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PREPARATION

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Focus Article

Supreme Court's Judgment on EVMs

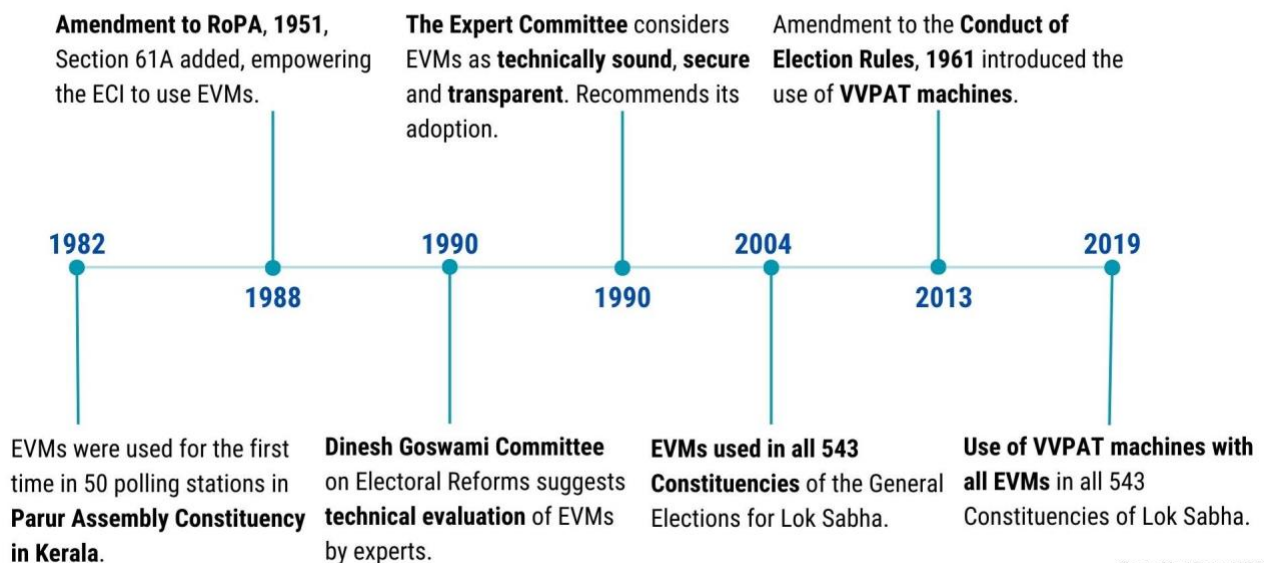
News: The Supreme Court has reposed faith in the integrity of the current electoral process based on the EVMs and has rejected the calls for return to the paper ballot system. The SC has also rejected the plea for 100% verification of the VVPAT slips with the EVM count.

What are the salient aspects of the Supreme Court Judgment?

The SC in the **Association of Democratic Reforms v. Election Commission of India (2024)** has ruled that:

- **Continuation of EVMs:** Voting will continue to take place using the Electronic Voting Machines (EVMs), with 100% of the EVMs attached to a Voter Verifiable Paper Audit Trail (VVPAT) unit.
 - In addition, the Supreme Court has retained the standard of verification of VVPAT slips for **5 EVMs per Assembly constituency or Assembly segment in a Parliamentary constituency**. The petitioners had asked for 100% verification of VVPAT slips (i.e., for each and every EVM).
- **Allegations of Manipulation of EVM Microcontrollers:** The Supreme Court observed that the micro-controllers, programmed separately by the manufacturers of EVMs, are neutral and they do not favour any political party or candidate. They only record the buttons pressed by the voters.
 - The program installed in the EVMs is securely hashed and burned into a **One Time Programmable micro-controller chip** during manufacturing, **eliminating any possibility of tampering**.
 - All three units of the EVM (the ballot unit, control unit, and VVPAT) have microcontrollers with firmware that **cannot be altered after delivery to the ECI by the manufacturer**.
- **Storage of Symbol Loading Units (SLUs):** The SC has directed the Election Commission of India (ECI) to seal and store the symbol loading units (SLUs) for 45 days after declaration of results.
- **Verification of EVMs:** The SC has allowed the candidates coming 2nd or 3rd to ask for a verification of the burnt memory semi controllers in 5% of EVMs per Assembly segment of each Parliamentary constituency.

Evolution of EVMs and VVPAT



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- **Feasibility of Automated Counting of VVPAT Slips:** The SC has asked the ECI to examine the feasibility of counting the VVPAT slips using a counting machine. VVPAT slips can have a barcode printed on them for enhancing the counting speed.

What is the significance of the SC Judgment?

- The SC's directives have put in place additional checks that would dispel doubts about the integrity of India's voting system and processes:
 - The directive on **mandatory storage of Symbol Uploading Units (SULs)** will ensure that votes have not been miscounted.
 - Rechecking of EVMs allows a window to **address the legitimate concerns of contesting candidates**.
- The Judgement has **affirmed the credibility of India's voting process**.

What are the advantages of using EVMs and VVPAT?

Advantages of EVMs

- **Cost Effective:** EVMs have eliminated the need for production and printing of ballot papers. There has been a substantial reduction in expenses in terms of transportation, storage, and recruiting the counting staff.
- **Booth Capturing:** Only 5 votes can be cast in 1 minute in an EVM. In contrast, miscreants can distribute ballot papers and can cast 100s of bogus votes per minute. Hence, the increased time requirement to cast false votes has eliminated the incentive for booth capturing.
- **Administrative Convenience:** EVMs provide administrative convenience for the polling officers on the day of the poll and has made the counting process faster and error-free.
- **Time Effectiveness:** It has reduced the time taken to conduct elections and declare the results in India.
- **Environment-friendly:** EVMs are environment friendly by reducing the usage of paper for ballot papers.

Advantages of VVPAT

- **Enables vote verification:** VVPAT provides instant feedback to a voter that the vote polled has been allocated to the intended candidate, thereby enabling a **vote verification mechanism**.
- **Direct Recording Election System (DRE):** VVPAT operates under a Direct Recording Election system (DRE) which detects fraud and existent malfunctions in the election system.
- **Transparency:** VVPAT enables authorities to count the votes manually in case of dispute in the electronically polled votes. This gives both the voters and political parties an assurance regarding integrity of the process.

What are the challenges associated with EVMs and VVPAT?

Challenges with EVMs

- **Susceptibility to Hacking:** Sceptics argue that EVMs being electronic devices will always remain vulnerable to manipulation and hacking. Hacking can be used to alter results and undermine the will of the electorate.
- **Limited Transparency:** The source code of EVMs is confidential and not available for public inspection. It is challenging for individuals and independent specialists to evaluate the security and dependability of EVMs due to a lack of transparency in their design and operation.
- **Inadequate Security Measures:** The voting process can be compromised by unauthorized access, physical manipulation, which can alter results. Opposition parties have raised concerns regarding handling of EVMs before the elections.

Challenges with the usage of VVPAT

- **Small sample Size:** At present, the sample size for checking EVM counts with VVPAT slips is 5 per Assembly Constituency/Segment. Critics argue that this is too small. However, the above number has been **scientifically determined** by statisticians from the Indian Statistical Institute (ISI) based on mathematically sound and statistically robust criteria.

- **Technical Glitches:** There are possibilities of malfunctioning of VVPAT machines due to extreme weather conditions. There are also other challenges like paper jamming, running out of ink, battery etc.
- **Voter Intimidation:** The counting of voting slips using VVPAT assembly wise can result in identification of booth-wise polling behavior by various political parties. This may result in profiling and intimidation.

What should be the way forward?

- **Addressing lacunae in VVPAT technology:** Measures like making VVPATs independent of battery, the usage of sustainable inks and reducing its sensitivity to heat and light, can make VVPATs more reliable.
- **Increasing the reliability of VVPAT:** Experts have suggested that the VVPAT protocol should be updated to offer an option for voters to cancel their vote if they observe any discrepancies.
- **Risk-Limiting Audit (RLA):** These audits can be carried out for cross-checking the electronic tally with VVPAT counts. This proactive approach will help in maintaining the integrity of the voting process.
- **Public Awareness and Education:** Public must be educated on EVM technology, security measures, and steps for a transparent electoral process to build confidence in electronic voting systems.

