña events, the trade winds are even stronger than usual and push more warm water towards Asia. Upwelling increases off the west coast of America, bringing cold, nutrient-rich water to the surface.

How do the La Niña and El Niño influence global atmospheric circulation and weather patterns?

- **La Niña, the El Niño Southern Oscillation (ENSO) phase**, occurs when the region of the Pacific Ocean between Indonesia and South America is cooler than usual.
- **Its counterpart, El Niño, represents the warming of the same region.** These two phases significantly influence global atmospheric circulation and weather patterns.
- **During La Niña years, India receives normal or above-normal rainfall** during the monsoon season.
- **Yet the same phenomenon causes drought in Africa** and strengthens hurricanes over the Atlantic Ocean. Conversely, El Niño brings

extreme summers and droughts in India while increasing rainfall in the southern United States.

Global Impact

- **India:** Supports normal to above-normal monsoon rainfall leading to better agricultural yields.
- **Africa:** Causes drought in some areas.
- **Atlantic Ocean:** Strengthens hurricanes.
- **United States:** Southern states receive increased rainfall during La Niña.

Effects of La Nina

- **Drop in temperature-** La Nina causes the sea surface temperature to drop drastically, making the temperature around the world much cooler than average.
- **Changing direction of cyclones** - La Nina can change the direction of tropical cyclones with its speed.
- **Impact on rainfall-** This may lead to excessive rainfall in Indonesia and surrounding areas and flooding in Australia. Ecuador and Peru are prone to drought.

Significance for India

- **Agriculture:** Increases crop production due to strong monsoons, which helps farmers.
- **Water Resources:** Improves reservoir levels and reduces water stress.
- **Energy:** More rainfall ensures better hydropower generation.

- **Heat relief:** Less severe heat waves compared to El Niño years.

Effect on Indian Monsoon

- **El Niño Effects:** Causes intense heat, disrupted monsoons, and below-average rainfall, particularly in northern and southern India since 1980.
- **La Niña Effects:** Strengthens monsoons, leading to above-normal rainfall (e.g., 2020-2022) and colder winters with cooler nights but warmer days.
- **Current Trends:** Southern India faces colder winters, while northern India sees delayed winters with above-normal temperatures. For e.g., La Niña usually forms during the pre-monsoon or monsoon season. However, there is an unusual delay in 2024, with the Oceanic Niño Index (ONI) hovering at -0.3°C (the threshold for La Niña is -0.5°C or lower).
 - **Research Insights:** La Niña winters feature distinct patterns like cooler nights, warmer days, and higher daytime wind speeds, as shown by 35 years of data.

Conclusion

- The delayed occurrence of La Niña in 2024 brought uncertainty about its impact on winter and monsoons. If La Niña sets in early 2025, it could ensure a strong monsoon season, which is crucial for India's agriculture and water resources. Monitoring ENSO patterns is critical to understanding and preparing for its climate effects.

5.6 E-WASTE IN INDIA

Context

- According to data presented by the Union Ministry of Housing and Urban Affairs, India witnessed a surge in electronic waste (e-waste) generation over the past five years, rising from 1.01 million metric tonnes (MT) in 2019-20 to 1.751 million MT in 2023-24.

About E-Waste

- E-waste is electronic products that are unwanted, not working, and nearing or at the end of their “useful life.” Computers, televisions, VCRs, stereos, copiers, and fax machines are everyday electronic products.

Reasons for the growth

- The **growing adoption of electronic products**, fueled by technological advances and affordable access to the Internet, has greatly improved living standards around the world. However, this **digital revolution** has also led to a significant increase in electronic waste (e-waste).
- The **sharpest increase in e-waste occurred in 2019–20 and 2020–21** due to the demand for electronic devices due to working from home and distance learning during the pandemic.

Challenges

Environmental and Health Issues

- E-waste contains toxic substances such as arsenic, cadmium, lead and mercury, which can harm the environment and human health if not properly managed. **According to the ASSOCHAM study- In India, around 4.5 lakh children aged 10-14 are involved in e-waste management activities.**

Lack of data at the state level

- There is no data on e-waste generation; instead, national-level figures are estimated from data on sales and the average lifespan of electronic items.

Recycling challenges

- Low recycling rates are attributed to ineffective stakeholder engagement. **As per Pathways to Circular Economy in Indian Electronics Sector report-** Only 22% of collected WEEE (Waste Electrical and Electronic Equipment) is recycled by the formal sector.

Informal Sector

- A large, unregulated informal sector complicates monitoring and compliance with environmental standards. **Approximately 85-**

90% of India's e-waste is managed by the unorganised or informal sector, primarily consisting of scrap dealers

Government Initiatives

The **E-Waste (Management) Rules, 2022** introduced **Extended Producer Responsibility (EPR)** to ensure that producers are responsible for recycling and disposal through authorized recyclers.

EPR mechanism:

- Manufacturers are assigned annual recycling targets based on e-waste generation and product sales. To meet these targets, they must purchase EPR certificates from registered recyclers.

The role of the circular economy:

- The circular economy seeks to reuse electronic components rather than simply salvage them. This model emphasizes that every material is a resource, not a waste.
- India needs policies to encourage manufacturers to reuse old components, similar to **China's goal of using 35% secondary raw materials by 2030.**

Way forward

Corporate and Informal Sector Engagement

- Promote green policies, recycling, skill development, and indigenous technologies in the informal sector.

Recycling and Technological Solutions

- Establish efficient recycling clusters, leverage advanced technologies, and adopt innovations like India's methods for recovering precious materials.

Monitoring and Awareness

- Enforce e-waste rules, ensure transparency in recycling, and educate the public on sustainable e-waste management.

5.7 THE GLOBAL WARMING FIGHT HAS A CHALLENGE FOR INDIA

Context

- India's development needs cannot be ignored; as it has to grow and diversify to clean energy sources, this would mean higher costs and a longer transition time.

Global Emission Reduction Targets

- **Commitments of developed countries:** The goal of developed countries is to achieve net zero emissions by 2050. China has committed to net zero emissions by 2060 and India by 2070.
- **Developments shortening the timeline:** However, two developments are shortening the transition timeline, namely the EU's Carbon Boundary Adjustment Mechanism (CBAM) and the push to adopt an emissions 'peak'. For e.g., Potential contraction of EU imports of CBAM goods by 4-26% by 2030.
- **Pressure to reach emissions cap:** The G-7 summit in Hiroshima and Puglia in 2024 called on major economies, including China and India, to adopt an emissions peak by 2025, with the EU and US already committed. For e.g., Compared to 2019, aim to cut emissions by 43% by 2030 and 60% by 2035.

Challenges for India's Energy Transition

- **Development vs. emissions targets:** India faces a dual challenge: meeting growing energy demand while reducing emissions. For e.g., India aims to achieve a \$5 trillion economy by 2025-26, necessitating sustained GDP growth of 8-9% per year.
- **India's electricity consumption** is a third of the global average and, unlike developed countries, it needs to diversify its energy sources while growing its economy. For e.g., industrial sector consumes 41.16% of total electricity.
- **Need for rapid electricity generation:** To sustain future growth, India needs to rapidly

increase electricity generation before emissions are curbed.

- Countries like China have already imposed sanctions on 200 GW of new coal-fired power plants that India needs to power.

Nuclear power and challenges

- **Comparing energy sources:** Renewable energy and nuclear energy are emission-free options, but nuclear energy may be a more cost-effective and space-efficient solution.
- **Cost:** The cost of renewable energy is higher than the cost of nuclear energy (₹3.80 per unit).
- **Land:** Renewable energy requires more land compared to nuclear energy.
- **Financial challenges in the energy transition:** At COP29, developed countries pledged \$300 billion annually by 2035, far short of the \$1.3 trillion requested by developing countries. A large part of these funds will be non-concessional loans, which many developing countries cannot afford.

Way forward

- **Renewable and nuclear expansion:** With 203.18 GW of renewable capacity, India is aiming for 500 GW by 2030.
 - Solar (92.12 GW),
 - Wind (47.72 GW)
 - Hydro (46.93 GW).
- **Equity in Climate Action:** India promotes equitable carbon space allocation, climate finance and technology transfer for developing countries.
 - For e.g., BASIC and G77+China that address historical emissions and support low-carbon transitions.
- **Balancing growth and commitment:** The Panchamrit framework aims for a 45% reduction in emission intensity by 2030, 50% non-fossil capacity, net zero by 2070.

Conclusion

- India needs to accelerate its energy transition to ensure its future growth while balancing the need to reduce emissions. With global

pressure mounting, the country must act decisively to claim its share of the remaining carbon space.

5.8 SHORT ARTICLES

Policy to manage sacred grooves

Context

- Recently the Supreme Court told the Union government to create a comprehensive policy for the management of sacred grooves across the country.

About Sacred grooves

- Sacred grooves are small areas of **trees traditionally protected by the local community** for religious and cultural significance. They are also important for the protection of local biodiversity. It also serves as a haven for nature and spirituality.
- **Sacred grooves are scattered all over India.** However, they are mainly found in forested areas such as the **Western Ghats, the Himalayas, and the northeastern and central hills.**
- **Shelters:** These sanctuaries harbor numerous species of trees, vines, medicinal plants, animals, birds, lizards, snakes, frogs, and other creatures that have become rare elsewhere in the landscape.

Classification of Sacred Grooves:

- **Traditional Sacred Grooves** –It is the place where the village deity resides, who is represented by an elementary symbol.
- **Temple Groves** – Here a grove is created around a temple and conserved.
- **Groves around the burial or cremation grounds.**
- **Examples of sacred grooves** include the Greco-Roman temenos, various Germanic words for sacred groves, and the Celtic nemeton, which was largely but not exclusively associated with Druidic practice.

Uses of sacred groves:

- **Traditional uses:** The vegetation cover helps reduce soil erosion and prevents desertification as in Rajasthan. They sometimes help in recharging aquifers as well.
- **Modern uses:** They harbor great genetic diversity and in urban landscapes act as "lungs" to the city as well, providing much-needed vegetation cover.

Importance of Sacred Grooves:

- The Supreme Court emphasized the need for a nationwide survey of sacred grooves under the **Ministry of Environment, Forest and Climate Change (MoEF & CC)** to assess their extent and recommended their protection under the **Nature Conservation Act, 1972**, as "**community reserves**" to preserve biodiversity and cultural heritage.
- **India's Forest Conservation Policy**, guided by the **Nature Conservation Act, of 1972**, and the **National Forest Policy, 1988**, highlights community participation in forest preservation, further strengthened by Supreme Court judgments.
- **Constitutional provisions like Article 48A and Article 51A (g)** underscore the duty of the State and citizens to protect the environment and wildlife.

Significance:

- The sacred grooves should be given legal protection under the **Nature Conservation Act 1972** and declared as **community reserves.**
- The government must recognize and empower local communities and tribes under the **Forest Rights Act 2006** as custodians of sacred groves.

- Communities should be empowered to regulate overexploitation or harmful activities in sacred groves.

5.9 SNIPPETS

Topic name	Details
Red-breasted Flycatcher (<i>Ficedula parva</i>)	A small migratory bird that breeds in Eastern Europe and Central Asia, migrating to South Asia for the winter. It is characterized by the reddish-orange throat of males. It is classified as Least Concern due to its widespread population and adaptability to diverse habitats.
Madhav Tiger Reserve	Located in the northern Central Highlands of India, this reserve features plateaus, valleys, and the Upper Vindhyan Hills. It houses diverse wildlife and supports various herbivores and carnivores, making it crucial for biodiversity conservation.
Ratapani Tiger Reserve	Situated in Madhya Pradesh, this reserve is known for its teak forests and rich wildlife. It is important for ecological conservation and ecotourism, benefiting local communities economically.
Aravalli Green Wall Project	A large-scale environmental initiative aimed at restoring 1.15 million hectares of degraded land, combating desertification in the Aravalli region through afforestation, water management, and biodiversity conservation.
Marburg Virus Disease (MVD)	A deadly virus transmitted by fruit bats and human contact, causing severe hemorrhagic fever. MVD is currently spreading in Rwanda with no specific treatment available, making it a global public health concern.
Feather Mite Species	Two new species of feather mites discovered in Meghalaya's East Khasi Hills highlight the region's rich biodiversity and the need for continued conservation efforts in India.
Frog Study in Western Ghats	Ecologists are studying how amphibians, such as the endemic <i>Microhyla nilphamariensis</i> , adapt to agroforestry practices, which may have varying impacts on species depending on habitat modifications.
Homo juluensis	A newly identified ancient human species from Pleistocene Eastern Asia, this discovery offers insights into human evolution and interaction between archaic human species like Denisovans and Neanderthals.
Tikhir Tribe	A tribe in Nagaland known for their agricultural practices and headhunting history. They celebrate the "TSONGLAKNYI" festival, blending traditional and Christian customs, with a focus on community and cultural preservation.
Little Gull	The smallest gull species, spotted near Sultanpur National Park in Haryana, it migrates from the Palearctic region and plays a role in the ecosystems of the wetlands it inhabits.
Indian Star Tortoise	Endemic to the Indian subcontinent, this species faces threats due to habitat loss and illegal trade. Its unique appearance and ecological role make it a focus for conservation efforts.
Markhor	A wild goat with distinctive spiral-shaped horns, found in mountainous regions of India and Central Asia. It is listed as Near Threatened due to habitat loss and hunting pressures.
Laysan Albatross	A seabird native to the North Pacific, known for its long lifespan and

	distinctive monogamous pairing. It faces threats from environmental changes and is listed as Near Threatened.
Moths	A diverse group of nocturnal insects, vital for ecosystems as pollinators and food sources for other species. Some moth species are agricultural pests, necessitating management strategies.
Damselfish	A family of cichlids found in tropical freshwater ecosystems. Known for their territorial and aggressive nature, they are vital to the balance of their habitats.
Marbled Duck	A rare migratory duck species, found in wetlands of southern Europe, northern Africa, and Asia, and listed as Vulnerable due to habitat loss and changing migratory patterns.
Shortfin Mako Shark	Known for its speed, this shark species is endangered due to overfishing and slow reproductive rates. Conservation efforts focus on regulating fisheries and protecting habitats.
UNEP Champions of the Earth	An award recognizing individuals and organizations for outstanding environmental work. 2024 winner Madhav Gadgil is celebrated for his contributions to sustainability and conservation in India.
Indian Rock Python	Found across India, this large snake faces threats from habitat loss and illegal trade. Its population decline has made it Near Threatened.
Phytoplankton Blooms in Eutrophic Lakes	These blooms can exacerbate climate change by emitting carbon dioxide. Managing nutrient levels in these ecosystems is key to mitigating environmental impacts.
D. Ering Wildlife Sanctuary	Located in Arunachal Pradesh, this sanctuary is home to diverse wildlife, including endangered species like the white-winged wood duck. It highlights the importance of wetland ecosystems for biodiversity.
Malayan Night Heron	A nocturnal bird recently spotted in Madurai, it is native to Southeast Asia and migrates to northern Tamil Nadu during the winter, adding to India's diverse bird populations.
White-winged Wood Duck	An endangered species, primarily found in Northeast India. With fewer than 800 individuals, it is highly threatened by habitat loss and poaching.
Darwin Wasp	A parasitic wasp species crucial for pest control. It plays an important ecological role by controlling crop-damaging pests without relying on harmful pesticides.
Dulcibella camanchaca	A newly identified species of predatory amphipod found in the Atacama Trench. It adapts to its extreme deep-ocean environment, showcasing biodiversity in the ocean depths.
Sultanpur National Park	A Ramsar site that supports a variety of resident and migratory birds, this wetland area in Haryana is an important habitat for species like Siberian cranes and greater flamingos.
Arabian Leopard	Critically endangered, the Arabian leopard faces severe threats from habitat loss and poaching. It is found in fragmented populations across the Arabian Peninsula.
Little Bunting	A migratory bird species that breeds in far northeastern Europe and migrates to India in the winter. Its IUCN status is Least Concern, reflecting stable populations.