Rather than moving to paper ballot system of election, the focus should be on improving the efficiency, credibility and transparency of the EVM-VVPAT enabled electoral process.

What is the Symbol Loading Unit?

- It is a small device connected to a laptop or personal computer to load a **bitmap file** containing the details related to candidates' names, serial numbers, and (party) symbols.
- It is connected to the VVPAT to transfer **that file onto the paper audit machine** under the supervision of a District Election Officer. SLU loads symbols and information of candidates onto VVPAT and ballot units, ensuring accurate representation during the voting process.
- Symbol Loading Units (SLUs) were introduced alongside Voter-Verified Paper Audit Trails (VVPATs).

Process Involved in the Use of Symbol Loading Units (SLUs)

- SLUs are used when EVMs are being commissioned, after the **finalisation of the order (sequence) of contesting candidates**.
- Candidate-setting can take place between **2-5 days before the voting**.
- A limited number of SLUs are utilized to load symbols onto VVPATs for each Constituency during the multi-phase elections. It takes **~2 to 3 minutes for an SLU to complete this task**.
- SLUs are then given to the **District Election Officers for safekeeping** until the day after voting.
- The SLUs are then returned to the engineers. They use the SLUs to load symbols onto VVPATs for other seats in subsequent phases of the election.
- The SC has now mandated the **sealing and storage of SLUs along with Electronic Voting Machines (EVMs)** in a container within a strongroom for a **minimum of 45 days post the declaration of the result**.

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General Studies Paper I

1. Supreme Court's Judgment on Childcare Leave

News: The SC has held that denial of childcare leave to women is violation of the Constitution.

What is the SC verdict which expands the scope of Childcare leaves?

- The Government of Himachal Pradesh had denied childcare leave to an assistant professor. The professor had requested the leave to take care of her ailing child who was suffering from a rare genetic disorder.

- **Employer's Argument:** The State Government argued that it was the States's choice to not adopt the special Childcare Leave Policy as provided under the **Rule 43-C** of the **Central Civil Services (Leaves) Rules, 1972**.

- **Supreme Court's Verdict:** The SC directed the Government of Himachal Pradesh to review its policies on Child Care Leaves concerning working mothers, especially mothers of children with special needs. The Court has held that the State as a model employer cannot be oblivious to the special concerns of working women.

Childcare Leave (CCL) Policy

Under **Rule 43-C** of **Central Civil Services (Leave) Rules, 1972** Childcare Leave is allowed for a **maximum period of 730 days** during entire service for taking care of two eldest surviving children up to the age of 18 years. There is **no age limit in case of disabled child**.

It is additional to regular maternity leave provisions.

Men are eligible for CCL only if they are **single fathers**.

What is the significance of the Judgement?

- **Reaffirms the Importance of Article 15 as Enabling Provision:** The Judgment has highlighted that Article 15 is not merely a **restrictive provision** (restricts discrimination based on gender) but also an **enabling provision** (enables State to make special provisions for women).
- **Child Care Responsibilities of Working Women:** The Judgement addresses the need for childcare services to bolster women's participation in paid work.
- **Responsibility of State and Employer:** The SC judgement puts the onus and responsibility on the State and the employer to **enable women to join and retain their employment**.

What are the issues faced by working women with regards to child care?

- **Childcare Burden on Working Women:** Working women have to single-handedly manage the **triple burden** of **housework**, **child care work** and **paid work**. According to the **Time Use Survey of India (2019)**, Indian men spend 173 minutes compared to 433 minutes spent by women for unpaid domestic and care work.
- **Marriage and Motherhood Penalty:** Working women face 'marriage penalties' and 'motherhood penalties' due to their **forced withdrawal from the workforce** in order to provide motherhood and childcare services.
- **Lack of Implementation of Legal Provisions:** The new labour codes provide for the **paid maternity benefits** for childcare and mandate **crèches on worksites**. However, various reports by the Government and NGOs point that the provisions are not implemented properly.
- **High Degree of Informalization:** According to a 2018 study by the ILO, **more than 95% of India's working women are informal workers**. The absence of social security net, like paid leaves for child care, in the informal sector discourages women from participating in the labour force.
- **Challenges with National Crèches Scheme:** The scheme suffers from the challenges of **underfunding**, its **limited reach** and **usage**.

What are the advantages of providing childcare leaves?

- **Economic Growth:** According to the IMF, gender parity in workforce can improve India's GDP by 27%.

- A decrease in women's unpaid care is related to a **10-percentage point increase in women's labour force participation rate**.
- **Tackling Poverty:** It helps to tackle the phenomenon of **feminisation of poverty**, which is a result of highly informalized work performed by women.
- **Improvement in Social Indicators:** Encouraging more women to enter the formal workforce will improve indicators like Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR) etc.
- **Self-confidence and Dignity:** Financial independence enables women to play a greater role in decision-making like family planning. It improves their self-confidence and dignity.

What steps have been taken by the Government to provide child care facilities for Women?

| Initiative | Description |
|--|---|
| Maternity Benefit (Amendment) Act, 2017 | <ul style="list-style-type: none"> • The Act more than doubled the duration of paid maternity leave for women employees to 26 weeks. • It proposed an option to work from home after this period, on mutual agreement with the employer. • It made crèche facilities mandatory for establishments employing 50 or more women. |
| Anganwadi Centres under the ICDS | <ul style="list-style-type: none"> • They provide maternal and child nutritional security, a clean and safe environment, and early childhood education. • They facilitate the ability of women to re-enter work post-childbirth. |
| Mission Shakti Project | <ul style="list-style-type: none"> • Under this project, Ministry of Women and Child Development has introduced the 'Palna Scheme'. • It provides options to the State Governments to open standalone crèches or turn <i>Anganwadi</i> centres into crèches. |
| National Food Security Act (NFSA), 2013 | <ul style="list-style-type: none"> • Apart from providing affordable food, it entitles pregnant and lactating mothers to a cash transfer of at least INR 6,000. • This is done to break the compulsion for early return to work. |

What should be the way forward?

- **Child Care Subsidies:** Child-care subsidies should be provided to free up mothers' time to enter the labour force, which would have significant implications in increasing female employment.
- **Institutionalisation of Anganwadi Centres-cum Crèches:** There is a need to institutionalise *Anganwadi* centres-cum crèches with a committed budget.
- **Incorporation of Special Childcare Leaves:** The State Governments must also incorporate special Child care leaves as provided under **Rule 43-C of the Central Civil Services (Leave) Rules, 1972**.
- **Collective Responsibility of State, Employers and Communities:** Labour markets need to **consider women as primary earners** and enable them to take up full employment. There is evidence of high female labour force participation in countries where unpaid care work responsibilities are equally shared.
- **Gender-neutral Approach:** There is a need to foster a **gender-neutral approach** to care work to **demolish stereotypes about gender-based work allocation** by considering the changing nature of families.

2. Supreme Court's Judgment on Registration of Marriage Under the Hindu Marriage Act

News: The Supreme Court has held that mere registration of marriage, in the absence of a proper ceremony, would not be valid under the Hindu Marriage Act.

What is the SC Judgment?

- A couple had sought a divorce decree without performing a valid Hindu marriage ceremony.
- The SC ruled that where a Hindu marriage is **not performed in accordance with the applicable rites or ceremonies** such as '**saptapadi**' (taking 7 steps by the groom and the bride jointly before the sacred fire), **the marriage will not be construed as a Hindu marriage**.
- The SC also said that if there has been no marriage in accordance with **Section 7 of Hindu Marriage Act**, "*the registration would not confer legitimacy to the marriage*".
- The Supreme Court exercised its powers under **Article 142** to declare that the **estranged couple were not married in accordance with the law**. The **marriage certificate issued to them** in the absence of a valid ceremony under the Hindu Marriage Act is **null and void**.
- The SC also **quashed their divorce proceedings** and a **dowry case** lodged against the husband and his family members.

What are the salient provisions of the Hindu Marriage Act, 1955?