Humpback Whale	Known for its long migrations, the humpback whale is an iconic marine mammal and continues to thrive, though conservation efforts are necessary to maintain populations.
Short-neck Clam	An economically important species in Kerala's Ashtamudi Lake, its population is threatened by pollution, invasive species, and climate change, making sustainable fishery practices essential.
Wroughton's Free-tailed Bat	A rare species with a crucial ecological role in insect control, now listed as Data Deficient on the IUCN Red List and protected under India's conservation laws.
Grey Junglefowl	Endangered due to hybridization with domestic chickens, this species is an important part of India's wildlife heritage and requires ongoing conservation efforts.
Spot-billed Pelican	Found in Southeast Asia, this pelican species is known for its social nature and effective fishing techniques. It is an important species in maintaining the health of wetland ecosystems.
Helmeted Water Toad	A rare and ancient frog species from Chile, known for its large size and resilience. It faces threats from climate change and habitat destruction.
Murder Hornets	Known for their impact on bee populations, these large hornets pose a significant threat to agriculture and ecosystems, particularly in areas outside their native range in Asia.
Dodo	An extinct flightless bird, the dodo was endemic to Mauritius and became extinct due to human activities and introduced species. It has become an iconic symbol of extinction.
Cephalopods	A diverse group of highly intelligent mollusks, including octopuses, squid, and cuttlefish, known for their advanced vision, communication through color changes, and predatory behaviors.
Sea otter	They play a key role in controlling invasive green crab populations, consuming up to 120,000 annually. Green crabs, native to the Atlantic, are destructive to coastal ecosystems, outcompeting native species and damaging seagrass beds.
The Bald Eagle (<i>Haliaeetus leucocephalus</i>)	This is a North America's iconic bird of prey, with a brown body, white head and tail, and sharp yellow beak. Once endangered, it is now of Least Concern, thriving in habitats across the U.S. and Canada.
The Oriental Dollar Bird,	It found from Australia to Japan and India, is named for the blue coin-shaped spots on its wings and migrates long distances. It has an IUCN status of Least Concern.
Chembarambakkam Lake,	Is an artificial rain-fed reservoir in Chennai, Tamil Nadu, was built by Rajendra Chola I and supplies water to the city, historically known as Puliur Kottam.
Subabul (<i>Leucaena leucocephala</i>)	It is a fast-growing leguminous tree native to Mexico, widely distributed in tropical regions of India. Its protein-rich leaves and seeds are used for food and fodder, while its wood serves purposes like charcoal, furniture, and paper pulp. Initially introduced for cover cropping, it has diverse agricultural and industrial applications.
Monarch butterflies,	A part of the Nymphalidae family, are known for their striking orange and black wings, long migrations, and reliance on milkweed for survival, which

	makes them unpalatable to predators. They are found in both tropical and temperate regions worldwide.
The International Tropical Timber Organization (ITTO),	It was established in 1985 under the UN-sponsored ITTA, promotes sustainable management, legal harvesting, and trade of tropical forests. Governed by the International Tropical Timber Council, it allocates equal votes to producer and consumer nations based on market share.

5.10 ADDITIONAL TOPICS FOR READING FROM IAS GYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
Ratapani	5 th December 2024
Natural WHS	12 th December 2024
Arctic sea ice and Arctic tundra	13 th December 2024
Critically endangered species in India	5 th December 2024
Beijing's War Against Air Pollution	14 th December 2024
No Indian city meets WHO air quality standards	16 th December 2024
New chemical pathway found to worsen air quality in harsh winters	19 th December 2024
IPBES Nexus Report	19 th December 2024
US NDC plan vs India's NDC plan	23 rd December 2024
ICJ begins hearing on landmark climate change case	23 rd December 2024
Climate forecast 2025	27 th December 2024
UNESCO's World Heritage marine sites	28 th December 2024
Solid Waste Management Rules, 2024	28 th December 2024
India's coastlines confront the dual crises	28 th December 2024
Tiger relocation	30 th December 2024
How the Western Ghats have changed due to global warming	31 st December 2024
India must revisit the animal welfare framework at its zoos	31 st December 2024
How thermal plants and waste-to-energy plants intensify air pollution	31 st December 2024

6. SCIENCE & TECHNOLOGY AND HEALTH

6.1 CHALLENGE OF UNIVERSAL HEALTH COVERAGE IN INDIA

Context

- Achieving Universal Health Coverage (UHC) in India—a country marked by vast socio-economic, cultural and regional diversity—is challenging due to its complex healthcare systems and varying local health profiles.

Definition

- Universal Health Coverage (UHC) aims to ensure that all individuals and communities receive the health services they need without financial hardship.
- **Key Components**
 - **Access to Care:** Timely access to necessary health services.
 - **Quality Services:** Effective, safe, and reliable care.
 - **Financial Protection:** Avoidance of economic strain due to medical expenses.
- Achieving UHC is a key goal under the 2030 Sustainable Development Goals (SDGs).

UHC in India

Constitutional Provisions

- **Directive Principles:** Articles 39(e), 42 and 47 direct the state to ensure public health, nutrition and humane work conditions.
- **Local Bodies:** Article 243G empowers panchayats and municipalities to enhance public health.

Policies and Programs

- **National Health Policy (1983):** Emphasized “Health for All” and equitable healthcare.
- **Ayushman Bharat (PM-JAY):** World’s largest publicly financed health insurance scheme covering over 500 million individuals.
- **National Rural Health Mission (NRHM):** Strengthened rural healthcare with a focus on maternal and child health, immunization, and nutrition.

- **National Health Policy (2017):** Reinforced UHC goals through primary and preventive healthcare.

Need for UHC in India

- **High Out-of-Pocket Expenditure:** Over 40% of healthcare costs are borne directly by citizens pushing over 60 million into poverty annually.
- **COVID-19 Impact:** Highlighted the necessity for robust healthcare systems.
- **Coordination Issues:** Multiple schemes with limited integration lead to inefficiencies.
- **Preventive Health Focus:** Early detection and management reduce chronic disease burden.

India's Health System Diversity

- India exhibits various healthcare models with significant regional variations.
- Some states combine public and private systems while others lean heavily on one type. For instance Kerala has a strong public health system while states like Bihar depend more on private healthcare providers.

Government Healthcare Expenditure

- **Disparities Among States:** Per capita government spending on health varies significantly as noted in the National Health Accounts (NHA) Estimates for India (2019-20).
- Fertility rates and teenage pregnancies vary widely across states.
- These contrasts underscore the need for tailored UHC approaches for different states.

Challenges in Achieving UHC

- A significant proportion of healthcare costs are borne by individuals. Despite increased government spending Out-of-Pocket Expenditure remains high due to systemic

inefficiencies and limited access to free public healthcare.

- Increased funding alone does not address systemic design flaws. For example: High C-section rates in public hospitals of West Bengal indicate a sufficient supply of public hospitals yet schemes like Swasthya Sathi channel resources to private hospitals unnecessarily.
- Non-communicable diseases (NCDs) present unique challenges across states. The **Indian Council of Medical Research (ICMR)** data highlights:
 - West Bengal: High rates of genetically inherited insulin insufficiency (high diabetes prevalence) but relatively low hypertension rates.
 - Kerala and Tamil Nadu: Both high diabetes and hypertension prevalence.
- Primary healthcare infrastructure is inadequate in many states. This limits access to early diagnosis, preventive care and

management of chronic conditions like diabetes.

Way Forward

- Integrate public health initiatives with regional adaptations to address state-specific challenges. Consider socio-cultural and historical contexts to design effective interventions.
- Address the impact of climate change on disease patterns and healthcare infrastructure. Strengthen surveillance and response systems for emerging health threats.
- Digital health tools like telemedicine and electronic health records can bridge gaps in rural and underserved areas. Expand access to healthcare through mobile health units and online platforms.
- Promote health literacy through campaigns targeting lifestyle-related diseases like diabetes and hypertension.
- Empower local communities to participate in health system governance.

6.2 PACKAGED DRINKING WATER CLASSIFIED AS HIGH RISK FOOD

Context

- The Food Safety and Standards Authority of India (FSSAI) has decided to treat the packaged drinking and mineral water segment as a “High Risk Food Category” and subject it to mandatory inspection and third-party audit norms.

Background

- The packaged drinking water industry was previously required to obtain dual certification from both the **Bureau of Indian Standards (BIS)** and **FSSAI**.
- In October 2024, the government removed the mandatory condition for BIS certification simplifying compliance requirements.

FSSAI's New Guidelines

- To maintain rigorous safety standards, FSSAI amended its Risk-Based Inspection Policy to include packaged drinking and mineral water under high-risk categories.
- This change ensures that the removal of mandatory BIS certification does not compromise food safety.

New Compliance Framework

- Manufacturers of packaged drinking and mineral water will undergo:
 - **Annual Risk-Based Inspections** by FSSAI officials.
 - **Pre-licensing inspections** before receiving a license or registration.
- Centrally licensed manufacturers in high-risk categories must be audited annually by **FSSAI-recognized third-party agencies**.

- Obtaining FSSAI licenses is now strictly tied to the inspection process ensuring that only compliant manufacturers are permitted to operate.

High-Risk Food Categories

- The FSSAI defines "high-risk foods" as those that require regular, risk-based inspections and annual audits. In addition to packaged water, other products that fall under this category include:
 - Dairy products and analogues
 - Meat and poultry products
 - Fish and seafood, including molluscs, crustaceans, and echinoderms
 - Eggs and egg products
 - Specialised food products for specific nutritional uses
 - Prepared foods
 - Indian sweets
 - Fortified rice kernels
- These categories are subject to periodic inspections by designated food safety officers, and the progress of these inspections

is monitored by food commissioners in each state and union territory.

What does this mean for the industry?

- Labeling packaged water as "high-risk food" does not imply these products are unsafe.
- Rather, it reinforces the government's commitment to ensuring consumer safety by enforcing stricter safety checks.
- This new regulation requires businesses to undergo routine inspections and audits to guarantee that safety and quality standards are upheld.
- Previously, the packaged drinking water industry had advocated for fewer regulatory hurdles, including the removal of the dual certification requirement by both the BIS and the FSSAI.
- The dual certification process was burdensome, leading to increased costs and administrative delays.
- By eliminating the BIS certification requirement, the government has responded to the industry's demand for a more streamlined regulatory framework.

Packaged Drinking Water

Aspect	Details
Definition	<ul style="list-style-type: none"> • Packaged drinking water is water treated and sealed in bottles, pouches or containers to meet safety and quality standards for human consumption.
Sources of Water	<ul style="list-style-type: none"> • Common sources include groundwater, spring water, municipal water supply or surface water (like rivers or lakes).
Processing Techniques	<ul style="list-style-type: none"> • Filtration: Removes physical impurities such as sand, debris and sediments through sand filters, carbon filters, or microfilters. • Reverse Osmosis (RO): Uses a semipermeable membrane to eliminate dissolved salts, heavy metals and microorganisms. • UV Treatment: Exposes water to ultraviolet light to kill or inactivate bacteria, viruses and other pathogens. • Ozonation: Dissolves ozone gas in water to disinfect and oxidize organic matter, providing an additional layer of microbial safety. • Mineral Fortification: Some packaged drinking water is fortified with essential minerals like calcium, magnesium, and potassium for taste and nutritional value.
Packaging	<ul style="list-style-type: none"> •

Regulatory Standards

- **Material:** Common materials include PET (polyethylene terephthalate) and HDPE (high-density polyethylene) which are lightweight and recyclable.
- **Sealing:** Bottles are hermetically sealed to prevent contamination during storage and transportation.
- **Labelling:** Labels provide details such as source, treatment methods, manufacturing date and compliance with regulatory standards.
- **Global Standards:** WHO guidelines and International Bottled Water Association (IBWA) standards ensure water safety and quality.
- **Indian Standards:** BIS (Bureau of Indian Standards) specifies IS:14543 for packaged drinking water and IS:13428 for packaged natural mineral water.

Food Safety Standards Authority of India (FSSAI)

- The FSSAI has been established under the **Food Safety and Standards Act of 2006**.
- It is a statutory body that works under the **Ministry of Health and Family Welfare**.
- It is responsible for protecting and promoting public health through the regulation and supervision of food
- **Power and Responsibilities of FSSAI:**
 - It Formulates the Regulations to lay down food safety standards.
 - It prepares guidelines for the accreditation of laboratories for food testing.
 - It provides scientific advice and technical support to the Government.
 - Collecting data regarding food consumption, contamination, emerging risks, etc.
 - Promoting awareness about food safety and nutrition in India.
 - Lay down science-based standards for articles on food.
 - Regulate the manufacture, storage, distribution, import, and sale of food.

- To promote food safety.
- The Chairman of FSSAI is appointed by the Central Government.
- The FSSAI has its headquarters in New Delhi.
- The authority also has 6 regional offices located in Delhi, Guwahati, Mumbai, Kolkata, Cochin, and Chennai.

Bureau of Indian Standards (BIS)

- It is the National Standards Body under the **Ministry of Consumer Affairs, Food & Public Distribution**.
 - It is a **statutory body** established under the Bureau of Indian Standards Act, 2016.
 - BIS has more than 500 scientific officers working as Certification Officers.
- BIS was formerly known as the **Indian Standards Institution (ISI)**.
 - ISI was set up in 1946.
 - The ISI was registered under the Societies Registration Act, 1860.
- **Bureau of Indian Standards (BIS)** headquarters are in New Delhi, with regional offices in Kolkata, Chennai, Mumbai, Chandigarh and Delhi.

6.3 MAKING AFFORDABLE GENERICS MORE RELIABLE

Context

- To ensure equitable access to high-quality healthcare addressing issues related to the manufacturing, regulation and quality control of generics is imperative.

Details

- Generics being bioequivalent to branded drugs are a cost-effective alternative, yet their quality and reliability have occasionally been questioned.

Role of Generics in Affordable Healthcare

- Generics drastically reduce the cost of treatment enhancing adherence to medical regimes. Example: Through the Pradhan Mantri Bhartiya Janaushadhi Pariyojana, ₹5,600 crore worth of generics saved consumers ₹30,000 crore in a decade.
- Out-of-pocket healthcare expenditure accounts for 39.4% of total health spending in India (2021-22).
- Generics alleviate this burden especially for economically weaker sections.
- India's production scale and low costs enable affordable generics to be exported worldwide benefiting millions globally.

Challenges in Ensuring Generic Drug Quality

- **Differences in Composition and Manufacturing**
 - **Excipients:** Variations in binders, fillers and coatings impact drug dissolution, stability and delivery mechanisms.
 - **Manufacturing Processes:** Factors like tablet hardness and particle size influence disintegration and absorption.
- **Bioequivalence Thresholds**
 - Regulatory limits (80%-125% range) might be inadequate for drugs with narrow therapeutic indices.
 - Even minor deviations can result in sub-therapeutic outcomes or adverse effects.
- **Stability Issues**
 - Inconsistent enforcement of stability testing to ensure drug efficacy under different climatic conditions.
 - Drugs approved before the 2018 stability mandate remain a concern.
- **Permitted Impurity Levels:** Higher impurity levels in Indian pharmacopoeia compared to

international standards undermine confidence.

Regulatory and Systemic Issues

- State Drug Regulatory Authorities (SDRAs) have significant autonomy leading to inconsistent enforcement and quality standards.
- Regulatory arbitrage arises as manufacturers exploit weaker oversight in certain states.
- The Central Drugs Standard Control Organisation (CDSCO) lacks sufficient resources, personnel and central drug-testing laboratories.
- Absence of retrospective reassessment for older generics perpetuates the circulation of substandard medicines.

Recommendations for Ensuring Reliable Generics

- Transfer all drug regulation responsibilities to a strengthened and well-resourced CDSCO. Establish centralised drug-testing laboratories for consistent quality checks.
- Enforce uniform stability testing protocols across all states.
- Mandate periodic reassessment of generics including those approved before 2018.
- Align India's pharmacopoeia impurity levels with international standards.
- Reorganise CDSCO to deliver robust regulatory safeguards through effective inspections and stringent enforcement mechanisms.
- Implement suggestions from past committees (Bhatia, Hathi, Mashelkar) advocating for centralised oversight.

6.4 SHORT ARTICLES

ecDNA

Context

- Extra-chromosomal DNA (ecDNA) has emerged as a significant player in cancer biology challenging long-held genetic principles.
- Once dismissed as a rare occurrence, ecDNA is now recognized for its role in cancer progression, metastasis and drug resistance. Recent studies led by the eDyNAmiC team have shed light on its formation, function and implications in oncology.

About ecDNA

- In normal cells, DNA resides in 23 pairs of chromosomes within the nucleus.
- However, processes like DNA damage or errors during cell replication can result in fragments of DNA breaking away to form circular structures known as ecDNA.
- First identified 50 years ago, ecDNA was initially deemed irrelevant due to its presence in only 1.4% of tumors.
- Modern genomic techniques revealed its prevalence in nearly 40% of cancer cell lines and up to 90% of certain tumor types highlighting its critical role.

Characteristics:

- Contains multiple copies of oncogenes (genes capable of causing cancer).
- Freely moves within the nucleus forming hubs where oncogene expression is amplified.

Formation Triggers:

- Environmental factors: Smoking, chemical exposure.
- Genetic mutations: Linked to chromothripsis, a process where chromosomes break and rearrange.

Role in Cancer Growth:

- ecDNA often carries oncogenes enhancing their expression beyond what is possible with chromosomal DNA.
- Oncogenes are a group of genetic mutations that may cause cancer. They're a mutated form of genes that manage cell growth. When these genes change into oncogenes, they cause cells to grow and divide uncontrollably.
- The dynamic nature of ecDNA accelerates tumor evolution aiding cancer cells in resisting treatments.
- ecDNA interacts with other ecDNA forming zones where oncogenes are over expressed. This contributes to aggressive tumor behavior.

ecDNA and Genetic Laws

- Mendel's third law posits that genes on different chromosomes are inherited independently.
- ecDNA, however, is passed on in clusters during cell division preserving specific oncogene combinations—a phenomenon termed the "jackpot effect."
- This discovery redefines gene inheritance patterns.
- Coordinated segregation of ecDNA during cell division boosts cancer cell survival and adaptability.

Nanobubbles

Context

- Union Minister of State for Forest, Environment and Climate Change launched 'Nano Bubble Technology' for cleaning and purifying water of National Zoological Park, Delhi to promote the health of aquatic animals.

About Nano Bubbles

- Nano bubbles, also known as ultra-fine bubbles, are gas-filled cavities within liquids that have diameters smaller than 200 nanometers.

- These bubbles are invisible to the naked eye and exhibit unique properties due to their small size and high surface energy.

Characteristics

Feature	Details
Stability	Highly stable due to their neutral buoyancy and large surface charge.
Surface Charge	Negative zeta potential helps maintain stability and prevents coalescence.
Behavior in Liquids	Do not rise to the surface like larger bubbles; instead remain suspended.
Gas Dissolution	Enhance gas solubility in liquids due to high surface area-to-volume ratio.
Collapse	Collapse under specific conditions releasing energy and generating radicals.

How Nano Bubbles Work

- **Formation:** Created using specialized equipment such as ultrasonic generators or venturi nozzles.
- **Stability:** Electrostatic charges prevent them from coalescing or bursting easily.
- **Behavior:** They penetrate deep into liquid systems due to their minute size and neutral buoyancy.
- **Energy Release:** Burst or collapse releases hydroxyl radicals and other reactive species.

Applications of Nano Bubbles

Water Treatment	<ul style="list-style-type: none"> • Effective in breaking down organic pollutants. • Generate reactive oxygen species for sterilization. • Enhance oxygen transfer efficiency in wastewater treatment.
Agriculture	<ul style="list-style-type: none"> • Improve nutrient absorption and oxygen availability in irrigation systems. • Detoxify contaminated soils by enhancing microbial activity.
Healthcare and Medicine	<ul style="list-style-type: none"> • Facilitate precise delivery of therapeutic agents to targeted areas. • Used in ultrasonic treatments for localized tumor destruction. • Promote cell growth and disinfection in wound management.
Industrial Applications	<ul style="list-style-type: none"> • Ultra-fine bubbles help in removing dirt and contaminants from surfaces. • Enhance cooling efficiency by improving heat exchange.
Aquaculture	<ul style="list-style-type: none"> • Improve water quality and oxygenation for healthier aquatic life.

Ultra-Processed Foods in US Diets

Context

- A new study analyzing dietary habits in the United States has highlighted the increasing reliance on **Ultra-Processed Foods** particularly those consumed at home.

What are Ultra-Processed Foods?

UPFs are food products that undergo extensive industrial processing, often containing:

- **Artificial additives** (e.g., sweeteners, colorings, emulsifiers)
- **Preservatives**
- High levels of **sugar, salt, and unhealthy fats**
Examples include **packaged snacks, soft drinks, frozen meals, french fries, cookies** and other convenience foods.

HFSS foods may be defined as foods (any food or drink, packaged or non packaged) which contain low amounts of proteins, vitamins, phytochemicals, minerals and dietary fibre but are rich in fat (saturated fatty acids), salt and sugar and high in energy (calories) that are known to have negative impact on health if consumed regularly or in high amounts.

Health Concerns Linked to UPFs

- **Heart diseases**
- **Weight gain and obesity**
- **Metabolic disorders** such as diabetes
- **Nutritional deficiencies** as UPFs often lack essential nutrients found in fresh, whole foods.

- Loss of Memory and Learning Problems, Depression.

Indian Scenario

- World Obesity Federation study estimates 27.4 million Indian children and teens will face obesity by 2030, second only to China, which leads with 61.9 million obese youth aged 5-19.
- The prevalence of diabetes in India has risen from 7.1% in 2009 to 8.9% in 2019 as per NFHS.
- A study published in PLOS ONE analyzed morbidity data from the National Sample Survey Organisation (NSSO) for the years 1995, 2004, 2014, and 2018. Key findings include:
 - **Overall Morbidity:** Doubled from 56 per thousand in 1995 to 106 per thousand in 2014, but dropped to 79 per thousand in 2018.
 - **NCDs:** Prevalence increased more than three times from 8.6 per thousand in 1995 to 30 per thousand in 2018.
 - **Infectious Diseases:** Prevalence almost doubled from 8 per thousand in 1995 to 15 per thousand in 2018.

Eat Right India

- In the preamble to the Food Safety and Standards Act, 2006, the Food Safety and Standards Authority of India (FSSAI) is expected to ensure availability of safe and wholesome food for the people in India.
- Therefore, FSSAI has embarked on a large-scale effort to transform the country's food system in order to ensure safe, healthy and sustainable food for all Indians through the 'Eat Right India' movement.
- The tagline 'SahiBhojan. Behtar Jeevan', thus, forms the foundation of this movement.
- Eat Right India adopts a judicious mix of regulatory, capacity building, collaborative and empowerment approaches to ensure that our food is good both for the people and the planet.

- Further, it builds on the collective action of all stakeholders - the government, food businesses, civil society organizations, experts and professionals, development agencies and citizens at large.
- Eat Right India adopts an integrative or 'whole of the government' approach since the movement brings together food-related mandates of the agriculture, health, environment and other ministries.

Malaria cases in India

Context

- India's fight against malaria has yielded significant progress yet it remains a critical contributor to the malaria burden in the WHO South-East Asia Region. The latest **World Malaria Report 2024** by the WHO highlights both achievements and ongoing challenges.

Findings

Regional Malaria Burden:

- The WHO South-East Asia Region contributes **1.5% of global malaria cases with India accounting for half of all estimated cases in 2023.**
- **Indonesia** follows with just under one-third of the region's cases.

Progress in Malaria Reduction:

- Estimated malaria cases in the region dropped by **82.4%**, from **22.8 million in 2000 to 4 million in 2023.**
- Deaths declined by **82.9%** from **35,000 in 2000 to 6,000 in 2023.**
- Case incidence fell by **87%** from **17.7 to 2.3 per 1,000 population at risk.**

India's Role in Regional Progress:

- India achieved a **93% decrease in malaria case incidence** since 2000, with **17.7 million fewer cases.**
- The country accounted for **9.6% fewer cases** between 2022 and 2023.
- In 2015, India joined 17 Asia Pacific leaders in endorsing a plan and roadmap to eliminate malaria throughout the region by 2030.

- India further pledged to achieve this goal by 2027 - three years ahead of the regional and global target.
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Country-Specific Trends:

- **Case Reductions:** Bangladesh (-9.2%), Indonesia (-5.7%), Nepal (-58.3%).
- **Case Increases:** North Korea (+47.9%), Thailand (+46.4%), Myanmar (+45.1%).
- **Malaria-Free Countries:** Timor-Leste and Bhutan reported **zero indigenous cases** in 2023.

Global Perspective

- Worldwide, there were **263 million malaria cases** and **597,000 deaths** in 2023, a slight increase of 11 million cases compared to 2022.
- Since 2000, an estimated **2.2 billion malaria cases** and **12.7 million deaths** have been averted globally.
- As of November 2024, **44 countries and one territory** have been certified malaria-free by the WHO.

Quantum Satellites

Context

- India is advancing in quantum technologies with plans to launch a quantum satellite within **2-3 years** as stated by chairman of the Mission Governing Board of the National Quantum Mission.

What is a Quantum Satellite?

- A **quantum satellite** is a communication device that uses principles of quantum physics to secure messages.
- Unlike classical satellites, it employs quantum mechanics to encrypt data offering enhanced security against interception even by quantum computers.

Functions

- The primary purpose of a quantum satellite is to facilitate **Quantum Key Distribution (QKD)** ensuring secure communication channels by:

- Quantum systems reveal any attempt to intercept the communication.
- Distributing encryption keys securely between two parties.
- Using quantum physics to ensure robust data protection.

Timeline

- India aims to launch its first quantum satellite by **2026** integrating research from institutions like the Raman Research Institute in Bengaluru and leveraging the Indian Astronomical Observatory in Ladakh for optimal conditions.

PSLV C60

Context

- The Indian Space Research Organisation (ISRO) has launched the much-anticipated **PSLV-C60 mission**. This mission will test critical technologies poised to enhance interplanetary exploration and human spaceflight capabilities in the future.

Mission Overview

- The PSLV-C60 mission carries two satellites, **SDX01 ('Chaser')** and **SDX02 ('Target')** weighing 220 kg each.
- The satellites will rendezvous, dock and undock in a **low earth orbit** as part of the **Space Docking Experiment (SpaDeX)**.
- This mission serving as a precursor to India's future space station (**Bharatiya Antariksh Station**) and other exploratory endeavors underscores ISRO's intent to master in-orbit docking.
- Additionally, the **fourth stage** of the PSLV-C60 called the **PSLV Orbital Experimental Module (POEM-4)** will host **24 payloads** designed by ISRO, academia and private companies, showcasing India's collaborative space ecosystem.

Highlights of the PSLV-C60 Mission

Core Satellite Experiments (SpaDeX)

- Satellites will start at 20 km apart and gradually close the gap to 3 m.

- After docking, power transfer will be demonstrated before undocking.

Payloads and Capabilities

- **'Chaser'**: Equipped with a high-resolution camera.
- **'Target'**: Carries a multispectral payload and a radiation monitor.

POEM-4 Payloads

- **Walking Robotic Arm**: Developed by IISU, mimicking an inchworm for target mobility.
- **Debris Capture Manipulator**: Designed to capture space debris.
- **APEMS**: Examining spinach cell growth in microgravity.

- **RVSat-1**: Studying gut bacteria to understand astronaut health.
- **RUDRA 1.0 HPGP**: Green propulsion with enhanced safety and performance.
- **VYOM 2U**: A safer monopropellant alternative to hydrazine.
- **Synthetic Aperture Radar (SAR)**: Demonstrated by payloads like **GLX-SQ** and **Varuna** capable of high-resolution imaging and sea monitoring.
- **BGS ARPIT**: Transmits data to amateur radio networks.
- **Swetchasat**: Demonstrates UHF transmitter communication capabilities.

6.5 TITBITS

RTS, S/AS01 is the first malaria vaccine to be tested in Phase 3 clinical trials and the first to be assessed in routine immunization programs in malaria-endemic areas.

The **R21/Matrix-M™** is a malaria vaccine that's been developed by the University of Oxford and manufactured by the Serum Institute of India (SII). It's the second licensed malaria vaccine to be prequalified by the World Health Organization (WHO).

The **National Framework for Malaria Elimination (NFME) 2016-2030** is a strategy to eliminate malaria in India by 2030. The framework was launched on February 11, 2016 by the Union Minister for Health & Family Welfare. The NFME was developed by the National Vector Borne Disease Control Programme (NVBDCP), Ministry of Health & Family Welfare (MoHFW), and the World Health Organization (WHO).

The NFME's goals include:

- Eliminating malaria by 2030
- Reducing malaria cases to less than 1 per 1,000 people per year by 2024
- Stopping the spread of malaria throughout the country by 2027
- Preventing malaria from coming back in areas where it has been eliminated

The **World Health Organization (WHO)** has certified many countries as malaria-free, including:

- **Algeria**: Certified in 2019, Algeria was the second African country to be certified after Mauritius in 1973
- **Argentina**: Certified in 2019, Argentina was the second American country to be certified after Paraguay in 2018
- **Azerbaijan**: Certified in 2023
- **Belize**: Certified in 2023
- **Cabo Verde**: No malaria transmission
- **China**: Certified in 2021, China was the first country in the WHO Western Pacific Region to be certified in over 30 years

- El Salvador: Certified in 2021
- Egypt: Certified as malaria-free after nearly a century of work
- Maldives: Certified in 2015
- Paraguay: Certified in 2018
- Sri Lanka: Certified in 2016
- Tajikistan: Certified in 2023
- Uzbekistan: Certified in 2018

The WHO grants malaria-free certification to countries that have interrupted indigenous transmission of the disease for at least three consecutive years.

China's 1-3-7 Malaria Elimination Strategy is a set of guidelines for reporting and responding to malaria cases:

- 1: Health facilities must report a malaria diagnosis within one day
- 3: Health authorities must confirm the case and determine the risk of spread within three days
- 7: Appropriate measures must be taken to prevent further spread of the disease within seven days

6.6 SNIPPETS

Diseases in News

Topics	Details
Handigodu Disease	<ul style="list-style-type: none"> • Health and family welfare minister of Karnataka directed the health department officials to undertake a scientific study of Handigodu disease and present a detailed report on its control measures. • Handigodu Disease is a rare, chronic skeletal disorder primarily reported in certain regions of Karnataka. • Named after the Handigodu village where it was first identified. • It primarily affects bones and joints leading to deformities, disability and chronic pain. • Scientific studies aim to uncover the genetic, environmental and biochemical factors contributing to this disorder.
Aortic Stenosis	<ul style="list-style-type: none"> • A large population study indicates that insulin resistance may be an important risk factor for the development of heart valve disease – aortic stenosis. • Aortic stenosis is the narrowing of the aortic valve, restricting blood flow from the left ventricle to the aorta and onwards to the rest of the body. • It is a common and potentially serious condition especially in older adults. It can lead to heart failure, arrhythmias or sudden cardiac death if untreated. • It affects about 2-7% of individuals over 65 years of age. <p>Aortic Valve</p> <p>Location</p> <ul style="list-style-type: none"> • Situated between the left ventricle and the aorta. <p>Structure</p> <ul style="list-style-type: none"> • Composed of three cusps (leaflets) that open and close to regulate blood flow. <p>Function</p> <ul style="list-style-type: none"> • Prevents backflow of blood into the heart and ensures efficient systemic circulation.

<p>Chronic Pulmonary Aspergillosis</p>	<ul style="list-style-type: none"> • Chronic pulmonary aspergillosis-- a common fungal infection that claims 340,000 lives every year worldwide, can turn lethal for about 1 in three people with lung diseases, finds a study by researchers at the All India Institute of Medical Sciences. • It is a severe, long-term fungal infection caused by the species of the genus <i>Aspergillus</i> predominantly <i>Aspergillus fumigatus</i>. • It primarily affects individuals with pre-existing lung conditions or weakened immune systems. • <i>Aspergillus</i> spores are inhaled from the environment. <ul style="list-style-type: none"> ◦ In healthy individuals, immune defenses eliminate the spores. ◦ In compromised lungs, spores colonize and form fungal balls (aspergillomas) or invasive structures. • Treatment: <ul style="list-style-type: none"> ◦ Antifungal Therapy. ◦ Surgical Intervention.
<p>Haemophilia</p>	<ul style="list-style-type: none"> • Indian scientists have achieved a significant milestone in medical research by developing a novel gene therapy for haemophilia A. • Hemophilia is a rare genetic disorder characterized by the inability of the blood to clot properly due to the deficiency of specific clotting factors. • Haemophilia A is caused by the lack of Factor VIII which is a critical blood-clotting protein. • Severe cases involve less than 1% of normal Factor VIII levels leading to frequent and potentially fatal bleeding episodes. • India has the second-largest haemophilia patient pool globally estimated at 40,000 to 1,00,000 individuals. • Conventional treatment costs around ₹2.54 crore per patient over 10 years. Gene therapy offers the potential to reduce long-term costs by eliminating the need for repeated infusions.
<p>Crohn's Disease</p>	<ul style="list-style-type: none"> • Trial reveals filgotinib's potential to redefine Crohn's disease treatment by delivering sustained remission and improved safety outcomes for patients worldwide. <p>Definition</p> <ul style="list-style-type: none"> • Chronic inflammatory condition affecting the gastrointestinal (GI) tract. <p>Commonly Affected Areas</p> <ul style="list-style-type: none"> • Terminal ileum and colon; can affect any part of the GI tract. <p>Nature of Inflammation</p> <ul style="list-style-type: none"> • Transmural inflammation affecting all layers of the intestinal wall. <p>Pattern of Disease</p> <ul style="list-style-type: none"> • Segmental with "skip lesions" (areas of normal tissue between inflamed regions).
<p>Kawasaki Disease</p>	<ul style="list-style-type: none"> • Recently a stand up comedian revealed his son was suffering from a rare disease called Kawasaki disease. • Kawasaki Disease is an acute, self-limiting illness that predominantly affects children under the age of 5.