- It **regulates Hindu marriages and divorce** by codifying laws concerning these aspects within the Hindu community.
- The HMA applies to individuals who are Hindu **by birth or through conversion**. It also includes **Buddhists, Jains, and Sikhs**.
- Under the HMA, the minimum age for marriage is set at 21 for the bridegroom and 18 for the bride. Marrying minors is punishable by imprisonment for up to 3 years and/or a fine of up to INR 1 lakh.
- The HMA respects **customary practices**, including the essential ritual of **Saptapadi**, where the bride and groom take 7 steps before the sacred fire.
- The Act **prohibits bigamy, polygamy, or polyandry**.
 - **Section 5** declares having two living spouses simultaneously **illegal and punishable** under Sections 494 and 495 of the Indian Penal Code.
- Under the Act, Marriages are deemed void if **one or both the parties are mentally unfit**. Legal consent is required in such cases.
- Registration is subject to **State laws**. However, **lack of an official certificate does not invalidate a marriage**.
- **Divorce is permitted** through **mutual consent or judicial separation**. Special circumstances may warrant divorce before one year of marriage. Various **grounds for divorce are specified**, including those allowing wives to seek divorce from their husbands.
- **Family courts** handle matters concerning Hindu marriages and divorce. Cases are heard in courts of territorial jurisdiction based on the place of marriage, residence, or last cohabitation.

What are the concerns associated with the Judgment?

- The Judgment has created a doubt whether the SC has made the *Saptapadi* ceremony an **essential practice for the validity of the marriage**. The SC didn't state any special status for *Saptapadi*. Therefore, this cannot be understood as the only form of solemnization of marriage.
- The Judgment hasn't mention other ways to validate the marriage or explore customs with simpler ceremonies like exchanging garlands.
- The Judgment didn't discuss the amendment in Tamil Nadu introducing the ***suva mariyadhai*** form of marriage.

What are previous Judgments in this regard?

- **S. Nagalingam v. Sivagami (2001)**: In 1967, the Legislative Assembly of Tamil Nadu passed an amendment to simplify marriage ceremonies (applicable only to Tamil Nadu). The Amendments were upheld by the SC. The

SC ruled that the presence of a priest is not necessary for a valid marriage. Parties can marry in front of relatives or friends, exchanging vows and performing simple rituals like garlanding or exchanging rings.

- **Balakrishnan v The Inspector of Police (2014)**: The Madras High court held that a marriage conducted in secrecy, called *suya mariyadhai*, is not valid.
- **Ilavarasan v The Superintendent of Police and Others (2023)**: The SC disagreed with Madras High Court's *Balakrishnan v The Inspector of Police (2014)* Judgment. It held that a public solemnization or declaration is not required for a valid marriage under **Section 7A(1)**. The Court argued that imposing a public declaration requirement, not mentioned in Section 7A (1), restricts the law's broader purpose and violates **Article 21** of the Constitution.

The SC Judgment has added confusion to the solemnization of the marriage. The Supreme Court should provide comprehensive clarity on the issue.

3. The Issue of Proportional Benefits

News: The issue of reservations based on population share has become central to the campaign of General Elections. There is a need for use of socioeconomic indicators for policy related to fair representation.

What is the historical background of proportional share of benefits?

- Proportional benefits means that rights should be proportional to a group's share of the population. It has roots in India's social justice movements.
- It was historically used by leaders to **demand fair representation for marginalized groups** e.g., Dr. B.R. Ambedkar advocated for proportional representation in his work '**States and Minorities**'.
- The British Colonial Government also introduced policies of proportional representation for certain sections of society.

Contemporary Significance

- The slogan is now used to push for policies for various groups like SCs, STs, OBCs, and others. There is an increased demand for caste and sub-caste data to inform these policies.
- Critics argue it is against the Constitution, which emphasizes **equality among all citizens**.
- Implementation challenges include demands for **sub-categorization within beneficiary groups**, such as among Dalits and OBCs. (*Read more on the issue of Reservation here*).

How should fair representation and reservation be determined?

- **Socioeconomic and Educational Status:** Fair representation should be based on a **group's socioeconomic and educational standing**. For instance, while Parsis and Christians are minorities, they are advanced in education and socioeconomic status.
- **Supplementary Indicators:** Population can be a **supplementary indicator** in the absence of detailed data. Historically, population was used as a tentative indicator for fair representation.
- **Comprehensive Policies:** There should be **general policies for economic and educational empowerment for all**, irrespective of caste and religion, alongside specific policies for discriminated groups.
- **Informed by Data:** Policies should be based on comprehensive data, including economic, educational, and social indicators, to ensure fair distribution of opportunities. For instance, a caste census can provide the necessary information to create fair and informed policies.

Why is a caste census important, and what could be its impact?

- **Detailed Data:** A caste census provides demographic and socioeconomic data about various castes and sub-castes.

- **Informed Policies:** This data helps create **fair and transparent policies**. For example, it can provide accurate information on education and income levels to guide resource allocation.
- **Addressing Inequality:** It reveals the economic and social status of different groups, showing progress or persistent discrimination.
- **Policy Shifts:** Data can highlight changes, such as certain SCs and OBCs moving out of poverty, impacting reservation policies.
- **Reducing Bias:** Current policies based on political pressure can shift to **evidence-based decisions**. (Refer EPIC October 2023 (click) for Caste Survey in Bihar and Caste Census).

4. Growth of Glacial Lakes in the Himalayas

News: According to ISRO, the size of the Glacial Lakes in the Himalayas is increasing. This poses significant risks especially related to Glacial Lake Outburst Floods.

What are ISRO's recent findings about Glacial Lakes?

- ISRO Scientists analyzed satellite data from 1984 to 2023, observing the Indian Himalayan river basins.
- The scientists found that out of 2,431 glacial lakes larger than 10 hectares, **676 have significantly expanded**.
- **601 of these lakes more than doubled in size**, showing substantial growth.
- 130 of the 676 lakes are situated in India, in the **Indus (65), Ganga (7), and Brahmaputra (58)** river basins, which have **expanded as the glaciers retreated due to global warming**.
- The data highlight the increased risk of **Glacial Lake Outburst Floods (GLOFs)**, posing a threat to the downstream communities. (Refer EPIC October 2023 for Glacial Lake Outburst Floods (GLOFs): Causes, Impacts and Solutions).

How are Glacial Lakes formed?

- Glacial lakes are formed by the **movement and melting of glaciers**, which create depressions in the landscape. These depressions **fill with meltwater, forming lakes**.
- **Types of Glacial Lakes**
 - **Moraine-dammed Lakes:** They are formed by debris such as rocks and soil left by moving glaciers.
 - **Ice-dammed Lakes:** They are formed when water is trapped by ice.
 - **Erosion-based Lakes:** They are created by depressions from erosion.
- Each type is categorized based on how the water is dammed or held in place.

What are the risks of Glacial Lakes?

- Glacial lakes pose significant risks due to potential GLOFs. GLOFs can occur when natural dams, such as moraine or ice, **fail to hold back lake water**. This failure can be triggered by **avalanches of ice or rock**. Such floods can cause severe and sudden flooding downstream, endangering communities.

How can the risks be mitigated?