	<ul style="list-style-type: none"> • It is characterized by inflammation of blood vessels (vasculitis) and can lead to serious complications if left untreated. • Slightly more common in boys than girls. • Most cases occur in Asia particularly Japan but it is found worldwide. • More common in late winter and early spring.
<p>Idiopathic Pulmonary Fibrosis</p>	<ul style="list-style-type: none"> • As Zakir Hussain, tabla maestro and five-time Grammy Award winner, passed away in San Francisco due to idiopathic pulmonary fibrosis (IPF), there are concerns as to how this happens and the age group vulnerable to it. • IPF is a chronic, progressive lung disease characterized by scarring (fibrosis) of the lung tissue. • The term <i>idiopathic</i> indicates that the exact cause of the condition is unknown. • IPF leads to a gradual decline in lung function making it harder for the lungs to transfer oxygen into the bloodstream. • Main Symptom: Breathlessness (dyspnea). • Gender Predominance: More common in men than women.
<p>Diabetes Biobank</p>	<ul style="list-style-type: none"> • India has established its first diabetes biobank to facilitate advanced research on diabetes and its variations particularly those unique to the Indian population. <p>Purpose</p> <ul style="list-style-type: none"> • To advance research on diabetes and its variations with a focus on the Indian population. <p>Location</p> <ul style="list-style-type: none"> • Madras Diabetes Research Foundation (MDRF), Chennai. <p>Collaborators</p> <ul style="list-style-type: none"> • Indian Council of Medical Research (ICMR) and MDRF. <p>Focus Areas</p> <ul style="list-style-type: none"> • Identification of novel biomarkers, early diagnosis and personalized treatment strategies. <p>Biospecimens</p> <ul style="list-style-type: none"> • Blood samples from individuals with various types of diabetes including Type 1, Type 2 and gestational diabetes.
<p>Disease X</p>	<ul style="list-style-type: none"> • Recent events such as the December 2024 outbreak in the Democratic Republic of Congo which claimed over 400 lives highlight the urgency of addressing the concept of Disease X and preparing for similar threats. • Disease X is not a specific illness but represents an unknown pathogen that could cause a significant health crisis. • COVID-19 is regarded as the first practical example as SARS-CoV-2 emerged as a novel and unpredictable threat. • The term was introduced after the West African Ebola epidemic (2014–2016) which exposed severe shortcomings in epidemic preparedness. • The WHO's 2018 Blueprint for Priority Diseases identifies high-risk pathogens with pandemic potential including: <ul style="list-style-type: none"> ○ Viral Diseases: Ebola, Marburg, Nipah, Zika. ○ Emerging Threats: Crimean-Congo haemorrhagic fever, Rift Valley fever. ○ Disease X: Represents unknown threats requiring global focus. • This list guides research and resource allocation to counter high-mortality,

	rapidly spreading diseases with limited medical countermeasures.
Dinga Dinga	<ul style="list-style-type: none"> • A mysterious illness locally referred to as “DingaDinga”, has wrecked havoc in Uganda. The disease has affected 300 people in Uganda’s Bundibugyo district. • DingaDinga is a colloquial term used to describe a mysterious illness characterized by uncontrollable body shaking and fever. • The name "DingaDinga" translates to shaking like dancing reflecting the primary symptom of involuntary, dance-like movements. • The illness is generally treatable with antibiotics leading to recovery within a week. • No fatalities have been associated with DingaDinga to date. • The exact cause of DingaDinga remains unknown prompting several theories. • The symptoms of DingaDinga draw parallels to historical events like the "Dancing Plague" of 1518 in Strasbourg, France where individuals experienced uncontrollable dancing movements.
GLP-1 RAS	<ul style="list-style-type: none"> • The World Health Organization has endorsed GLP-1 receptor agonists (GLP-1 RAs) for managing obesity. • These drugs including semaglutide and tirzepatide are hailed as transformative tools that complement traditional interventions like diet and exercise. • GLP-1 receptor agonists mimic the glucagon-like peptide-1 hormone which regulates appetite and blood sugar levels. • Originally designed for diabetes management, these drugs have demonstrated efficacy in achieving significant weight loss.

Space in News

Topics	Details
High Energy Cosmic Rays observed	<ul style="list-style-type: none"> • The recent discovery at the High Energy Stereoscopic System (HESS) observatory in Namibia has brought attention to the highest-energy cosmic rays ever recorded reaching up to 40 teraelectronvolts (TeV). <p>What are Cosmic Rays?</p> <ul style="list-style-type: none"> • High-energy particles including protons, electrons and atomic nuclei originating from cosmic sources. • First detected in 1912 by Austrian physicist Victor Hess using high-altitude balloon experiments. • High Energy Stereoscopic System (HESS) Observatory: It is an array of telescopes in Namibia designed to study gamma rays and cosmic phenomena.
Solar Storms and Miyake Events	<ul style="list-style-type: none"> • 'Cataclysmic' solar storm hit Earth around 2687 years ago, ancient tree rings reveal. <p>About Miyake Events</p>

	<ul style="list-style-type: none"> • Rare, extreme solar storms identified through spikes in radioactive isotopes such as Carbon-14 in tree rings. • Miyake Events serve as indicators of Earth's history with extreme solar activity offering insights into their frequency and magnitude. <p><u>Scientific Methodology</u></p> <p>Steps</p> <p>Tree-Ring Analysis</p> <ul style="list-style-type: none"> • Radiocarbon content in tree cellulose reveals spikes corresponding to Miyake Events. <p>Ice Core Studies</p> <ul style="list-style-type: none"> • Beryllium-10 isotopes in polar ice provide corroborative data. <p>Cross-Referencing Data</p> <ul style="list-style-type: none"> • Comparing isotopic spikes from tree rings and ice cores pinpoints solar storm events. <p>About Solar storms</p> <ul style="list-style-type: none"> • Solar storms, also known as space weather events, are disturbances in the Sun's activity that affect the space environment surrounding Earth. • These phenomena primarily result from solar eruptions such as solar flares and coronal mass ejections (CMEs). • Solar storms can disrupt technological systems and pose risks to astronauts and satellites.
<p>Jupiter's Opposition</p>	<ul style="list-style-type: none"> • There was a major astronomical event on December 7th when Earth will align itself between the Sun and Jupiter. Because of alignment, known as Jupiter's opposition-the gas giant will be visible all night long. <p><u>About Opposition</u></p> <ul style="list-style-type: none"> • Opposition occurs when a celestial body is directly opposite the Sun as observed from Earth. In this alignment, Earth lies between the Sun and the celestial object. • At opposition, the celestial object is closest to Earth and appears brighter and larger in the night sky. <p><u>Jupiter's Opposition</u></p> <ul style="list-style-type: none"> • Jupiter, Earth and the Sun align in a straight line. • Jupiter is at its closest approach to Earth approximately 590 million kilometers away. • The planet appears fully illuminated by the Sun offering optimal visibility. • Jupiter's opposition occurs roughly every 13 months due to its orbital period (11.86 Earth years). • Jupiter's bands, Great Red Spot and its four largest moons (Io, Europa, Ganymede, Callisto) are clearly visible.
<p>Cosmos expansion</p>	<ul style="list-style-type: none"> • Recent observations from NASA's James Webb Space Telescope have provided fresh evidence supporting the perplexing phenomenon known as the Hubble Tension—a discrepancy between the observed and expected rate of the universe's expansion. • The Webb Telescope's two-year dataset corroborates the Hubble Space Telescope's earlier observations showing the universe is expanding

	<p>approximately 8% faster than predicted.</p> <ul style="list-style-type: none"> The findings highlight our limited understanding of dark energy (69% of the universe) and dark matter(27%), which collectively dominate the cosmos. Dark energy is believed to drive the universe's accelerating expansion while dark matter is inferred from its gravitational effects though both remain elusive in nature. The observations suggest potential gaps in our standard model of cosmology indicating the need to revise or expand theories of cosmic evolution and composition.
<p>Novae</p>	<ul style="list-style-type: none"> Astronomers from the Indian Institute of Astrophysics have made a groundbreaking discovery by detecting far-ultraviolet emissions from novae in the neighboring Andromeda galaxy. This is the first instance of such emissions being observed in this galaxy. <p>Details</p> <p>Definition</p> <ul style="list-style-type: none"> A nova is a transient astronomical event caused by the sudden eruption of hydrogen fusion on the surface of a white dwarf. <p>Name Origin</p> <ul style="list-style-type: none"> Derived from the Latin word <i>nova</i> meaning "new" as they appear as new stars to the naked eye. <p>Duration</p> <ul style="list-style-type: none"> Typically lasts for days to months with varying brightness. <p>Formation</p> <p>White Dwarf</p> <ul style="list-style-type: none"> A dense remnant of a star that has exhausted its nuclear fuel. <p>Companion Star</p> <ul style="list-style-type: none"> Often part of a binary system where the white dwarf accretes hydrogen-rich material from a companion. <p>Thermonuclear Explosion</p> <ul style="list-style-type: none"> Accumulated hydrogen undergoes fusion on the white dwarf's surface releasing energy and causing a bright outburst.
<p>Subaru Telescope</p>	<ul style="list-style-type: none"> The Subaru Telescope has captured a pair of interacting galaxies designated as NGC 5257 and NGC 5258. It is a state-of-the-art optical and infrared observatory. Operated by the National Astronomical Observatory of Japan (NAOJ) it is a critical tool for cutting-edge astronomical research. <p>Location</p> <ul style="list-style-type: none"> Mauna Kea Observatory, Hawaii, USA. <p>Primary Mirror</p> <ul style="list-style-type: none"> 8.2 meters in diameter. <p>First Light</p> <ul style="list-style-type: none"> January 1999. <p>Primary Purpose</p> <ul style="list-style-type: none"> Observing optical and infrared wavelengths to study galaxies, stars, planets and other celestial objects.

	<p>Unique Feature</p> <ul style="list-style-type: none"> • Among the largest single-aperture optical telescopes in the world.
<p>GG Tau A</p>	<p>Indian astronomers from the National Institute of Science Education and Research of Odisha have studied GG Tau A a rare triple-star system located 489 light-years from Earth.</p> <p>GG Tau A is a star system. Its unique characteristics include:</p> <ul style="list-style-type: none"> • Three stars orbiting each other in a gravitational dance. Rare among the known star systems in the universe. • A young system only 1 to 5 million years old making it ideal for studying the initial stages of planetary formation. • Surrounding these stars is a disk of gas and dust the building blocks for planet formation.
<p>Gravity and Zero Gravity</p>	<ul style="list-style-type: none"> • The Indian-origin astronaut, Sunita Williams, recently hosted a highly engaging virtual session for students of Sunita Williams Elementary School. <p>About Gravity</p> <ul style="list-style-type: none"> • Gravity is a fundamental force of nature that governs the motion of objects on Earth and across the universe. • It is the force of attraction between any two objects with mass. • Acts on all objects with mass. Infinite in range but decreases with distance. • Compared to electromagnetic, strong nuclear and weak nuclear forces, gravity is the weakest. • Any object with mass generates a gravitational field. <p>Zero Gravity</p> <ul style="list-style-type: none"> • Zero gravity, often called microgravity, refers to the condition in which an object or person experiences negligible or no apparent weight. • It is a state where gravitational forces are not entirely absent but are balanced by the free-fall motion of the object or system.
<p>Copernicus Program</p>	<ul style="list-style-type: none"> • The third Copernicus Sentinel-1 satellite was launched last night aboard a Vega-C rocket from Europe's Spaceport in French Guiana. • The Copernicus Program is the European Union's Earth Observation (EO) initiative managed by the European Commission in partnership with the European Space Agency (ESA). • Launched in 2014, it aims to monitor and manage the environment effectively. • The program relies on Sentinel Satellites, specifically designed for EO: <ul style="list-style-type: none"> ○ Sentinel-1: Radar imaging for land and ocean monitoring. ○ Sentinel-2: Optical imaging for land cover and vegetation. ○ Sentinel-3: Marine and atmospheric monitoring. ○ Sentinel-4 and Sentinel-5: Air quality and atmospheric monitoring. ○ Sentinel-6: Sea-level monitoring.
<p>CW 20 Engines</p>	<ul style="list-style-type: none"> • ISRO successfully conducted a sea level hot test of its CE20 cryogenic engine at the ISRO Propulsion Complex in Mahendragiri, Tamil Nadu. • The CE-20 cryogenic engine is an indigenous cryogenic rocket engine developed by the ISRO. • It is a pivotal component of India's GSLV Mk III also known as LVM-3 used

	<p>for launching heavy payloads into geostationary orbits.</p> <ul style="list-style-type: none"> • Mk III India's most powerful rocket capable of lifting up to 4,000 kg into geostationary orbit and 10,000 kg into low Earth orbit (LEO). • The engine has played a crucial role in missions like Chandrayaan-2 and is set to support Gaganyaan India's first crewed space mission. <p><u>Specifications</u></p> <p>Parameter</p> <p><u>Propellants</u></p> <ul style="list-style-type: none"> • Liquid Oxygen (LOX) and Liquid Hydrogen (LH2) <p><u>Thrust</u></p> <ul style="list-style-type: none"> • 200 kN (kilonewtons) <p><u>Specific Impulse</u></p> <ul style="list-style-type: none"> • 442 seconds (in vacuum) <p><u>Combustion Cycle</u></p> <ul style="list-style-type: none"> • Gas Generator Cycle. The engine burns a small amount of fuel in a separate gas generator to drive turbines which power the fuel and oxidizer pumps. <p><u>Burn Time</u></p> <ul style="list-style-type: none"> • Approximately 640 seconds <p><u>Engine Mass</u></p> <ul style="list-style-type: none"> • 587 kg <p><u>Cooling System</u></p> <ul style="list-style-type: none"> • Regenerative Cooling. Liquid hydrogen flows through channels in the nozzle to absorb heat preventing overheating and increasing efficiency.
<p>Ursid Meteor Shower</p>	<ul style="list-style-type: none"> • The Ursid meteor shower, the last celestial event of 2024, will light up the night skies in December. Peaking on the night of December 21 and 22, the spectacle perfectly aligns with the winter solstice in the Northern Hemisphere. • The Ursid Meteor Shower is an annual celestial event caused by Earth passing through the debris trail of Comet 8P/Tuttle. • The shower is named after the Ursa Minor constellation (Little Bear) because the meteors appear to radiate from this region, specifically near the star Beta Ursae Minoris (Kochab). • Comet 8P/Tuttle <ul style="list-style-type: none"> ○ Discovered in 1790 by Pierre Méchain. ○ It is a periodic comet with an orbital period of approximately 13.6 years. ○ As the comet orbits the Sun it sheds tiny particles that form the debris trail. ○ When Earth passes through this debris cloud in December the friction of particles with Earth's atmosphere generates visible meteors. • While not as prominent as the Perseids or Geminids the Ursids mark the end of the meteor shower calendar for the year.
<p>Sundials</p>	<ul style="list-style-type: none"> • The Vikram Sarabhai Space Centre (VSSC) in Thiruvananthapuram has unveiled an innovative polar sundial at its Space Museum's 'Rocket Garden.' • It is a timekeeping instrument that uses the position of the Sun's shadow cast by a gnomon (a rod or triangular blade) to indicate the time of day.

	<ul style="list-style-type: none"> The earliest sundials date back to 3500 BCE in ancient Egypt where obelisks functioned as simple sundials. Sundials work on the concept of Earth's rotation which causes the Sun to appear to move across the sky.
<p>ISRO begins assembly of HLVM3 for Gaganyaan's Flight</p>	<ul style="list-style-type: none"> The Indian Space Research Organisation (ISRO) has initiated a critical phase in the Gaganyaan mission by commencing the assembly of the Human Rated Launch Vehicle Mark-3 (HLVM3). The assembly is taking place at the Satish Dhawan Space Centre (SDSC), Sriharikota and is aimed at launching the maiden uncrewed flight early next year. The assembly coincides with the December 18, 2014, maiden flight of LVM3-X where a 3775 kg Crew Module was launched into a suborbital altitude of 126 km. Key achievements of the 2014 mission include: <ul style="list-style-type: none"> Controlled re-entry using thrusters. Recovery of the Crew Module by the Indian Coast Guard from the Bay of Bengal, about 1600 km from SDSC. The LVM3-X/CARE mission laid the groundwork for the Gaganyaan program, testing essential technologies like re-entry, deceleration and recovery.
<p>Kaveri Engine</p>	<ul style="list-style-type: none"> Recently approved for in-flight testing the Kaveri engine marks a critical step forward in India's indigenous aerospace development. The Kaveri engine project began in the late 1980s with the goal of powering the Light Combat Aircraft (LCA) Tejas. Developed by the Gas Turbine Research Establishment (GTRE) under the Defence Research and Development Organisation (DRDO), the engine aims to provide India with an indigenous solution for jet propulsion systems. The engine currently produces approximately 49-51 kN of thrust. This thrust level is suitable for Unmanned Aerial Vehicle (UAV) applications, such as the Ghatak, India's stealth Unmanned Combat Aerial Vehicle (UCAV) program. Engine Type: Turbofan engine.
<p>IRIS²</p>	<ul style="list-style-type: none"> IRIS² (Infrastructure for Resilience, Interconnectivity, and Security by Satellite) is the European Union's strategic satellite initiative designed to provide secure and high-speed internet connectivity. Developed in partnership with the SpaceRISE consortium, it aims to rival Elon Musk's Starlink and bolster Europe's autonomy in space-based communication. IRIS² is a response to the growing reliance on satellite constellations for connectivity and security, marking a significant step in the EU's space ambitions. <p>Features of IRIS²</p> <p>Total Satellites</p> <ul style="list-style-type: none"> 290 satellites (264 in Low Earth Orbit, 18 in Medium Earth Orbit) <p>Purpose</p> <ul style="list-style-type: none"> Dual-use: Governmental (border security, crisis management) and civilian

	<p>applications.</p> <p>Coverage</p> <ul style="list-style-type: none"> Primarily focused on Europe unlike Starlink’s global reach. <p>Launch Timeline</p> <ul style="list-style-type: none"> First launch expected in 2029. <p>Funding and Cost</p> <ul style="list-style-type: none"> €10.6 billion (\$11 billion) funded by the EU, ESA and private partners. <p>Consortium Members</p> <ul style="list-style-type: none"> Includes SES, Eutelsat, Hispasat, Airbus, Deutsche Telekom and others.
<p>Minimum Possible Mass of Dark Matter Particles</p>	<ul style="list-style-type: none"> Dark matter remains one of the most enigmatic substances in astrophysics constituting five-sixths of the universe's matter. Recent developments have revised the minimum mass of dark matter particles. Previous Estimate: The minimum mass of dark matter particles was thought to be approximately 10^{-31} times the mass of a proton New Estimate: Theoretical physicists in May 2023 revised this limit increasing it to 2.3×10^{-30} proton masses. Dark matter is an invisible substance that interacts weakly with ordinary matter and light. It may exist uniformly or in clumps. Its presence is inferred from gravitational effects such as the rotation curves of galaxies and the motion of stars. Local density is estimated at approximately two protons per teaspoon. At cosmic scales dark matter density can be described as 0.0003 solar masses per cubic light year.
<p>Dark Comets</p>	<ul style="list-style-type: none"> Dark comets are a newly categorized class of celestial objects that challenge our traditional understanding of comets. The term gained prominence with the discovery of the interstellar object ‘Oumuamua in 2017. Its unusual path and lack of a nucleus or tail classified it as a dark comets. Dark comets are celestial bodies that lack the characteristic bright tails of traditional comets. Their distinguishing features include: <ul style="list-style-type: none"> Appearance: Faint points of light often mistaken for asteroids. Orbits: Elongated, elliptical paths similar to typical comets bringing them close to the Sun before retreating to the outer Solar System. Origins: Likely from the Oort Cloud or similar distant regions.

Chemicals/Materials/Compounds in News

Topics	Details
<p>Tungsten</p>	<ul style="list-style-type: none"> Tamil Nadu chief minister wrote to Prime Minister Narendra Modi seeking the cancellation of rights granted by the Centre to a private firm to mine tungsten in Madurai district. <p>About Tungsten</p> <ul style="list-style-type: none"> Tungsten, symbol W (from its German name <i>Wolfram</i>), is a chemical element with atomic number 74. <p>Properties</p>

	<p>Atomic Mass</p> <ul style="list-style-type: none"> • 183.84 amu <p>Melting Point</p> <ul style="list-style-type: none"> • 3422°C (highest among all metals) <p>Boiling Point</p> <ul style="list-style-type: none"> • 5930°C <p>Density</p> <ul style="list-style-type: none"> • 19.25 g/cm³ <p>Electrical Conductivity</p> <ul style="list-style-type: none"> • Moderate conductor of electricity. <p>Hardness</p> <ul style="list-style-type: none"> • One of the hardest metals; ranks 7.5 on the Mohs hardness scale. <p>Chemical Stability</p> <ul style="list-style-type: none"> • Resistant to oxidation at high temperatures and highly stable in most chemical environments. <p>Sources</p> <p>Minerals</p> <ul style="list-style-type: none"> • Found in minerals such as <i>wolframite</i> and <i>scheelite</i>. <p>Global Reserves</p> <ul style="list-style-type: none"> • China, Russia, Canada, Austria and Bolivia are leading producers of tungsten. <p>Extraction</p> <ul style="list-style-type: none"> • Extracted from ores through methods such as roasting and reduction with hydrogen or carbon.
<p>Bromalites</p>	<ul style="list-style-type: none"> • New research using fossilized feces and vomit, known as bromalites, highlights how dinosaurs rose to dominance during the Triassic Period. • Bromalites are fossilized remains of materials ingested by ancient organisms providing crucial insights into their diets, behaviors and environments. • They are the group of ichnofossils that record the consumption, processing, and elimination of material through digestive systems. <p>Importance:</p> <ul style="list-style-type: none"> ○ Helps reconstruct ancient ecosystems and food chains. ○ Offers direct evidence of feeding habits and digestive processes. <ul style="list-style-type: none"> • Triassic Period • The Triassic Period was a geologic period that lasted from 251.9 to 201.3 million years ago. • The Triassic Period was the first period of the Mesozoic Era and the seventh period of the Phanerozoic Eon. • It followed the Permian Period, which ended with a mass extinction event.
<p>Hsp70 (Heat Shock Protein 70)</p>	<ul style="list-style-type: none"> • The team from JNU's Special Centre for Molecular Medicine, identified a human protein, Hsp70, as a critical factor in the spread of diseases like malaria and Covid-19. • Heat Shock Protein 70 (HSP70) is a molecular chaperone that plays a crucial role in protein folding, stabilization and cellular stress response. • This highly conserved protein family is critical for maintaining cellular homeostasis especially under stress conditions like heat, toxins and

	<p>infections.</p> <ul style="list-style-type: none"> • Molecular chaperones are defined as proteins that assists in the folding, assembly and conformational maintenance other proteins without becoming part of its final structure.
<p>World's first Diamond Battery</p>	<ul style="list-style-type: none"> • Scientists at the University of Bristol and the UK Atomic Energy Authority have developed the carbon-14 diamond battery an extraordinary technology capable of powering devices for thousands of years. • Powered by carbon-14, the battery has a half-life of 5,700 years retaining half of its power even after thousands of years. • Operates by harnessing energy from the radioactive decay of carbon-14. • Works similarly to a solar panel but converts the fast-moving electrons from decay into electricity instead of light. • Encased in manufactured diamond ensuring: <ul style="list-style-type: none"> ○ Strength and resilience. ○ Safe containment of short-range radiation. ○ Continuous microwatt power generation in a secure manner. • Extracts carbon-14 from graphite blocks a by product of nuclear reactors offering a sustainable way to repurpose nuclear waste.
<p>Agextend</p>	<ul style="list-style-type: none"> • By developing an AI-driven platform named AgeXtend, researchers from the IIT-Delhi have streamlined the process of identifying compounds with geroprotective (age-defying) properties. • AgeXtend screened 1.1 billion compounds over two years identifying a fraction (<1%) with anti-ageing properties. • Unlike other tools, AgeXtend not only identifies potential molecules but also explains the mechanisms that make these molecules geroprotective. • AgeXtend's code and data are available on an open-source platform for researchers and students, with paid access for commercial entities.
<p>Trichloroethylene and Perchloroethylene</p>	<ul style="list-style-type: none"> • The US Environmental Protection Agency announced sweeping bans on trichloroethylene and perchloroethylene under the 2016 Toxic Substances Control Act. <p>Trichloroethylene</p> <ul style="list-style-type: none"> • A non-flammable, volatile organic compound widely used as a solvent. It is colorless with a slightly sweet odor. • Primary Uses: <ul style="list-style-type: none"> ○ Degreasing metal parts ○ Used in adhesives, paint removers and cleaning fluids ○ Historically used as an anesthetic and analgesic (no longer common due to toxicity concerns). <p>Perchloroethylene</p> <ul style="list-style-type: none"> • Also a non-flammable, volatile organic compound with a slightly sweet odor. It is commonly referred to as "tetrachloroethylene." • Primary Uses: <ul style="list-style-type: none"> ○ Dry cleaning and textile processing ○ Metal degreasing ○ Production of fluorocarbons

Tirzepatide	<ul style="list-style-type: none"> The United States Food and Drug Administration (FDA) recently approved Tirzepatide sold under the brand name Zepbound as the first drug for the treatment of Obstructive Sleep Apnea (OSA). OSA is a sleep disorder where throat muscles relax excessively during sleep obstructing the airway and causing intermittent breathing disruptions. Tirzepatide is a dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 (GLP-1) receptor agonist. Its weight-loss properties address key OSA risk factors by: <ul style="list-style-type: none"> Reducing Fat Accumulation: Especially around the neck and abdomen which alleviates pressure on the respiratory system. Improving Lung Function: Reduced abdominal fat enhances lung expansion, mitigating airway collapse.
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Concepts in News

Topics	Details
Gait Analysis	<ul style="list-style-type: none"> Gait analysis leads to arrest of 7 month old's rapist in Bengal. Gait analysis is the scientific study of human movement specifically focusing on the mechanics of walking or running. It evaluates the body's movements, muscle activity and biomechanics to understand how individuals move. This process is crucial in diagnosing, treating and improving conditions related to locomotion.
Mass Varmam Therapy	<ul style="list-style-type: none"> The National Institute of Siddha has set a Guinness World Record for providing Varmam therapy to 567 individuals simultaneously. <p>National Institute of Siddha</p> <ul style="list-style-type: none"> It is an institute for study and research of Siddha medicine. It was established in 2005 at Tambaram, Chennai. It is one of the eight national institutes established across nation for training and research in "Indian Systems of Medicine and Homeopathy education" by Department of AYUSH. <p>Mass Varmam Therapy</p> <ul style="list-style-type: none"> A cornerstone of the Siddha system of medicine, it is an ancient Indian practice that focuses on the manipulation of vital energy points in the body known as varmam points. These points are considered intersections where life energy (prana or vaasi) is concentrated playing a crucial role in maintaining physical and mental health. The human body is believed to contain 108 varmam points categorized into: <ul style="list-style-type: none"> PaduVarmam: 12 major points. ThoduVarmam: 96 minor points.
Never Events	<ul style="list-style-type: none"> While never events might be reduced, complete prevention is more aspirational than practical. Adopting the ALARP (As Low As Reasonably Practicable) principle offers a pragmatic framework for addressing and minimising these incidents.

- The concept of Never Events was introduced in 2002 by the National Quality Forum in the United States.
- These events are broadly defined as serious, largely preventable incidents that should never occur in healthcare settings if proper safety protocols are followed.
- **Common Examples:**
 - Surgery on the wrong body part.
 - Administration of lethal medication doses.
 - Retained surgical instruments post-procedure.
- The **ALARP (As Low As Reasonably Practicable)** principle provides a pragmatic framework to minimize risks rather than achieve absolute elimination.
- In India, the term Never Events has not been explicitly adopted.

6.7 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
Food Safety Laws in India	4th October 2024
India's steps as a Key Space-Faring Nation	14th December 2024
Extraterrestrial Life	20th December 2024
Muscle mass loss with age	27th December 2024
Universal Immunisation Programme	30th December 2024

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7. CULTURE & HISTORY

7.1 C. RAJAGOPALACHARI

Context

- Recently the Lok Sabha Speaker paid floral tributes to Shri C. Rajagopalachari on his birth anniversary.

About C. Rajagopalachari

Birth

- 10th December 1878 in Salem district of Madras Presidency.

Who was he?

- An Indian statesman, writer, lawyer, and Indian Independence activist.

Contributions to India's freedom struggle

- joined the Indian National Congress (INC) and participated as a delegate in the 1906 Calcutta session.
- In 1919, participated in the agitations against the Rowlatt Act.
- Inspiration for Independence Activism from Annie Besant, V.O. Chidambaram Pillai, Subramania Bharati, and C. Vijayaraghavachariar.

- Participated in the Non-Cooperation Movement.
- Elected to the Congress Working Committee in 1921
- At INC's 1922 Gaya session, he strongly opposed collaboration with the colonial administration and participation in the diarchy legislatures established by the Government of India Act 1919
- Led the group of "No-Changers", in opposition to the "Pro-changers" who advocated council entry.
- Involved in the Vaikom Satyagraha movement against untouchability during 1924-25
- Broke the salt laws at Vedaranyam during the Dandi March organized by Gandhi ji.
- Instrumental in getting the INC to participate in the 1937 general elections.
- He opposed the Quit India Movement and instead advocated dialogue with the British.
- Instrumental in initiating negotiations between Gandhi and Jinnah.

7.2 SHORT ARTICLES

Intach

Context

- Recently the Supreme Court has ordered the Archaeological Survey of India (ASI) and UNESCO's Indian National Trust for Art and Cultural Heritage (INTACH) in a plea for the restoration of two heritage buildings in Mysore city.

About INTACH:

Existence

- A non-profit charitable organization registered under the Societies Registration Act of 1860

Constitution

- Set up in 1984 and consultative status with UNESCO in 2007

Aim

- Creating a membership organization to stimulate and spearhead heritage awareness and conservation in India.

Chapter

- Over 228 chapters across India and in Belgium and the United Kingdom (UK).

Works Undertaken

- Restoration of monuments and their management
- Advocacy for heritage property conservation

- Public awareness through heritage walks and buses
- Establishment of Heritage clubs in schools
- Awareness workshops for teachers
- Heritage walks to various unprotected sites

About the Archaeological Survey of India (ASI):

Establishment

- In 1861 by Alexander Cunningham

Statutory status

- Under the Ancient Monuments and Archaeological Sites and Remains Act, 1958(AMASR Act).

Responsibility

- Archaeological research and conservation and preservation of cultural monuments.

Ministry

- Ministry of Culture

7.3 SNIPPETS

Historical Sites and Monuments in News

Topics	Details
Al-Natah	<ul style="list-style-type: none"> • A 4000-year-old ancient town was recently discovered in Saudi Arabia's Oasis. • Origin: around 2400 BC (early Bronze age) • 3 zones: residential, decision-making, necropolis • Dwellings with proper spacing and connected with small streets. • Capacity to hold up to 500 residents. • Reflects the transition from a nomadic to an urban lifestyle with a slow urbanism.
Ramappa/ Rudreshwara Temple and Somasila	<ul style="list-style-type: none"> • The Centre approved a loan under the Special Assistance to States/Union Territories for Capital Investment (SASCI) scheme • <u>Ramappa temple:</u> <ul style="list-style-type: none"> ○ Origin: 1232 AD at Telangana ○ Founder: Kakati Ganapathi Deva of Kakatiya dynasty ○ Presiding deity: Lord Shiva ○ UNESCO World Heritage site as 'Kakatiya Rudreshwara (Ramappa) Temple, Telangana' 2021 ○ Only temple in India to be named after its architect Ramappa. ○ Stands on a high star-shaped platform with a foundation made with the Sandbox technique and a roof made of Sawdust brick. • <u>Somasila:</u> <ul style="list-style-type: none"> ○ Small village in Telangana known for the Sri Lalitha Someswara Swamy Temple, of the 7th century and dedicated to Lord Shiva. ○ Famous for ecotourism.
Adhai Din ka Jhonpra	<ul style="list-style-type: none"> • A survey order is given by a court for Adhai Din Ka Jhonpra based on a petition as there is evidence of a Sanskrit college and temple standing at the Jhonpra. • A 12th-century mosque, commissioned by Qutubuddin Aibak after the Muhammad of Ghor defeated Prithviraj Chauhan in the second Battle of Tarrain. • Oldest surviving monument in Ajmer and the second oldest completed

	<p>mosque in North India after the Quwwat ul Islam mosque in Delhi.</p> <ul style="list-style-type: none"> the Muhammad of Ghor, in Ajmer (capital of Prithviraj Chauhan), destroyed the pillars and foundations of the idol temples and dismantled Visaldeva's college (the Sanskrit college), a portion of which he turned into Adhai Din ka Jhonpra.
<p>Abathsahayeshwarar Temple</p>	<ul style="list-style-type: none"> The 1,300-year-old Abathsahayeshwarar Temple in Thanjavur district has recently been chosen by UNESCO to receive the Award of Distinction - 2023, the UNESCO Asia - Pacific Awards for cultural heritage conservation for having been conserved keeping its heritage intact. Built by: the Cholas (Vikrama Chola and Kulothunga Chola) The present masonry structure was built in Nayak in the 16th century. Presiding deity: Lord Shiva (worshipped as Apathsahyesvarar) The temple includes shrines like Soundaryanayaki Ambal, Ashtabhuj Durga Parameshwari, Aadhi Sarabeswarar, Pillayar, Murugan, Chandikeshwara, two Bhairavas, two Suryas and two Nagars Architecture: a five tier gateway tower known as gopurams, surrounded by two prakarams (closed precincts of a temple).
<p>Pandupol Hanuman Temple</p>	<ul style="list-style-type: none"> The Supreme Court highlighted the importance of considering the sentiments of devotees visiting the Pandupol Hanuman temple in Sariska Tiger Reserve while also addressing wildlife conservation concerns Location: Sariska, Alwar, Rajasthan (at the foothills of the Aravalli) Historical context: Mahabharata (Bhima had an encounter with Lord Hanuman here and established the reclining statue of Hanuman) The name 'Pandupol' is derived from the word 'Pandavas'.
<p>Mehrauli Archeological Park</p>	<ul style="list-style-type: none"> Recently the Archeological Survey of India (ASI) informed the Supreme Court that it would soon submit a survey report on religious structures inside the Mehrauli Archeological Park. Location: Delhi, beside the Qutub complex Only area in Delhi that had 1,000 years of continuous occupation by the rule of the Khalji dynasty, Tughlaq dynasty, Lodhi dynasty, Mughal empire, and British Raj. The oldest extant fort in Delhi as it includes the ruins of Lal Kot. It includes over 100 historically significant monuments.
<p>Durgadi Fort</p>	<ul style="list-style-type: none"> Recently Maharashtra's Kalyan civil court has dismissed the claim of Muslim petitioners over the land of the Durgadi Fort which includes an old Durga temple Location: Kalyan, near Ulhas river in Mumbai, Maharashtra The construction started during Shahjahan and finally completed during Aurangzeb in 1694 AD. Built under the Adil Shahi Sultanate (Bijapur) in the 16th-century. Shivaji captured and rebuilt it close to the Kalyan creek to use it as a dock to built boats and ships and began the work of the first Navy of Hindavi Swarajya Apart from the durga temple, the fort also include an Idgah (prayer hall), mosque, and a deep stone well.