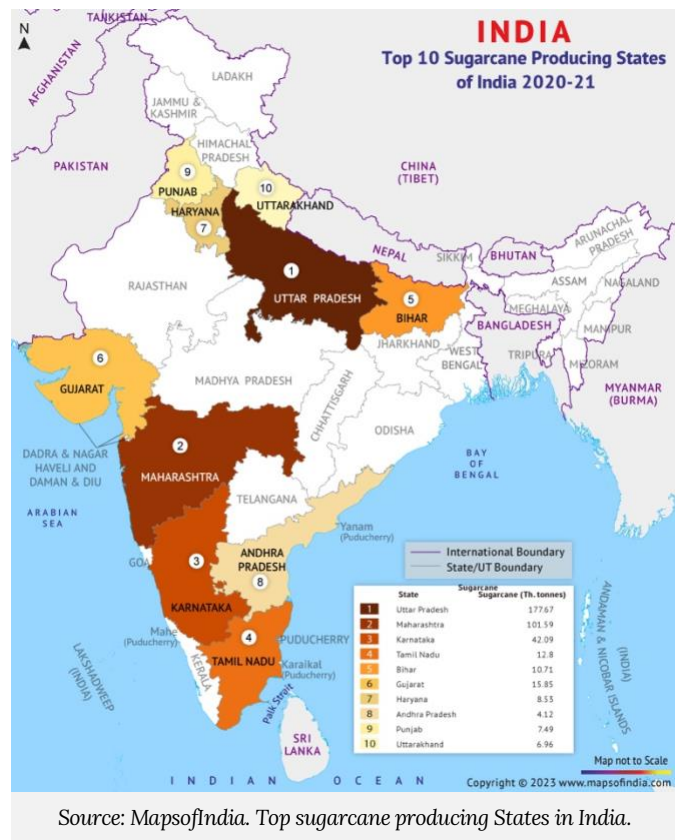
- **Lowering Lake Levels:** A study on Ghepan Gath lake suggested reducing water levels by 10-30 meters can significantly lessen impact on downstream areas like Sissu town (HP), though not completely eliminating risk.
- **Using HDPE Pipes:** In 2016, the Sikkim State Disaster Management Authority and others successfully used High Density Polyethylene (HDPE) pipes to lower water levels in South Lhonak Lake, reducing flood risks.
- **Installing Early Warning Systems:** Fieldwork at critical lake sites can include setting up instrumentation like **motion detection cameras**, water level sensors, and discharge meters to **monitor for signs of potential GLOFs**.
- **Satellite Monitoring:** Utilizing advanced satellite remote-sensing tools helps in **continuous monitoring and assessment of glacial lake dynamics**. It is crucial for timely interventions and planning.

5. Need to Change Approach Towards Cultivation of Sugarcane

News: Sugarcane growers in India are facing extreme uncertainty. Agriculture experts say that there is a need to pay more attention to sugarcane rather than sugar.

What is the economic and ecological significance of cultivation of sugarcane?

- **High Yields:** Cane has a higher yield as compared to other crops. Top Punjab farmer can harvest only ~5-6 tonnes of wheat and 8-9 tonnes of paddy whereas the least successful sugarcane grower in Uttar Pradesh can yield ~40 tonnes.
 - Thus, sugarcane uses less water per day and for every unit weight of biomass produced.
- **Fodder:** The green top-leaves of sugarcane meet most of the fodder needs for Uttar Pradesh farmers in winter and spring and is highly efficient at **carbon sequestration**.
- **Electricity Generation:** The high-pressure boilers used in modern sugar mills can generate around **130 kilowatt-hours (kWh)** of **electricity** from every tonne of cane.
- **Renewable Source of Energy:** The largest component of sugarcane, that makes up about 30% of its weight, is **bagasse**. It's the fibrous material left over after the juice is extracted and is a **valuable source of biofuel**.
- **Production of Alcohol:** **Molasses** is the leftover juice after extraction of the maximum possible sugar from 3 cycles of boiling and crystallization. This non-recoverable sugar in the molasses gets fermented into alcohol.
- **Carbon Fixation:** It exhibits "**C4 photosynthesis**" which is a more efficient mechanism of deploying solar energy to convert atmospheric carbon dioxide and water into plant matter.



What is there need to relook at the approach to the cultivation of Sugarcane?

- **Awareness:** There is little awareness about **C4 carbon fixation** ability of sugarcane. It is often presented as a water guzzling crop, threatening the availability of water for other crops.
- **Obsession with sugar:** There is too much importance given to the production of sugar from sugarcane. This is despite the fact that it makes up just 10 % of the cane in terms of recovery during processing.
- **Overlooking bagasse-based Generation of Electricity:** Bagasse-based electricity generation has faced a neglect in the context of renewable energy, whereas more importance is given to wind and solar energy. Sugar mills have installed around **2,700 MW of grid-interactive capacity** producing real and reliable power.
- **Lack of Robust Policy:** Despite the recent initiatives, the Union Government does not have a robust ethanol-blending programme.
 - In Brazil, ethanol is used for either a 25% blend with petrol or as 100% hydrous spirit for **flex-fuel vehicles**.
- **Role of State Governments:** The UP government sets aside 34% of molasses produced by mills for supplying to country liquor makers. This implies that while cane farmers don't get paid, country liquor makers get subsidized molasses.

General Studies Paper II

1. The Issue of Article 31C and the Material Resources of the Community Under Article 39(b)

News: The Supreme Court is hearing a case (*Property Owners Association vs State of Maharashtra*) whether the Government can acquire and redistribute privately owned properties if they are deemed as “material resources of the community” — as mentioned in Article 39(b) of the Constitution. The 9-Judge SC Bench has also decided to take up the question, “Whether Article 31C still exists?”

What is the current legal challenge?

- **Case Context:** The SC is reviewing a challenge to the 1986 Amendment to the **Maharashtra Housing and Area Development Act**, focused on cessed properties in Mumbai.
- **Specific Dispute:** Property owners are challenging the Amendment’s provision that allows the State to acquire properties if 70% of the occupants request it, with the aim of redistributing them to “needy persons”.
- **Legal Argument:** The property owners contend that the Amendment violates their Right to Equality under Article 14 of the Constitution.
- **Previous Judicial Decision:** The Bombay High Court had ruled that laws promoting the Directive Principles, like Article 39(b), could not be challenged on the basis of violating the right to equality, according to the Article 31C of the Constitution.
- **Supreme Court Involvement:** The case reached the Supreme Court in December 1992. The central question became whether “material resources of the community” under Article 39(b) includes privately owned resources like cessed buildings.

What are the key questions raised in the case of *Property Owners Association vs State of Maharashtra*?

- The interpretation of the term “**material resources of the community**” as mentioned in **Article 39(b)**.
- Whether laws enacted to achieve the objective set forth in Article 39(b) are **immunized from legal challenges based on fundamental rights to equality and liberty**. This question also highlights a **conflict between Part III of the Constitution** (Fundamental Rights), and **Part IV** (Directive Principles of State Policy (DPSP)).

What is Article 31C?

- It was added to the Constitution in 1971 via **25th Amendment**. It was added in response to the SCs decision in the **Bank Nationalisation Case**. (*Rustom Cavasjee Cooper vs Union of India* (1970)). The SC had invalidated Government’s Act to nationalize banks due to issues with the compensation offered.
- The Article **shields laws that implement the principles specified in Article 39(b) and (c)**, ensuring the distribution of material resources to prevent wealth concentration, **from being challenged on the grounds of violating rights to equality and freedoms under Article 14 and Article 19**.

Article 31C

Notwithstanding anything contained in Article 13, no law giving effect to the policy of the State towards securing all or any of the principles laid down in Part IV shall be deemed to be void on the ground that it is inconsistent with, or takes away or abridges any of the rights conferred by Article 14 or Article 19 and no law containing a declaration that it is for giving effect to such policy shall be called in question in any court on the ground that it does not give effect to such policy.

Why is the existence of Article 31C in question?

- **Legal Revisions and Challenges:** The existence of Article 31C is in question due to history of amendments and legal challenges. In the *Kesavananda Bharati* Judgment (1973) parts of the Article 31C were struck down, affecting its overall standing.

- **Impact of the Minerva Mills Ruling:** In the Minerva Mills case, the **SC limited Parliament's power to amend the Constitution**. This cast doubt on the expansions made to Article 31C under the 42nd Amendment, specifically whether the original version of Article 31C survived these changes.
- **Current Case in the Supreme Court:** At present, the Supreme Court is examining Article 31C to address unresolved constitutional uncertainties. This includes its application in property laws such as the Maharashtra Housing and Area Development Act. The **Act uses Article 39(b) to justify the redistribution of cessed properties**, making this review crucial for determining the future application of Article 31C in socio-economic legislation.

What are the arguments regarding Article 31C?

- **Argument Against Automatic Revival:** Senior Advocate Zal Andhyarujina argued that the original Article 31C was completely replaced by an expanded version in the 42nd Amendment. Therefore, when the new version was struck down in the **Minerva Mills case**, the **original could not automatically revive**. This argument is based on the legal principle that once replaced, the original provision ceases to exist unless explicitly reinstated.
- **Argument for Doctrine of Revival:** Solicitor General Tushar Mehta contended that the original Article 31C should automatically be revived based on the **Doctrine of Revival**. This view is supported by precedents like the ruling on the National Judicial Appointments Commission, where struck-down amendments led to the **revival of previous provisions**, suggesting that the **pre-amended Article 31C should resurface if the subsequent amendments are invalidated**.

Judicial View on “Material Resources of the Community”



- **State of Karnataka v Shri Ranganatha Reddy (1977)**
 - **Majority Opinion:** Private properties do not fall within the scope of “material resources of the community” under Article 39(b).
 - **Minority Opinion by Justice Krishna Iyer:** Justice Iyer expressed the view that private properties should be considered community resources, aiming to facilitate redistribution in a socialist manner.
- **Sanjeev Coke Manufacturing Company v Bharat Coking Coal (1983)**
 - The Court confirmed the Government's right to nationalize coal mines by treating them as community resources under Article 39(b), aligning with Justice Iyer's interpretation.
 - The Court extended the application of Article 39(b) to include the transformation of private property into public ownership.
- **Mafatlal Industries Ltd v Union of India (1996)**
 - **Majority Opinion** (as expressed by Justice Paripoornan): Supported the broad interpretation of “material resources” in Article 39(b) to encompass both natural and man-made, as well as private and public properties.

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What has been the history of conflict between Fundamental Rights and DPSPs?

- The conflict became particularly intense in the 1970s when amendments were made to exempt certain laws from judicial review.
- The original Constitutional Provisions were clear enough.
 - Article 13 stated that any law violating a fundamental right would be invalid.
 - In contrast, Article 37 stated that DPSPs wouldn't be enforceable in court.
- In its early judgments, the Supreme Court clarified the hierarchy between fundamental rights and DPSPs. In **Mohd. Hanif Quareshi vs State of Bihar (1958)**, the Chief Justice stated that the State should implement DPSPs without abridging fundamental rights.

- **Introduction of Article 31C:** The 25th Amendment introduced Article 31C to protect laws enacted to fulfil Article 39(b) and (c) from challenges under Articles 14 and 19 of the Constitution. This provision aimed to exempt legislation promoting the common good from scrutiny under fundamental rights.
- **Kesavananda Bharati vs State of Kerala (1973):** The SC upheld the validity of Article 31C but made it subject to judicial review.
- **42nd Constitutional Amendment:** The Amendment extended the scope of the Article 31C by including within its purview any law to implement any of the DPSPs specified in Part IV of the Constitution and not merely Article 39 (b) or (c).
- **Minerva Mills vs Union of India (1980):** The 42nd CAA was challenged. The SC declared the Amendment unconstitutional. The SC found that while DPSPs provided the ends of governance, fundamental rights constituted the means to such ends.
- **Waman Rao vs Union of India:** The SC upheld the validity of Article 31C by arguing that laws aligned with Articles 39(b) and (c) wouldn't violate rights under Articles 14 and 19.

What are the consequences of legal ambiguity surrounding Article 31C?

- **Potential for Abuse:** Critics argue that Article 31C, as amended, **gives excessive power to the legislature**, enabling it to enact laws that could infringe upon fundamental rights under the guise of achieving the objectives of DPSPs. It places certain laws above fundamental rights e.g., a law nationalizing printing press, purportedly for the common good, could suppress free speech.
- **Judicial Responses and Uncertainties:** The Supreme Court has struggled with implications of Article 31C e.g., in Minerva Mill case, some questions were not answered like “Has Article 31C reverted to its original version from the 25th Amendment, minus the parts invalidated by the majority in Kesavananda? Or is it in a limbo where its validity is uncertain?”
 - These rulings questioned the Amendment's alignment with the Constitution's basic structure. But did not conclusively resolve the tensions between Directive Principles and Fundamental Rights.

The ongoing ambiguity has led to a persistent conflict between fundamental rights and DPSP. The Court now has an opportunity in the Property Owners case to address this conflict and strengthen the Constitution's core principles.

2. State Can't Acquire Private Property Without Proper Procedure: Supreme Court

News: The Supreme Court has held that payment of compensation, in compulsory acquisition of private property without following the mandatory procedures, will not make the acquisition constitutional.

What is the Supreme Court's Judgment on Acquisition of Private Property?

- The Supreme Court emphasized that the **right to private property is protected under the Constitution** and is also considered a **human right**.
- The Court declared that for a valid acquisition of property, it is not sufficient to just have the **power of eminent domain** and **provision of compensation**. **Proper legal procedures** must be **established** and should be **followed**.
- The SC noted that the **44th Constitutional Amendment Act** removed the Right to Property as a Fundamental Right but it also **added Article 300A**. Article 300A states that no person shall be deprived of their property except by the authority of law. This involves **adhering to due process**.
- Article 300A does not mean mere presence of legislation. The SC laid down **seven basic procedural rights of private citizens** which constitute the “real content of the right to property under Article 300A”.
 - **Right to Notice:** The duty of the State to inform the person about the intended acquisition.
 - **Right to be Heard:** The State must listen to objections from the property owner.

- **Right to a Reasoned Decision:** The State must explain its decision regarding the acquisition.
- **Demonstration of Public Purpose :** The acquisition must exclusively serve a public purpose.
- **Right to Fair Compensation:** The property owner is entitled to reasonable compensation.
- **Efficient Process:** The acquisition process should be conducted efficiently and within set timelines.
- **Conclusion of Proceedings:** Acquisition isn't complete without the actual physical possession of the property being taken.

3. Importance of Mediation in Dispute Resolution

News: In the backdrop of judicial backlog and prolonged litigations, the Chief Justice of India has emphasized the need for mediation over litigation.

What is Mediation?

- The Mediation Act, 2023 defines Mediation as:
 - Mediation includes a process whereby parties attempt to **reach an amicable settlement** of their dispute with the **assistance of a third person** (referred to as mediator), who **does not have the authority to impose a settlement** upon the parties to the dispute.
- The Mediation Act recognizes various forms of mediation process including pre-litigation mediation, online mediation, community mediation, conciliation etc.

What are the salient aspects of Mediation Act, 2023?

- The Act aims to **promote alternative dispute resolution** (ADR) by **formalizing mediation**.
- The Act has expanded the scope of Mediation (to include online, community mediation etc.). It has dispensed with the concept of conciliation, in line with the international practice of **using the terms 'mediation' and 'conciliation' interchangeably**.
- The Act defines the applicability of the Mediation including matters beyond civil and commercial disputes, e.g., disputes relating to **compoundable offences** including the matrimonial offences. *(In compoundable offences the victim/complainant can drop the charges against the accused after reaching a compromise in good faith).*
- The Act clarifies the **matters where mediation can't be applied** like the disputes against minors or persons with intellectual disability, prosecution of criminal offences, any dispute relating to levy, collection, penalties, direct/indirect tax refunds etc.
- Parties may agree to mediation even subsequent to the dispute arising between them i.e., the parties can resort to mediation even if they had **no such clause related to mediation** (for dispute resolution) **in their original agreement**.
- The provision has been made **voluntary**. In the Bill, pre-litigation mediation had been kept mandatory in case of civil or commercial disputes.
- The Act defines provisions related to form, registration, enforcement and challenges regarding Mediation Settlement Agreements.
- The Act refers to establishment of a **Mediation Council of India** in the form of a corporate body, tasked with duties to **develop India to be a robust center for domestic and international mediation**.

What is the significance of Mediation?

- Mediation can help in **peaceful settlement** of disputes through mutual agreement. It can help avoid acrimonious litigation and **reduce the burden of courts**.
- It is more **cost-effective** compared to prolonged process marred with delays in courts.
- Mediation reorients the focus from **adversarial confrontation to reconciling differences** and healing relationships. This is in alignment with Mahatma Gandhi's vision of lawyers as peacemakers.

- Mediators foster a **democratic space for open dialogue**, allowing individuals to express emotions and grievances freely. This paves the way for **mutual understanding and balance**.

What are the challenges?