Guruvayur Temple	<ul style="list-style-type: none"> • Recently the Supreme Court issued notice against the authority of the Guruvayur temple for skipping the Udayasthamana pooja on Ekadashi citing the issue of crowd management. • Dedicated to Guruvayurappan (four-armed form of Lord Vishnu). • Location: Guruvayur town, Kerala. • Origin: According to the debates, either 17th-century or 5000 years back. • Often referred to as Bhuloka Vikuntha and one of the 108 Abhimana Kshethram of Vaishnavite tradition. • Also known as Dwarka of South. • Features: <ul style="list-style-type: none"> ○ Rudrateertham Pond in the north. ○ Home to the largest population of captive male Asian Elephants in the world. ○ Kerala style of architecture. ○ 70-foot-tall flagstaff, called Dwajasthamba, fully covered with gold. ○ Main festivals: 10-day festival in the Kumbham month, Krishna Janmashtami, Ekadashi, and Vishu
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Personalities in News

Topics	Details
Toder Mal	<ul style="list-style-type: none"> • The Punjab government is about to preserve and restore Jahaz Haveli which was once the residence of Diwan Toder Mal. • Career roles: <ul style="list-style-type: none"> ○ Revenue official (Diwan) of Akbar and Shahjahan. ○ Vakil-us-Sultanat (Counsellor of the Empire) and Joint Wazir of the Mughals. ○ One of the Navaratnas (a group of nine extraordinary people) in Akbar's court. • Contributions: <ul style="list-style-type: none"> ○ Under Akbar, <ul style="list-style-type: none"> ✓ In charge of Agra ✓ Governor of Gujarat ✓ Managing Akbar's Mint in Bengal ✓ Overhauled the revenue system of Akbar's Mughal empire ○ He built a fortress palace in Uttar Pradesh. ○ He translated the Bhagavata Purana into Persian. ○ He was the first Hindu to be sent to lead the Mughal Arm.
Subramania Bharati	<ul style="list-style-type: none"> • Recently it was announced that a complete annotated version of the works of C. Subramania Bharati will be released by the Prime Minister. • Born: in 1882 in Tamil Nadu • An Indian writer, poet, journalist, teacher, Indian independence activist, social reformer, and polyglot. • Titles: Bharati and Mahakavi Bharati for his poetry • Fought against: child marriage, caste system, and colonial rule

- **Advocated for:** emancipation of women, social reform, and religious reform.
- **Major Works:** Panjali Sabatham, Kannan Paatu, Kuyil Paatu, Paapa Paatu, Chinnanchriu Kiliye, etc
- **Translated in Tamil:** Patanjali's Yoga Sutra and Bhagavad Gita.
- **Writing themes:** politics, society, and spirituality
- **First poet whose literature was nationalized in 1949**

7.4 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
Al-Natah	25 th December, 2024
Nazca Geoglyphs in Peru	5 th December, 2024
Gussadi Dance	6 th December, 2024
Akal Takht and SAD	25 th December, 2024
Gharchola	9 th December, 2024



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8. GEOGRAPHY AND DISASTER MANAGEMENT

8.1 ALL IS NOT WELL WITH THE SOIL

Context

- December 5, 2024, marked the 10th World Soil Day with the theme "*Caring for Soils – Measure, Monitor, and Manage*", emphasizing the critical need to protect nutrient-deficient topsoil, vital for 95% of global food production.

Introduction

- Soil ecosystems are vital for human life, and issues like soil erosion, nutrient depletion, and organic matter loss hinder crop yields and contribute to poverty. Recognizing the importance of soil in food security and climate change mitigation, the UN declared 2015 the Year of Soils. The International Union of Soil Science (IUSS) designated 2015-2024 as the International Decade of Soils.

The State of Indian Soils

- Soil Nutrient Deficiency:** Less than 5% of soil is nitrogen-sufficient; phosphate, potash, and organic carbon are also deficient, with severe micronutrient deficiencies in sulfur, iron, zinc, and boron.
- Fertiliser Industry Role:** Provides essential nutrients (N, P, K) and micronutrients to farmers, ensuring timely distribution for higher agricultural productivity.
- Agri Export and Fertiliser Significance:** India is a net agri-exporter, notably the largest rice exporter, with fertilisers playing a key role in maintaining food security and high productivity for domestic and export markets.

Challenges in the Indian Fertiliser Sector

- Burden of Subsidy:** High subsidy costs amounting to about **INR 70,000 crores** or **approx. USD 9.5 billion** annually burdens the government. Inefficient distribution and

leakage in the subsidy system. E.g., Urea, which receives the lion's share of the subsidy (about two-thirds), is priced at approximately \$70 per tonne, the lowest globally.

- Dependence on Imports:** India largely draws upon imports- about 20-30% of demand for meeting its fertilizer needs. Volatility in global prices and supply disruptions affect its availability in the country.
- Raw Material Security:** Domestic scarcity of key raw materials such as **natural gas, ammonia, and phosphoric acid**. Price sensitivity through imported raw material usage. For example, Punjab applies 61% more nitrogen than the recommended dose but under uses potash by 89% and phosphate by 8%.
- Environmental:** Emissions of greenhouse gases, water, and soil pollution through the use and production of fertilizers. **Strict regulations and an increasing consciousness** of society make the industry adopt environmentally friendly behaviors.
- Infrastructure Bottlenecks:** Inefficient storage facilities, transportation, and distribution networks. High cost of logistics and theft of fertilizer during transportation.

Transformational opportunities for the fertilizer sector in India are

- Digital Agriculture:** Precision farming and digital tools that enhance optimization of fertilizer application. Data analytics for soil health monitoring and delivering personal recommendations.
- Sustainable Production:** Eco-friendly processes and technologies that are on board to produce fertilizers. Renewable sources of energy utilized and ensuring that the emission of greenhouse gases is minimized.

- **Circular Economy:** Recycled waste material used in making fertilizers. Closed-loop system be created in a manner that provides nutrient recovery.
- **Management of Soil Health:** Balanced Nutrient inputs through integrated soil fertility management. Promotion of conservation agriculture and regenerative agriculture.

On-going Government Policies for Sustainable Soil and Nutrient Management

- Since April 2010, India's Nutrient-Based Subsidy (NBS) policy supports P and K fertilizers, promoting sustainable agriculture through initiatives like NMSA, NAPCC, and Soil Health Cards. Organic farming is encouraged via programs such as RKVY, MIDH, NMOOP, and NPOP.

Recommendations (New Policy Initiatives/Directions needed for Farmer's Welfare Implementable)

- Strengthen the implementation of technologies developed by ICAR and agricultural universities to combat water and wind erosion.
- Frame a national land use policy to prevent the diversion of productive agricultural land for non-agricultural purposes.
- The Soil Health Mission, with 120 million Soil Health Cards distributed, is a crucial step toward improving soil health across the country.

Conclusion

- In view of the 3 related SDGs (2, 13, 15), "4 per 1000" as well as India's Climate Pledge stated earlier, extra emphasis has to be laid on carbon sequestration in soils. Since Organic Carbon Content is an easily measurable parameter, monitoring and incentivizing the farmers through payment of ecosystem services, would go a long way in achieving these targets.

8.2 SILICA MINING

Context

- NGT directs CPCB to create guidelines for silica sand mining and washing plants to address health risks and non-compliance.

CPCB Overview

- The CPCB, established under the Water (Prevention and Control of Pollution) Act, 1974, aims to control water and air pollution in India. It provides technical support to the Ministry of Environment and Forests.

Silica Overview

- Silica, or silicon dioxide (SiO₂), is a naturally occurring compound found in quartz. It is used in construction, microelectronics, and the food and pharmaceutical industries. It

exists in three crystalline forms: quartz, tridymite, and cristobalite.

Impacts of Silica Sand Mining:

- Alters river courses, increases flood risks and harms aquatic life.
- Disrupts wildlife and coastal barriers, exposing areas to natural disasters.
- Reduces groundwater levels and affects local livelihoods and aesthetic value.

Sand Mining in India

- Sand mining in India, affecting rivers like Narmada, Chambal, and Betwa, is driven by infrastructure demands. Despite regulations under the MMDR Act, illegal mining, sand mafias, and poor monitoring remain

significant challenges. The sector employs over 35 million people, valued at \$126 billion annually.

Global Comparisons

- Countries like China and the US have varying regulations, with substitutes like crushed stone and recycled materials being explored for construction.

Conclusion

- Silica sand mining requires stricter enforcement and sustainable practices, with technological solutions like drones and satellite surveillance to prevent illegal activities and safeguard ecosystems.

8.3 WASTE FROM RENEWABLE SOURCES

Context

- The National Green Tribunal (NGT) has sought a response from the Centre on the improper disposal and recycling of photovoltaic (PV) solar panels.

About photovoltaic (PV) solar panels

- Solar photovoltaic (PV) technology converts sunlight directly into electricity through the photovoltaic effect. The term "photovoltaics" is derived from the conversion of light (photons) into electricity (voltage), a phenomenon known as the photovoltaic effect.
- **PV cells are made of semiconductor** materials such as silicon. When sunlight hits the cell, electrons are released from the atoms and generate electricity.
- **Grid-connected systems** feed excess electricity back into the grid.
- In many regions, photovoltaic systems are being deployed on a large scale to help power the electricity grid.
- **Methods:** PV systems come with small rooftop solar installations, solar pumps, off-grid lighting systems, and large solar power plants.
- **Cost-Effective:** The cost of PV systems has dropped dramatically, making solar energy cost-competitive.
 - With weatherproof panels and no moving parts, PV systems require minimal maintenance and have a long lifespan.

- **Disadvantage:** Solar PV production depends on sunny weather and output varies throughout the day.

Challenges particular to India

- India faces challenges in the **collection, storage, recycling and reuse of PV waste.**
- Generally, only about 20% of the waste is used and the rest is handled informally, leading to environmental pollution.

Gaps in photovoltaic waste management

- **Generalized as e-waste:** Pooling PV waste with other e-waste could lead to confusion and specific provisions for the treatment of PV waste are needed within the e-waste directives.
- **Risks are ignored:** PV waste is classified as hazardous waste in India and there is a need for India-wide sensitization and awareness programs on PV waste management.

Current challenges in the field of recycling

- Recycling PV panels faces challenges. Scrap dealers typically only accept certain components, such as aluminum, copper, and glass.
- **The remaining materials, including polymers and silicon, are often non-recyclable.**
- This restriction creates a large volume of waste that ends up in landfills, worsening the impact on the environment.

Legal framework and compliance issues

- The NGT has called for compliance with the **E-Waste (Management) Rules, 2022**.
- These rules are designed to manage e-waste, including solar panels.
- **The tribunal sought responses** from the Union of India and other stakeholders to address gaps in enforcement and regulation.
- **The lack of mechanisms** in place for safe disposal means there is a need for stricter compliance and better infrastructure.

The need for organized disposal systems

- There is an urgent need for a structured system for the disposal and recycling of photovoltaic solar panels. An **organized approach** would ensure the safe handling of hazardous materials.
- It would also encourage recycling practices that minimize waste.

- The development of such systems will require collaboration between government authorities, industry stakeholders, and local communities.

Future directions

- India needs to pay more **attention to domestic R&D efforts** as dependence on a single type of module will unevenly deplete certain natural resources.
- It is important to increase the capacity to recycle and recover critical materials.
- **This can be achieved by -**
 - The formulation of special provisions for the processing of photovoltaic waste,
 - All India sensitization campaigns and awareness programs,
 - Supporting domestic research and development efforts.
 - Ensuring appropriate infrastructure and adequate funding.

8.4 WORLD SOLAR REPORT 2024

Context

- World Solar Report 2024 was recently released by the International Solar Alliance (ISA).

About World Solar Report 2024:

- It was released by President of the ISA Assembly and India's Minister for New and Renewable Energy. The first edition was published in 2022.
- **Purpose:** The latest edition emphasizes the vital role of solar energy in advancing sustainable energy solutions worldwide, offering stakeholders valuable insights into the industry's rapid evolution.

World Solar Market Report Highlights Unprecedented Growth and Future Projections

Solar Capacity Growth

- In just two decades, global solar capacity has exploded from 1.22 GW in 2000 to a staggering 1,418.97 GW in 2023 - a staggering 40% annual growth.
- In 2023 alone, 345.83 GW of solar power was added, representing three-quarters of all new renewable capacity worldwide. Solar generation has similarly grown, skyrocketing from 1.03 TWh in 2000 to 1,628.27 TWh in 2023.

Solar generation to exceed demand with more than 1,100 GW by 2024

- By the end of 2024, capacity for global solar generation is projected to exceed 1,100 GW, more than double the projected demand for PV panels.

Solar jobs boom

- The clean energy industry now powers 16.2 million jobs, with solar leading the way at 7.1

million – up 44% from 4.9 million in 2022. And a remarkable 86 % of these jobs are concentrated in just ten countries.

Future predictions

- Global solar capacity is set to skyrocket to 5,457 to 7,203 GW by 2030, driven by Paris Agreement commitments.

Emerging solar technology

Quantum Dot Solar Cells

- These cells achieved a record efficiency of 18.1%, showing great promise in enhancing solar energy capture and enabling atmospheric water harvesting.

Self-repairing solar panels

- Researchers are developing solar panels that can repair themselves, extending their lifespan and reducing maintenance.

Solar-powered phytomining

- This innovative technique uses solar energy to extract valuable metals from the soil using plants, a greener alternative to traditional mining.

Solar pavers and building-integrated photovoltaics (BIPV)

- New solar technologies, such as pavers that generate electricity and transparent solar panels integrated into building designs, allow solar energy to be incorporated into infrastructure without compromising aesthetics or functionality.

Current Status of India's Solar Sector

Global Energy Rank	3rd-largest energy consumer globally
Solar Power Rank	5th in the world (REN21 Renewables 2024 Global Status Report)
COP26 Commitment	500 GW of non-fossil fuel-based energy by 2030 under the Panchamrit initiative
Renewable Energy Expansion	Represents the world's largest renewable energy expansion effort
Solar Capacity Growth	Increased 30 times in the past nine years, reaching 89.4 GW by August 2024
Solar Potential	Estimated at 748 GWp (National Institute of Solar Energy - NISE)
FDI Policy	100% Foreign Direct Investment (FDI) allowed through the automatic route for renewable projects
Regulatory Framework	In compliance with the Electricity Act of 2003

8.5 SHANAN HYDEL PROJECT

Context

- Recently Haryana has added a new dimension to the ongoing legal dispute between Himachal Pradesh and Punjab over the British-era 110 MW Shanan Hydel Project.

About the Shanan hydel project

- The project was commissioned in 1932, it is **India's first megawatt-capacity hydroelectric project.**
- It is located in **Joginder Nagar in Mandi District, Himachal Pradesh.**
- It is built on the **Uhl River, a tributary of the Beas.**

- **Issue:** Leased to Punjab for 99 years in 1925, agreement expired March 2024; Himachal Pradesh is now seeking ownership, saying the land originally belonged to it.
- **Present Status:** Under the control of Punjab, Himachal is seeking support from the Centre to ensure transfer of the project.

What is the dispute between Punjab and Himachal Pradesh?

- **Historical background:** During the British era in 1925, Punjab was granted a lease for a 110 MW hydroelectric project located in Jogindernagar, Mandi district of Himachal Pradesh on the Uhl River, a tributary of the Beas River.
- **Lease Agreement:** The lease was formalized between Raja Joginder Bahadur, the then ruler of Mandi, and Colonel BC Batty, who represented the British government and served as the Chief Engineer of the Punjab.

Project Utilities:

- The hydroelectric project served the energy needs of undivided Punjab and Delhi before India gained independence.
- After partition, the supply to Lahore was stopped and the transmission line was terminated at Verka village in Amritsar.