- Aspiring mediators are required to have **15 years of professional experience** before practicing as mediators, which can **hinder skill development**.
- Law students are trained to advocate strongly for their clients. This is in stark contrast with the **mediator's role of neutrality and impartiality**.
- There is a **disconnect in legal education and practice**. The focus of legal education is more on courtroom advocacy rather than on the Alternative Dispute Resolution processes.

What should be the way forward?

- Innovative training methods like **co-mediation** and **shadow mediation** should be incorporated under the Mediation Act, 2023, for young lawyers.
 - **Co-mediation** pairs novice mediators with the experienced, **facilitating dynamic learning environment**.
 - **Shadow mediation** allows observation of mediation sessions by novices without direct involvement.
- There is a need to integrate **structured mediation training into law school curricula**. This helps students develop essential skills for resolving disputes with empathy and efficiency.
- Improving the Mediation Act, 2023, by adding practical training and integrating it into curricula will make it more than just a law. It will help drive growth and innovation in dispute resolution throughout India.

4. The Issue of Affordable Housing in India

News: The issue of affordable housing remains a major challenge in India. The problem is compounded further by rising migration towards urban areas.

What is the meaning of Affordable Housing?

- The term Affordable Housing has not been clearly defined. However, the Ministry of Housing and Urban Affairs had **defined a criteria in 2012** for affordable housing schemes in terms of **size, income** and **affordability** (like ratio of price of the house to annual income or EMI Size).
- The size and income criteria has been **set differently for the various income groups** like the EWS, Low-Income Groups (LIGs) and Middle-Income Groups (MIGs).

DEFINITION OF AFFORDABLE HOUSING- MHUPA 2012

| Income Categories | Size | Income Criteria | Affordability |
|-------------------|---|--|--|
| EWS | <ul style="list-style-type: none"> • 21-27 sqm of carpet area • EWS maximum area could be between 25.2 and 30.8 sqm if subsidies are tied to them | The maximum Household Income for the EWS and LIG category are recommended to be INR 8,000 and INR 16,000 per month and since many households in this category do not have regular monthly income an annual income of INR 100,000 for EWS and INR 200,000/- for LIG households could also be used | The Task Force recommends that the desirable goal of a house price to income multiple that should be pursued for Affordable Housing projects should be 5 |
| LIG | <ul style="list-style-type: none"> • 28-40 sqm of carpet area • maximum area for LIG could be between 36.9 and 45.1 sqm if subsidies are tied to them | | |
| MIG | <ul style="list-style-type: none"> • 41-60 sqm of carpet area | | |

What is the requirement of Affordable Housing in India?

- According to a Government of India report in 2012, an estimated 18.78 million more houses were required to cater to the housing demand in the country.
 - The report also noted that **housing for low-income groups** accounted for more than **95% of the deficit**.
- A study done by the **Indian Council for Research on International Economic Relations (ICRIER)** in 2020 found that **India's urban housing shortage** rose by 54% from 2012 to become **29 million in 2018**.
 - This included homeless populations, inadequate houses that could not be upgraded, obsolete houses and congested households.
- According to the 2011 census, about 5% of India's total population (over 65 million people), lived in slums.
- According to the Economic Survey of Government of Delhi for 2020-2021, **6.75 million people lived in poor housing in low-income settlements only in Delhi**. (Refer October 2023 (click) for Slum Redevelopment in India).

What steps have been taken by the Government for Affordable Housing?

| Initiative | Description |
|--|---|
| Indira Awaas Yojana | <ul style="list-style-type: none"> • It was the first Government policy intervention with regards to affordable housing in 1985. • It was focused on rural housing. |
| JNNURM (National Urban Renewal Mission) | <ul style="list-style-type: none"> • It was launched in 2005, with focus on urban housing. |
| Rajiv Awas Yojana and Rajiv Rinn Yojna | <ul style="list-style-type: none"> • These urban housing interventions were launched in 2008, based on the Report of Parekh Committee. • The Pradhan Mantri Awas Yojana (Urban): It was launched in June 2015 to tackle urban homelessness. <ul style="list-style-type: none"> ◦ It promised houses for 1.18 crore families by December 2024. • Pradhan Mantri Awas Yojana (Gramin): It was launched in 2016 with the aim of constructing 2.95 crore houses. <ul style="list-style-type: none"> ◦ The scheme offers INR 1.3 lakh for each unit constructed under the scheme, with a 60:40 funding split between the Centre and State. ◦ As of April 30, 2024, 2.6 crore houses have been completed (88% of the target). |
| Housing for All schemes (2015-22) | |

What are the challenges regarding Affordable Housing in India?

- **Non-achievement of Targets**: PMAY(U) promised houses for 1.18 crore families by December 2024. As of March 2024, it has achieved **only ~67% of its target** (~80 lakh). There are several constraints like PMAY(U) is applicable only for families having access to capital and land, and **not for urban landless poor**.
- **High Cost**: The high cost of land and construction materials makes affordable homes economically unviable for people with low incomes. They cannot afford the house without subsidy.
- **Unaffordability of Vacant Units**: According to the Centre for Social and Economic Progress, despite the urban housing shortage of 19 million units, **there are 11 million vacant units** (2011 Census). However, these vacant units are unaffordable for the lower middle class.
- **Limited Availability of Low-Cost Land**: Scarcity of suitable low-cost land within city limits poses a significant challenge for the development of affordable housing projects.
- **Lack of Access to Finance**: The affordable housing developers lack the access to institutional finance for affordable housing development.

- **Delays:** The real estate developers suffer from the challenges of lengthy approval procedures, multiple clearances and thin profit margins. These contribute to delays and hamper the swift execution of projects.

What should be the way forward?

- **Addressing Demand-side Constraints:** The provision of subsidies, funds for affordable infrastructure development and provision of basic services/amenities around these housing projects, will help in rejuvenating the affordable housing sector in India.
- **Matured Rental Market:** Development of a matured rental market that specifically enhances the robustness of affordable rental housing and will enable the holistic development of the affordable housing sector.
- **Promotion of Rental Vouchers:** The National Urban Rental Housing Policy's rental voucher scheme must be implemented more broadly to help urban poor and migrants afford private rentals in suitable locations.
- **Administrative Efficiency:** The regulatory authorities must proactively speed up the process of regulatory clearances for the affordable housing projects, to spur growth in this sector.
- **Increase focus on Urban Housing Needs:** The aim must be to redirect some resources from rural to urban housing projects. This will support the workforce in urban and semi-urban settings, and would in turn enhance labour mobility and economic productivity.
- **Participatory Approach:** Policy reforms for the affordable housing sector should be participatory. They must take into account other stakeholders and the real estate market.

5. The Issue of Child Labour in India

News: An Australian Parliamentary Committee Report has raised concerns over Child Labour in India in the context of The Economic Cooperation and Trade Agreement (ECTA) signed between India and Australia.

What is Child Labour? What is the Extent of Child Labour in India?

- According to ILO child labour is a work that **deprives children of their childhood**, their potential and dignity, and that is **harmful to their physical and mental development**.
- Children or adolescents who participate in work that does not affect their health and personal development or interferes with their schooling, is not child labour e.g., helping parents at home, assisting family or earning pocket money outside school hours and on holidays.

Child Labour Statistics

| Aspect | Details |
|---|--|
| Number of Child Labourers in India | <ul style="list-style-type: none"> • According to Census 2011, there were 10.1 million child labourers in India. • According to the ILO, India has the highest number of child labourers in the 5-17 age range in South Asia. |
| NCRB Report 2022 on Child Labour | <ul style="list-style-type: none"> • According to NCRB Report (2022), in 2021, ~ 982 cases were registered under the Child Labour (Prohibition and Regulation) Act, 1986. |
| Impact of COVID-19 on Child Labour | <ul style="list-style-type: none"> • According to a study by Campaign Against Child Labour (CACL), there has been a significant increase in child labour in India. • According to a report by ILO and UNICEF, the number of children in child labour has increased to 160 million worldwide. |
| Biggest Employers of Child Labour In India | <ul style="list-style-type: none"> • India's biggest child labour employers are in Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, and Maharashtra. |

What are the Causes of Child Labour in India?

- **Poverty and Indebtedness:** For impoverished households, income from a child's work is crucial for their and child's survival. Many such children belong to families caught in bonded labour due to indebtedness.
- **Adult under-/unemployment:** High prevalence of adult under- or unemployment often forces children to work to support the family.
- **High Illiteracy:** Illiteracy and ignorance put children under the risk of inhuman exploitation.
- **Lack of Access to Education and Skilling:** Deplorable quality of education and lack of coverage of 15-18 year age group in compulsory education, has led to increase in dropout rates and forced children into child labour.
- **Cultural Factors:** Children often take up family's traditional work from an early age, contributing to enhancement of child labour e.g., a Goldsmith's son taking to gold-smithery, or a carpenter's child taking up carpentry from an early age.
- **Social factors:** India's differentiated social structure also contribute to child labour. The majority of child labourers in India belong to the marginalised social groups.
- **Epidemics and Disasters:** Natural disasters, conflicts, and pandemics increase the vulnerability of children towards forced labour, as they forced to work for survival and are often exploited by traffickers and perpetrators.

International Provisions on Child Labour

International Labour Organization (ILO) Conventions

- **Convention 138** (Minimum Age Convention) and **Convention 182** (Worst forms of Child Labour Convention) aim to eliminate the malpractice of child labour.
- India has ratified both the Core Conventions of ILO.

Declaration of the Rights of the Child, 1959

- The Declaration recognizes the need for special safeguards and care for Children.
- It declares that every child should be provided with opportunities to enable to develop physically, mentally, morally, spiritually and socially.

United Nations Convention on the Rights of the Child, 1989

- It sets out different rights of children– civil, political, economic, cultural, social and health.
- Article 32 states that the Government should protect children from work that is dangerous or might harm their health or their education.

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What is the impact of the prevalence of Child Labour?

- **Impedes Education and Skilling:** Child labour impedes children from gaining the skills and education they need to have opportunities of decent work as an adult. This **violates their right to life and liberty**.
- **Health and Physical Risks:** Long working hours and hazardous working conditions adversely affect a child's physical and mental health and impairs their intellectual, emotional and psychological development.
- **Impact on Human Capital Formation:** Child labour diminishes children's ability to accumulate skills and knowledge, thereby affecting their future productivity and income.
 - It is a serious obstacle to socio-economic welfare of the country.
- **Perpetuation of Poverty:** Child labour is both a cause and consequence of poverty. Household poverty forces children into the labour market to earn money.

- Thus, the children miss out on an opportunity to gain an education, further perpetuating household poverty across generations.
- **International Repercussions:** It can impact country's international standing. Western nations are pushing for liberal labour laws and protection of human rights as pre-conditions for trade agreements. Prevalence of child labour may be used as a condition to not sign or cancel trade pacts.

What steps have been taken to check Child Labour?

National Policy Framework surrounding Child Labour

| Act/Policy | Features |
|---|--|
| Child Labour (Prohibition & Regulation) Act, 1986 | <ul style="list-style-type: none"> ● The Act was passed based on the recommendations of the Gurupadswamy Committee (1979). ● The Act aims to prohibit the engagement of children in certain employments and to regulate the conditions of work of children. |
| Child Labour (Prohibition and Regulation) Amendment Act, 2016 | <ul style="list-style-type: none"> ● The Amendment Act completely prohibits the employment of children below 14 years. ● It also prohibits the employment of adolescents in the age group of 14 to 18 years in hazardous occupations. |
| National Policy on Child Labour (1987) | <ul style="list-style-type: none"> ● It contains the action plan for tackling the problem of Child Labour. It focuses more on rehabilitation of children working in hazardous occupations and processes, rather than on prevention. |
| The Right to Free and Compulsory Education Act (2009) | <ul style="list-style-type: none"> ● The Act made it mandatory for the State to ensure that all children aged 6-14 years are in school and receive free education. |
| Juvenile Justice (Care and Protection of Children) Act 2000 and Amendment of the Act in 2006 | <ul style="list-style-type: none"> ● Section 23 (cruelty to juvenile) and Section 26 (exploitation of juvenile employee) prohibit child labour by children in need of care and protection. |

Schemes

| Scheme | Features |
|--|---|
| National Child Labour Project (NCLP) Scheme | <ul style="list-style-type: none"> ● The Government has initiated the National Child Labour Project (NCLP) Scheme to eliminate all forms of child labour through identification. ● It also aims to withdraw children from child labour and prepare them for mainstream education along with vocational training. |
| Pencil Portal | <ul style="list-style-type: none"> ● The platform has been launched by the Ministry of Labour and Employment and aims at engaging the Central Government, State Government, District, civil society and the public in eradicating child labour. |

What are the challenges in combating Child Labour in India?

- **Issues with Child Labour (Prohibition and Regulation) Amendment Act, 2016**
 - The Amendment Act has drastically decreased the types of hazardous industries. This allows employers in industries like battery recycling units, and brick kilns etc. to employ adolescent labour.

- The Amendment allows the child to be employed in “family or family enterprises”. This promotes child labour in agrarian rural India, where poor families are trapped in intergenerational debt-bondage.
- **Definition of Child:** There is the confusion around the definition of a child (in terms of age) in various laws dealing with child labour e.g., the conflicting age of child in Juvenile Justice Act and Child Labour Act.
- **Lack of Proper Identity Documents:** Child labourers often lack school registration certificates and birth certificates, which, creates an easy loophole in the law to exploit. Lack of reporting of children of migrant workers working as labourers and domestic help, further aggravates the problem.
- **Weak Enforcement of Law:** Weak enforcement of law, lack of adequate deterrence and corruption is a major hurdle in eradicating child labour.

What should be the way forward?

- **Uniformity in Laws:** The Government should bring uniformity in existing laws dealing with child labour. The laws must expand the definition of a child.
- **Action Against Failure to Register Child Labour:** The 52nd report of the Parliamentary Standing Committee on Labour has suggested incorporating provisions for taking action against the police for not registering FIRs in the Child Labour Prohibition Act, similar to the Protection of Children from Sexual Offences Act, 2012.
- **Social Protection Schemes:** There should be concerted effort towards social protection programmes and cash transfers to improve the economic situation of families and to reduce the “need” to send children to work.
- **District-level Funds and National Level Child Tracking Mechanism:** The 52nd report of the Parliamentary Standing Committee on Labour has recommended establishing a district-level fund and National Level Child Tracking Mechanism for immediate relief and rehabilitation for child laborers.
- **Awareness:** Government with the help of NGOs like *Bachpan Bachao Andolan*, ChildFund, CARE India, Talaash Association, Child Rights and You etc. should take adequate measures to raise awareness among families and communities. Parental literacy can play an important role in ensuring the rights of children are upheld.

6. Recent Improvements in Healthcare Services in India

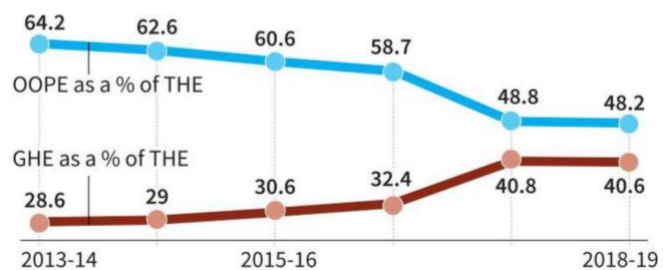
News: The quality of healthcare services has improved in various aspects because of several Government policies and interventions.

What are the recent trends in India’s healthcare spending?

- Government health expenditure (GHE) as a proportion of GDP has risen from 1.13% in 2014-15 to 1.84% in 2021-22. (Refer EPIC May 2023 (click) for National Health Accounts (NHA) about India’s Healthcare Sector).
- Per capita Government Expenditure on Health has nearly tripled from INR 1,108 in 2014-15 to INR 3,156 in 2021-22. (Refer EPIC April 2024 (click) for Ensuring Health Equity in India).
- Spending on Government-funded insurance has increased, rising 4.4 times from INR 4,757 crore in 2013-14 to INR 20,771 crore in 2021-22.

Health spending

The chart shows government health expenditure (GHE) and out-of-pocket expenditure (OOPE) as a share of total health expenditure (THE). OOPE still remains high



Source: The Hindu. Rising share of Government expenditure and falling out-of-pocket expenditure on healthcare.