Legal control under the Punjab Reorganization Act, 1966:

- During the **reorganization of states in 1966**, the hydroelectric project was transferred to Punjab as Himachal Pradesh was then designated as a Union Territory.
- **Punjab was officially allotted the project** through a central notification issued on 1 May 1967 by the Union Ministry of Irrigation and Power.
- The notice said that Punjab's legal control over the project was governed by the provisions contained in the **Punjab Reorganization Act, 1966**.

Claims of Punjab

Claim to Ownership and Ownership:

- Punjab took its case to the Supreme Court claiming that it was the rightful owner and in legal possession of the **Shanan Power House Project as per the 1967 Central Notification**.
- The State Government, through the **Punjab State Power Corporation Ltd (PSPCL)**, currently exercises control over all the assets associated with the project.

Required Legal Actions

- **Under Article 131**, the Punjab government sought a "permanent ban" from the Supreme Court.
- The order is to prevent the Himachal Pradesh government from interfering with the "lawful peaceful possession and smooth functioning" of the Project.

Interim measures ordered by the Centre

- A day before the 99-year lease expiration, the Central Government intervened to maintain the project's status. The Ministry of Power issued the directive under Sections 67 and 96 of the Punjab Reorganization Act, 1966, and Section 21 of the General Clauses Act, 1887. This ensured the project's continuous operation.

Future Implications

- **Interim Measures:** The Centre's order is an interim measure to prevent disruption of the functioning of Shanan Power House until the dispute is resolved.
- **Legal Framework:** Both parties are expected to proceed within the legal framework in settling a dispute, ensuring due process and fairness.
- **Regional Cooperation:** A cooperative approach between Punjab and Himachal Pradesh, supported by federal authorities, could lead to a win-win solution and promote inter-state harmony.

8.6 KEN BETWA RLP

Context

- The Ken Betwa Link Project envisages transferring water from the Ken River to the Betwa river, both tributaries of the Yamuna.

What is the Ken-Betwa Link Project (KBLP)?

- The Ken-Betwa Link Project (KBLP) diverts water from the Ken River to the Betwa River, spanning 221 km, including a 2 km tunnel. It aims to irrigate 10.62 lakh hectares, provide drinking water to 62 lakh people, and generate 130 MW of power. KBLP is the first project under the National River Linking Plan, initiated in 1980, with 16 peninsular and 14 Himalayan links proposed.

The Ken-Betwa Link project has two phases.

- **Phase-I** will include the construction of the Daudhan Dam Complex and its associated units like Low-Level Tunnel, High-Level Tunnel, Ken-Betwa Link Canal, and Power Houses.
- **Phase II** will include three components – Lower Orr Dam, Bina Complex Project, and Kotha Barrage.

When was the Ken-Betwa project agreement signed?

- On March 22, 2021, the Ministry of Jal Shakti and the governments of Madhya Pradesh and Uttar Pradesh signed an agreement to implement the Ken-Betwa Link project.

How was the project conceived?

- The Ken-Betwa Link Project (KBLP) gained momentum in 2005 with a tripartite MOU for

a Detailed Project Report (DPR). Declared a national project in 2008, it became part of the Prime Minister's development package for Bundelkhand. In 2018, a comprehensive DPR was finalized and shared with Uttar Pradesh, Madhya Pradesh, and the Central Water Commission.

Which regions will benefit?

- **Irrigation facilities:** The NPP aims to use 35 million hectares of irrigation.
- **Hydro Power Generation:** It can potentially help generate ~34000 MW of hydropower.
- **Water Security:** Increasing availability of water for drinking and industrial purposes.
- **Inland waterways:** Used as waterways for navigation.
- **Others:** Flood and drought management, development of agricultural sectors, job creation during and after the construction phase, tourism development, etc.

What are the likely environmental and social impacts of the project?

- **Environmental impact:** This may lead to disruption of complex natural cycles which may have far-reaching adverse impacts on monsoon and biodiversity.
- **Social costs:** e.g. the Polavaram Link project, part of the Mahanadi-Godavari-Krishna-Pennar-Cauvery-Vaigai River link, has reached around 1 million families, 80% of whom are tribal.
- **Others:** state disputes over water, international disputes especially with Himalayan rivers, etc.

8.7 SHORT ARTICLES

Siliguri corridor

Context

- Union Home Minister Amith highlighted the significance of the Siliguri corridor as a crucial link to Northeast India and the presence of Sashastra Seema Bal (SSB) in the area comes as an assurance to the entire country.

About Siliguri Corridor

- The Siliguri Corridor or Chicken's Neck is a narrow stretch of land located in West Bengal that connects the northeastern states of India with the rest of India. At its narrowest point, the corridor is only 17 km wide
- It is bordered by **Nepal, Bangladesh and the Kingdom of Bhutan.**
- The corridor stretches from the Darjeeling, Jalpaiguri and Terai regions of West Bengal towards the northeast.
- The Siliguri Corridor is a strategically important and highly sensitive area as it remains the only bridge between the eight northeastern states of India and the rest of the country.

Landfall of a cyclone

Context

- Cyclone Fengal made landfall over Puducherry. As a precaution, the Tamil Nadu government moved around 471 people to six relief centres in Tiruvallur and Nagapattinam districts.

About Cyclone Fengal:

- Cyclone Fengal, named by Saudi Arabia, is part of a naming system for North Indian Ocean cyclones, coordinated by 13 WMO and UNESCAP member countries. After Fengal, the next names are Shakhti (Sri Lanka) and Montha (Thailand).
- A cyclone's **landfall** occurs when its center, or eye, moves over land. It's different from a "direct hit," where the eyewall, the area of strongest winds, reaches land while the

center may remain offshore. The damage from landfall depends on the cyclone's intensity, with severe storms causing extensive damage to houses, power lines, and transport, along with flooding and flying debris.

- Landfalls typically last a few hours, with cyclones losing strength as they move over land due to reduced moisture and increased friction. This marks the beginning of the storm's decline.

Santa Ana-driven wildfires

Context

- Santa Ana winds drive wildfires in California, a natural phenomenon, but the wildfire season has recently extended. Fire crews are currently battling a blaze in Malibu, a wealthy coastal town.

About Santa Ana Winds

- **Santa Ana winds are dry, warm winds blowing from the Great Basin deserts** toward Southern California, particularly from September to May, with October being the peak.
- These winds occur when high pressure in the Great Basin and low pressure along California's coast create a pressure difference, driving winds over mountains.
- **As the winds compress and heat, humidity drops, creating dry, fire-prone conditions,** often fueling wildfires like those in Malibu.

Phlegraean Fields

Context

- The Phlegraean Fields, now considered one massive supervolcano, are beginning to stir, making the scientific community uneasy.
- **Campi Flegrei, located near Naples, Italy, is Europe's largest active caldera and a super volcano.**

- Formed 39,000 years ago by a massive eruption, it spans one-third under the Tyrrhenian Sea.
- Since 1950, it has been in a state of unrest due to bradyseism, with potential for global impact. It is also a significant emitter of volcanic CO₂.

Angami tribe

Context

- As part of Nagaland's Hornbill Festival, the Angami Naga tribe showcased their unity by pulling a massive 15-tonne stone for four kilometers.

About Angami Naga tribe:

- **Cultural Identity:** The Angami-Naga tribe, primarily Christian (98.22%), speaks Tenyidie and is divided into four groups based on geography: Khonoma, Kohima, Viswema, and Chakroma. They are known for terrace wet cultivation and refined basket-making, especially the signature khophi basket.
- **Economy and Practices:** They practice shifting (Jhum) cultivation, with priests wearing the distinct "Phichu-Pfe" shawl during religious ceremonies.
- **Festivals and Cuisine:** The tribe celebrates the ten-day Sekrenyi festival and enjoys dishes like Galho, made from rice, vegetables, and meats (pork or beef).
- **Social Structure:** The Angami-Naga society is patriarchal and patrilineal, with no distinct script and belonging to the Mongoloid race.

Lonar lake

Context

- The Maharashtra government plans to submit a proposal to the Archaeological Survey of India (ASI) to include the famous Lonar Lake in Buldhana district in the Unesco World Heritage Sites list.

About Lonar Lake:

- It is a lake and lagoon in the **Buldhana district of Maharashtra state**. It was created due to a **meteorite**. It is the **only major** hoveback in

the **basalt rock**. Its water is **alkaline**. It is in an impact crater created by a meteorite impact during the Pleistocene Epoch.

- **The presence of plagioclase** that has been either converted into maskelynite or contains planar deformation features has confirmed the impact origin of this crater.
- **Historical context:** The lake was first mentioned in ancient scriptures such as the Skanda Purana and the Padma Purana.
- Lonar Lake has **been declared a Wildlife Sanctuary for the conservation and conservation of Lonar Lake**. There are temples from around 1250 years ago.

Facts: Reports by Agharkar Research Institute, National Environmental Engineering Research Institute and Geological Survey of India suggested that lowered water levels and high salinity caused growth of Halobacterium and increased Carotenoid levels, leading to color change.

Melye-amiley

Context

- A study by Indian researchers has found that the traditional fermented bamboo shoot from Tripura has anti-obesity properties.

About 'Melye-amiley'

- Melye-amiley, a traditional fermented bamboo shoot from Tripura, offers anti-obesity effects by reducing lipid accumulation and boosting fatty acid metabolism.
- **Studies show it enhances fat burning by increasing gene expression** for lipolysis and fat browning. The fermentation process, which improves nutritional value and flavor, supports mitochondrial biogenesis and fat oxidation.
- These **findings suggest Melye-amiley** as a natural, cost-effective alternative for weight management and metabolic health.

SARAT

Context

- INCOIS, under the Ministry of Earth Sciences, has developed an updated version of its Search and Rescue Aid Tool (SARAT) to enhance accuracy and support Indian SAR agencies like the Coast Guard in sea operations.

About Search and Rescue Aid Tool (SARAT)

- **Launch and Purpose:** SARAT, developed by INCOIS in 2016 under Make in India, aids sea-based search and rescue by locating distressed vessels or persons.
- **Key Features:** Uses advanced ensemble modeling, relies on ROMS data, offers 60 object types, and provides results via interactive maps, texts, and emails in localized languages.
- **Version 2 Enhancements:** Improved search accuracy with the default position set to the last known location, better visualizations, color-coded areas, and markers for clearer identification.

Barley

Context

- Recently, scientists suggested that barley should be grown in Punjab in a bid to diversify wheat-paddy monoculture in the state. Barley **requires much less water to grow compared to paddy, and is healthier than wheat.**

Details:

- In recent years, the area under barley cultivation has dramatically shrunk across India, including in Punjab. In **1960-61, barley cultivation area stood at 3.20 million hectares in India**, and 66,000 hectares in Punjab. However, it came down to **0.54 million hectares and 5,000 hectares** in India and Punjab respectively.

About Barley

- Barley is a major cereal grain widely grown in temperate regions around the world.

- Among the oldest domesticated cereals, barley has been cultivated for almost 10,000 years, mainly throughout Eurasia.
- It serves many purposes, including use as animal feed, a source of fermentable material for beer and some distilled beverages, and as an ingredient in a variety of health foods.
- In addition, barley is a **key ingredient in the production of beer and whiskey.**

Conditions for growing barley

- **Does not tolerate high heat** or humidity. It grows in areas with rainfall between 75 cm and 100 cm.
- It is grown as a **rabi crop in the Great Plains** and the valleys of the western Himalayas.
- It can thrive at **altitudes up to 1300 meters** as seen in Uttarakhand.

Hydrothermal vents

Context

- The National Centre for Polar and Ocean Research has performed multiple geophysical surveys along the Central and Southern Ridge of the Indian Ocean since 2012 on the lookout for hydrothermal vents.

About Hydrothermal vents

- Hydrothermal vents are underwater springs that form in tectonically active areas where seawater interacts with magma beneath the ocean floor.

Location

- Ridges, e.g. Central and southern Indian Ocean ridge, convergent plate boundaries, volcanic regions, oceanic trenches

Formation:

- **Cold water inflow:** Seawater at a temperature of about 2°C seeps into cracks in the oceanic crust caused by tectonic activity.
- **Heating by magma:** Water heats up to extreme temperatures (up to 370°C) when it comes into contact with magma.
- **Chimney formation:** As hot water meets cold seawater, minerals solidify and form chimney-like structures around the vents.

Key Features:

- It includes chimneys and black smokehouses emitting super-hot mineral-rich plumes.
- It hosts rich deposits of **copper, zinc, gold, silver, platinum, iron, cobalt, and nickel.**
- It supports chemosynthetic organisms thriving in a mineral-rich environment.
- This discovery highlights the potential for resource exploration and study of extreme marine ecosystems.

8.8 SNIPPETS

Topics	Details
WOH G64	A red supergiant star located 160,000 light years away in the Large Magellanic Cloud. It is 2,000 times the size of the Sun and surrounded by gas and dust. First detailed image captured using the Very Large Telescope Interferometer (VLTI).
Koraga Community	A Particularly Vulnerable Tribal Group (PVTG) in Kerala. Under Kerala's Operation Smile project, the community will receive land titles to support housing and agricultural activities.
Niger River	Africa's third-longest river, flowing through Guinea, Mali, Niger, and Nigeria. It is vital for agriculture and provides essential water resources to the region.
Nicobarese People	Indigenous people of the Nicobar Islands, part of India's Andaman and Nicobar Islands. They are Austroasiatic-speaking and are the dominant tribal group in the region.
Austria	A Central European country with mountainous terrain, forests, and the Danube River. It is ranked 8th globally in the 2024 Environmental Performance Index and is a federation of nine states.
Annamalai Tiger Reserve	Located in Tamil Nadu's Western Ghats, this biodiversity hotspot is home to diverse wildlife. It borders the Parambikulam Wildlife Sanctuary and features tribal communities like Kadars and Malasars.
Chakki River	Tributary of the Beas River, flowing through Himachal Pradesh and Punjab. Unregulated sand mining in Kangra district is causing environmental degradation.
GenCast	An AI-powered weather prediction model by Google DeepMind that provides accurate forecasts in 8 minutes using a diffusion model approach, enhancing disaster preparedness.
Birhor Tribe	A tribal community in Jharkhand, traditionally known for subsistence hunting and gathering. They have joined a movement against child marriage, indicating cultural reform.
Latakia Port	Syria's primary port on the Mediterranean, facilitating the export of goods such as bitumen, cotton, and cereals. It supports industries like vegetable oil processing.
Red Sea:	An inlet of the Indian Ocean with high salinity and rich biodiversity. It is crucial for regional trade, with ports like Jeddah and Port Sudan. Recent attacks on vessels threaten navigation.
Konda Reddis	A Particularly Vulnerable Tribal Group in Andhra Pradesh and Odisha, not listed as tribals in Odisha. They speak Telugu and live mainly in Khammam district.
Malwa Canal Project	An irrigation project in Punjab, India, aiming to irrigate 2 million hectares. It originates from the Harike structure on the Sutlej River and runs parallel to the Rajasthan Feeder Canal.

Golan Heights	Strategically significant hilly region, occupied by Israel in 1967 and annexed in 1981. It has a complex demographic situation with both Israeli settlers and Syrian Druze Arabs.
Kerch Strait	A vital waterway connecting the Black Sea to the Sea of Azov, separating Russian-occupied Crimea from the Taman Peninsula. It is a focal point of conflict between Russia and Ukraine.
Morocco	A North African nation with diverse landscapes, including the Sahara Desert and the Atlas Mountains. It is a key gateway for India's defense exports to Africa.
Khamniungan Tribe	A Naga tribe in Nagaland and Myanmar, known for their festivals like Tsokum and Khaotzao Sey Hok-ah Sumai. The region is rich in biodiversity and mineral resources.
Jodhaiya Bai	A Padma Shri awardee from the Baiga tribe, known for her contributions to preserving and promoting Baiga tribal art internationally.
Cyclone Chido	A powerful tropical cyclone that struck Mayotte in December 2024, with winds exceeding 200 km/h, causing significant devastation in the region.
Panama Canal	A man-made waterway connecting the Pacific and Atlantic Oceans. Its completion in 1914 revolutionized global maritime trade, with a system of locks managing elevation differences.
Denali Fault	A major geological fault in southern Alaska responsible for horizontal tectonic movements and the formation of the Wrangellia Complex, significant in North America's geological history.
Greenland	The world's largest non-continental island, strategically located between North America and Europe. It is rich in rare earth minerals and significant for global geopolitics due to melting ice and proximity to the Arctic.
Kilauea Volcano	One of the most active volcanoes in the world, located on Hawaii's Big Island. Its frequent eruptions shape the island's landscape and hold significant geological importance.
Lesotho	A landlocked country in Southern Africa, entirely situated above 1,000 meters. Known for its mountainous terrain, water resources, and diamond mines, it is bordered by South Africa.
Business 4 Land initiative	UNCCD's initiative, engages the private sector in sustainable land and water management, aiming to restore 1.5 billion hectares by 2030. It focuses on transforming business operations, mobilizing finance for land restoration, and fostering advocacy and collaboration.
Kamarajar Port	Kamarajar Port (formerly Ennore Port) in Tamil Nadu is India's first corporate port, specializing in coal, LNG, and automobiles. It operates under a public-private partnership, focusing on efficient cargo handling and eco-friendly practices.
Rooppur NPP	The Rooppur Nuclear Power Plant in Bangladesh, under construction in Pabna District, will be the country's first nuclear power facility, generating 2,400 MW using Russian VVER-1200 reactors. It is primarily funded by a Russian loan.
Denmark Strait Cataract	The Denmark Strait Cataract, the world's largest waterfall, lies beneath the Arctic Ocean, with a 3,500-meter drop. Formed during the Ice Age, it significantly impacts global ocean currents.
Khorlochhu Hydropower Project	A 600 MW hydroelectric project between Druk Green Power Corporation (60% stake) and Tata Power (40%), costing Nu 70 billion, aiming for completion in 5 years. It supports Bhutan's goal of 20 GW hydropower capacity by 2040.

8.9 ADDITIONAL TOPICS FOR READING FROM IAS GYAN WEBSITE

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
La Nina, El Nino, ENSO	12 th December 2024
The Global Status of Salt-Affected Soils	13 th December 2024
Toxic metal pollution	14 th December 2024
Assessment of Water Resources of India 2024	14 th December 2024
Why Arctic tundra is emitting more carbon than it absorbs	18 th December 2024
People displaced by disasters	21 ST December 2024
India's reliance on China for critical minerals	26 th December 2024
How the 2004 Tsunami Changed Early Warning Systems	27 th December 2024
China to build the World's largest hydropower dam in Tibet	28 th December 2024

9. GOVERNMENT SCHEMES

9.1 SHORT ARTICLES

Government could discontinue the Sovereign Gold Scheme

Context

- Due to the high cost of financing, the government is considering ending the sovereign gold bond scheme.

About Sovereign Gold Bond (SGB) Scheme

- The Scheme was **launched in 2015** as part of the Gold Monetisation Scheme.
- It **offers gold-backed debt securities** as an alternative to physical gold.
- Each bond unit represents one gram of gold.
- The **Reserve Bank of India (RBI) issues these bonds** on behalf of the Government of India.

What are the key features of the Scheme?

- SGBs offer a **fixed annual interest rate of 2.5%**, credited semiannually.
- Investors pay the issue price in cash and receive the redemption amount in Indian rupees, based on the average closing price of 999 purity gold over the last three business days.
- The bonds have a **tenure of eight years** but can be redeemed after five years.
- **SGBs can be traded on the secondary market**, providing flexibility for investors.
- They can be **used as collateral** for loans.
- Payments can be made in cash (up to Rs. 20,000), demand drafts, cheques, or electronic banking.
- **Interest on SGBs is taxable** under the Income-tax Act of 1961. However, individuals are **exempt from capital gains tax** when they redeem their SGBs.

Performance of Sovereign Gold Bonds

- The Series I SGBs (issued in 2016-17) matured in August 2024, providing a return of more than 120% on the original investment.
- Series II bonds redeemed in March 2024 returned 126.4% of their initial investment.

- These returns indicate SGBs' potential as a profitable long-term investment.

Future outlook for the Scheme

- The government believes that **funds raised through SGBs are more expensive than other methods**, such as dated securities and small savings funds.
- The reduction in gold customs duty from 15% to 6% in July 2024 resulted in lower gold prices and increased demand for physical gold, reducing the need for SGBs as an investment option.
- The rising costs of financing and the increased demand for physical gold after changes in gold duties have prompted the government to reevaluate the continuation of the SGB scheme.

Bima Sakhi Yojna

Context

- The Prime Minister launched the Bima Sakhi Yojana in Panipat (Haryana) in collaboration with the state-owned Life Insurance Corporation.

About Bima Sakhi Yojana

- It is an initiative aimed at **empowering women**.
- It is a **program by the state-owned Life Insurance Corporation (LIC)** that focuses on promoting financial literacy and insurance awareness among women.
- **Women aged between 18 and 70 years who have completed Class 10 are eligible** for the scheme. However, relatives of existing LIC agents and employees, as well as retired employees, are not eligible to apply.
- Under the scheme, **women will receive specialized training in insurance and financial literacy**. They will also receive a stipend during the first three years of their involvement. The stipend will be Rs. 7,000

per month in the first year, Rs. 6,000 per month in the second year, and Rs. 5,000 per month in the third year.

- The government plans to **appoint two lakh Bima Sakhis** over a period of three years.
- After completing the training, women can become LIC agents.

Yuva Sahakar Scheme

Context

- The Minister of Cooperation informed the Lok Sabha about the status of the Yuva Sahakar Scheme.

About Yuva Sahakar Scheme

- It is an **initiative launched by the National Cooperative Development Corporation (NCDC)** to support newly formed cooperative societies with innovative ideas.
- It aims to encourage young entrepreneurs by providing long-term loans for project activities.
- It is open to cooperatives that have been in operation for at least three months and have innovative concepts.

The key features of the Yuva Sahakar Scheme include:

- It is linked to a fund of Rs. 1000 crores under the Cooperative Start-up and Innovation Fund.
- It provides long-term loans of up to 5 years.
- **NCDC offers a 2% interest subsidy** on the applicable loan rate.
- The scheme provides additional incentives for cooperatives in the North-Eastern region and aspirational districts.
- It offers exclusive benefits for women and Scheduled Caste and Scheduled Tribe candidates.

About National Cooperative Development Corporation (NCDC)

- It is a **statutory corporation established under the National Cooperative Development Corporation Act (1962)** to promote cooperative development in various sectors.

- Its objectives include developing and promoting programs for the production, processing, marketing, storage, export, and import of agricultural produce, foodstuffs, industrial goods, livestock, and other commodities and services.
- The **headquarters of NCDC is located in New Delhi**, and it operates through multiple regional offices.
- It is a major cooperative financial institution that provides financial assistance and development support to cooperative bodies.

Pragati

Context

- A study conducted by Oxford University's Saïd Business School (SBS) praised the PRAGATI infrastructure monitoring system.

About PRAGATI platform

- PRAGATI (Proactive Governance and Timely Implementation) was **introduced in 2015 to adopt e-transparency and e-accountability**, promoting a culture of proactive governance and timely project implementation.
- It aims to address public grievances and monitor and review important government programs and projects at both the national and state levels.
- **It uses three technologies:** digital data management, video conferencing, and geospatial technology.

What is the working structure of PRAGATI?

- **PRAGATI has a three-tier structure:** the Prime Minister's Office (PMO), Union Government Secretaries, and State Chief Secretaries.
- The Prime Minister meets with Union Government Secretaries and Chief Secretaries via video conference once a month, usually on the fourth Wednesday of every month (PRAGATI Day).
- During this session, the Prime Minister discusses public grievances, current programs, and pending projects.

- Issues are selected from a database and submitted 7 days before the PRAGATI day for review.

What did the Oxford study highlight about the PRAGATI system?

- The study praised the PRAGATI system for speeding up 340 projects worth \$205 billion across India and highlighted its role in overcoming bureaucratic challenges and promoting a culture of accountability and efficiency.
- The initiative promotes a "Team India" mindset, in which diverse stakeholders work together efficiently to complete projects on time and improve the overall governance framework.
- The study also noted that India sees a ₹2.5 to ₹3.5 gain for every rupee spent on infrastructure, indicating the significance of well-executed projects in driving economic growth.

Svmitva Scheme

Context

- The Prime Minister distributed over 50 lakh property cards under the SVAMITVA Scheme.

About SVAMITVA Scheme

- The SVAMITVA Scheme (Survey of Villages and Mapping with Improved Technology in Village Areas) was launched on April 24, 2020.
- It aims to boost the economic progress of rural India by providing legal recognition of property rights through advanced surveying technology, particularly drones.

The main stakeholders involved are:

- The Ministry of Panchayati Raj (MoPR) is the nodal ministry.
- State Panchayati Raj Departments.
- State Revenue Departments.
- Survey of India.
- Local authorities, including Gram Panchayats.

What are the main objectives of the SVAMITVA Scheme?

- To empower rural citizens by legally recognizing their land rights.
- To enable rural residents to use their properties as financial assets, making them eligible for loans and other financial benefits.
- To create accurate land records that aid in better rural planning.
- To simplify property tax resolution for Gram Panchayats and state exchequers.
- To reduce property disputes and enhance legal clarity.
- To support better quality Gram Panchayat Development Plans (GPDP) with the help of GIS maps.

Ayush Oushadhi Guvatta Evam Uttpadan Samvardhan Yojana

Context

- The Union Minister of State for Ayush informed the Rajya Sabha on the Ayush Oushadhi Guvatta evam Uttpadan Samvardhan Yojana.

About Ayush Oushadhi Guvatta evam Uttpadan Samvardhan Yojana

- It is a Central Sector Scheme developed by the Ministry of Ayush under the framework of the Drugs and Cosmetics Act of 1940. The main objectives of the Yojana are:
- To strengthen manufacturing capabilities and exports of traditional medicines and health promotion products as part of Atmanirbhar Bharat.
- To improve infrastructure and technology in both the public and private sectors to standardize, manufacture, and test Ayush drugs and materials.
- To strengthen regulatory frameworks at the national and state levels to ensure effective quality control, safety monitoring, and surveillance of misleading Ayush drug advertisements.
- To encourage cooperation, collaborations, and convergent approaches to improve the standards and quality of Ayush drugs and materials.

Homi Bhabha Chair Scheme

Context

- The Department of Atomic Energy (DAE) administers the **DAE-Homi Bhabha Chair Scheme** to honor and leverage the expertise of distinguished scientists and engineers.
- This scheme provides recognition and opportunities to outstanding professionals including those retired or superannuated who have significantly contributed to the development of sensitive or critical technologies.

Features of the DAE-Homi Bhabha Chair Scheme

Objective

- Recognize and support outstanding scientists/engineers for continued research and development.

Eligibility

- Includes retired/superannuated scientists and engineers.

- Focus on individuals involved in sensitive or critical technologies.

Tenure

- 1 to 5 years determined at the discretion of the Selection Committee.

Honorarium

- ₹2,00,000/- per month.
- If honorarium + pension exceeds last drawn salary, honorarium is adjusted to match the last drawn salary.

Contingency Grant

- ₹76,000/- per annum for secretarial assistance, telephone bills, and stationery.

Equipment Allowance

- ₹1,25,000/- (inclusive of ₹10,000/- for books) for the entire tenure subject to utilization.

Transport Allowance

- Fixed monthly allowance if no official vehicle is provided.

9.2 SNIPPETS

Topics	Details
Global Engagement Scheme	<ul style="list-style-type: none"> • The Ministry of Culture has implemented the "Global Engagement Scheme" to promote India's cultural heritage on a global scale. • Its main objective is to promote closer friendship and cultural contacts between India and other countries by providing grants to Indian Foreign Friendship Cultural Societies in those countries to organise cultural programs and activities. • The Festival of India (Foi) is organised abroad as part of the Global Engagement Scheme to promote India's cultural heritage.
Smile Program	<ul style="list-style-type: none"> • The Indian government and the Asian Development Bank (ADB) signed a \$350 million policy-based loan as part of the SMILE program. • The Strengthening Multimodal and Integrated Logistics Ecosystem (SMILE) program aims to improve the logistics sector through strategic reforms. • It is a collaboration between the Department of Economic Affairs (DEA), Ministry of Finance and the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry.
C-Pace	<ul style="list-style-type: none"> • The Union Government announced that corporate exits are now taking place in 70-90 days through the Centre for Processing Accelerated Corporate Exit (C-PACE). • C-PACE is a centralized platform created by the Ministry of Corporate Affairs (MCA) to promote voluntary company winding-up processes in six months or less through process reengineering.

	<ul style="list-style-type: none"> It is based at the Indian Institute of Corporate Affairs in Gurgaon. Section 248 of the Companies Act allows for the removal of a company's name from the Registrars of Companies (ROC) if it has not conducted any business or operations in the previous two fiscal years and has not applied for dormant status under Section 455 during that time.
Charak	<ul style="list-style-type: none"> Northern Coalfields Limited (NCL) launched the 'CHARAK' initiative as a health-focused Corporate Social Responsibility (CSR) project on behalf of the Ministry of Coal. The main objective is to treat economically disadvantaged people with life-threatening illnesses in the Singrauli region of Madhya Pradesh for free. To be eligible, the family's annual total income from all sources must be less than Rs. 8 lakh. The scheme covers a wide range of life-threatening diseases, including cancer, tuberculosis, HIV, cardiovascular diseases, liver disorders, and neurological disorders.
Samarth Udyog Bharat 4.0 Initiative	<ul style="list-style-type: none"> The Union Minister of State for Heavy Industries and Steel discussed the SAMARTH Udyog Bharat 4.0 initiative's implementation status in the Rajya Sabha. The Ministry of Heavy Industries launched this initiative to increase competitiveness in the capital goods sector. Its main objective is to raise awareness among manufacturers by establishing experiential and demonstration centres for Industry 4.0 technologies. SAMARTH Centres do not provide financial assistance. Instead, they focus on providing training, awareness, and consulting services to industries and MSMEs interested in implementing Industry 4.0 technologies.
Viksit Panchayat Karmayogi	<ul style="list-style-type: none"> The Union Minister of State (Independent Charge) for Personnel, Public Grievances, and Pensions launched the 'Viksit Panchayat Karmayogi' initiative The initiative is designed to strengthen Panchayati Raj Institutions (PRIs). It focuses on increasing the capacity of elected representatives and officials by providing them with the tools and knowledge they need to ensure effective governance and participatory planning at the local level. The program is currently being tested in Odisha, Assam, Gujarat, and Andhra Pradesh. It is part of the larger 'Prashasan Gaon Ki Aur' campaign to decentralise governance and promote participatory decision-making at the grassroots level.
Amrit Gyaan Kosh	<ul style="list-style-type: none"> The Union Minister of Personnel, Public Grievances & Pensions launched the "Amrit Gyaan Kosh" Portal. The Portal is jointly developed by the Capacity Building Commission and Karmayogi Bharat. It is a platform to promote self-reliance in governance training and strengthen governance training. It is developed on the iGOT platform and serves as a comprehensive repository of best practices in governance and policy implementation. The portal aligns with 15 of the 17 Sustainable Development Goals (SDGs),

	<p>covering critical themes such as health, education, agriculture, and digital governance.</p>
<p>PM Evidya</p>	<ul style="list-style-type: none"> The Union Minister for Education launched the PMeVIDYA DTH 24x7 Channel No. 31 for Indian Sign Language (ISL). PM e-Vidya was launched as part of the Atmanirbhar Bharat Abhiyaan by the Ministry of Education in 2020 to bridge the digital divide and ensure inclusive, quality education for all learners across India. It offers a variety of e-courses and digital resources, including interactive videos, audiobooks, and digital events such as quizzes. Key components of PM e-Vidya: <ul style="list-style-type: none"> DIKSHA (Digital Infrastructure for School Education) platform provides high-quality e-content, including QR-coded textbooks for all grade levels. SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) platform offering higher education courses with credit transfer and school courses (9th-12th grade) through NIOS and NCERT.
<p>Rutag 2.0</p>	<ul style="list-style-type: none"> The first annual review meeting of the Rural Technology Action Group (RuTAG) 2.0 projects was held at the Sher-e-Kashmir University of Agricultural Sciences and Technology (SKUAST) in Srinagar. RuTAG was launched by the Office of the Principal Scientific Adviser (PSA) in 2004 to provide higher levels of Science & Technology intervention and support for rural areas. RuTAG 2.0 was launched in 2023 to focus on the commercialization and wider distribution of developed technologies as products. It aims to promote transformative changes in rural areas by translating innovations into market-ready products, supporting sustainable development, and improving socioeconomic conditions.
<p>Anna Chakra</p>	<ul style="list-style-type: none"> The Union Minister of Consumer Affairs, Food, and Public Distribution launched 'Anna Chakra', the Public Distribution System (PDS) Supply chain optimisation tool, along with the SCAN portal. Anna Chakra is a Public Distribution System (PDS) supply chain optimization tool that improves the efficiency of the PDS logistics network across India. It was created in collaboration with the World Food Programme (WFP) and the Foundation for Innovation and Technology Transfer (FITT), IIT-Delhi. It has been integrated into the PM Gati Shakti platform, which now includes the geolocations of Fair Price Shops (FPS) and warehouses across states. The SCAN Portal is a platform that allows states to submit subsidy claims, which are then reviewed and approved by the Department of Food and Public Distribution (DFPD), leading to an expedited settlement process.
<p>PM Abhim</p>	<ul style="list-style-type: none"> Delhi High Court directs MoU between Union Health Ministry and Delhi Govt for implementing PM-Ayushman Bharat Health Infrastructure Mission. It is a Centrally Sponsored Scheme (CSS) to strengthen healthcare infrastructure across India with an outlay of Rs. 64,180 Crores for the period 2021-22 to 2025-26.