This increase reflects higher investments in programs like **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana** (AB PMJAY). (Refer EPIC August 2023 (click) for the Performance of the PM Jan Arogya Yojana (PM JAY)).

- There has been a consistent decline in out-of-pocket expenditure (OOPE) as a share of total health expenditure, dropping from 62.6% (2014-15) to 39.4% (2021-22).

What are the reasons behind this trend?

- **Utilization of Services:** Free ambulance services, improved Government secondary and tertiary services, and the initiatives like the Pradhan Mantri National Dialysis Programme have played significant roles in reducing out-of-pocket expenditure.
- **Free Drugs and Diagnostics:** Free drugs and diagnostics services in facilities, including at ~169,000 **Ayushman Arogya Mandirs** (AAMs, Health and Wellness Centres) have led to major financial savings for families.
 - More than **10,000 Jan Aushadhi Kendras** sell over **1,900 quality generic medicines** and **~300 surgical items** at affordable prices across districts. Since 2014, this scheme has saved consumers an estimated INR 28,000 crore.
- **Price Regulation:** Regulating prices of **coronary stents, orthopaedic knee implants, cancer drugs**, and other vital medicines has saved people **INR 27,000 crore each year**.

What has been the impact of access to safe drinking water on health?

- Access to safe drinking water and sanitation significantly improves health. A WHO report observes that availability of tap water in every rural household will **save over 4 lakh lives over 5 years**.
- ~76% rural households have now access to clean and safe drinking water, made through the **Jal Jeevan Mission**. The access was ~17% in 2019, when the Mission was launched.
- The WHO predicts that the Swachh Bharat Mission (SBM) Grameen, which made rural India open defecation free (ODF), **could have prevented over 300,000 deaths from diarrhoea and malnutrition** between 2014 and October 2019. (Refer EPIC February 2024 (click) for Improving Access to Sanitation in India and Jal Jeevan Mission).

What major interventions have focused on healthcare infrastructure?

- **Pradhan Mantri Swasthya Suraksha Yojana:** This is aimed at creating medical colleges and new AIIMS.
- **Pradhan Mantri Ayushman Bharat Infrastructure Mission:** This aims to strengthen the public health infrastructure in cities and villages so it can effectively handle health crises or outbreaks.
- **Emergency Response and Health System Preparedness Package:** This is aimed at developing paediatric and adult ICUs.
- **Fifteenth Finance Commission Grants:** The health grants, totalling INR 70,000 crore under the Fifteenth Finance Commission award, are being injected into the primary health system.

The rising trends in public health expenditure and a steady decrease in OOPE alongside increasing shares of GHE and social security schemes on healthcare, **indicate a move towards a more progressive health system**.

7. Improving Coverage of Immunization Programmes

News: 2024 marks the 50th anniversary of the launch of the Expanded Programme on Immunization (EPI) by the WHO. India launched its EPI in 1978 (now called Universal Immunization Programme, UIP). The occasion provides an opportunity to assess the programme and expand its reach.

What has been the progress with regards to Immunization in India and the World?

- Globally, vaccines have expanded from 6 diseases in 1974 to 13 universally recommended and 17 context-specific diseases today, with research ongoing for 125 more pathogens.

- The percentage of children receiving three doses of DPT rose from 5% in low- and middle-income nations in the 1970s to 84% globally in 2022.
- **Smallpox has been eradicated, polio eliminated** from **all but 2 countries**, and many vaccine-preventable diseases have nearly disappeared.
- In India, the coverage has risen significantly with 76% children receiving recommended vaccines in 2019-21 (NFHS-5). While this is remarkable, it indicates that still 1 out of every 4 children miss out on essential vaccines.
- Studies have shown that vaccines have saved millions of lives, prevented billions of hospitalizations, and are highly cost-effective, with 7-11 times return on investment.

What are some challenges in Immunization?

- In 2023, UNICEF said childhood immunization coverage dropped for the first time in over ten years. There were 14.3 million children with no doses and 6.2 million partially immunized children worldwide in 2022.
 - Gaps in immunization can **reverse years of achievements** as old eradicated diseases can reappear.
 - The **fall in coverage** has been primarily due to the **impact of COVID pandemic** and the diversion of healthcare resources in tackling the pandemic. Such **external shocks pose a danger in future** as well.
- There has been **hesitancy to vaccines and immunization** in some sections. Even during the COVID pandemic, misinformation led many people to be wary of getting vaccinated (**vaccine hesitancy**).
- Despite increasing coverage in India, persistent **inequities exist** based on **geography, socioeconomic status**, and other parameters exists.

Why is there a need to focus on adult vaccination?

- Vaccines have always been intended for individuals of all age groups. However, due to limited supply and resources in the past, children have been prioritized.
- Because more children are getting vaccinated, diseases that vaccines can prevent are now affecting more adults and older people. It **necessitates a focus on immunization throughout a person's life**.

What steps can be taken for expanding adult and elderly immunization in India?

- NTAGI (National Technical Advisory Group on Immunization) should provide recommendations on adult and elderly vaccine use. After NTAGI recommendations, vaccines for all age groups should be made available as free at the government facilities.
- **Myths and misconceptions** related to vaccines should be **proactively addressed** through **professional communication agencies** and **public education**.
- Medical colleges and research institutions should generate **evidence on the burden of diseases** in the adult population.
- The Government should conduct another **independent national-level review of the UIP**, engaging key partners and international experts. The last independent evaluation was undertaken in 2004.

What initiatives have been undertaken by the government to enhance adult immunization?

- The Government has launched a pilot initiative for adult BCG vaccination as part of efforts to 'End TB'.
- The COVID-19 vaccination drive has sensitized the public to the need for and benefits of adult vaccination.
- The Government should expand the program to focus on **zero-dose children, address coverage inequities, and offer vaccines to adults and the elderly**.

It is time to transform the EPI into an '**Essential Program on Immunization**' for all age groups.

8. Issues with the Safety of Processed Foods in India

News: Incidents related to Nestle and MDH Spices have raised concerns regarding safety standards of processed food products in India.

Which recent incidents have raised concerns about India's Food Safety Standards?

- A report published by a Swiss organization found that Nestlé's baby products in Asia, Africa, and Latin America contain added sugars, while products sold in Europe do not. This is concerning because:
 - Excess sugar leads to **unbalanced nutrition** and **unhealthy diet**.
 - It can **enhance risk of non-communicable diseases** including diabetes and obesity in children.
 - It can lead to **addiction in children** and they may start looking for more sugary foods.
 - WHO recommends **avoiding added sugar** in food products for consumption by **children below 2 years**.
- Hong Kong and Singapore have recently banned MDH and Everest spice brands due to presence of **carcinogenic pesticide ethylene oxide** in some of their spice mixes.
- In 2023, the US FDA recalled MDH products due to **salmonella contamination**. Indian food products are under constant scrutiny in various international markets including the EU.
- These incidents highlight the poor standards of India's food and drug regulation.

What are the issues with the Food Safety and Standards Authority of India (FSSAI)?

- **Staff and Infrastructure Shortages:** The FSSAI has consistently struggled with insufficient staff and inadequate infrastructure, which has compromised its ability to effectively monitor and regulate food safety.
- **Perceived as Paperwork:** Many businesses view the regulatory process as mere paperwork rather than seeing it as an opportunity for regular inspections and guidance from experts.
- **Procedural Shortcomings:** In cases like Vital Neutraceuticals incident (2015), the FSSAI's actions were overturned by the Judiciary due to procedural errors, illustrating flaws in FSSAI's enforcement processes.
- **Inadequate Consumer and Business Education:** Despite its mandate, the FSSAI has been ineffective in educating businesses and consumers about food safety.

What are the consequences of these regulatory shortcomings?

- **Health Concerns:** Lax standards and poor enforcement leads to unhealthy quality of processed food products. Consumption of such foods can lead to poor impact on health including diseases like diabetes.
 - According to NFHS-5 estimates, ~3.4% of children below 5 years were overweight in India.
- **Damaged Reputation:** Poor nutrition standards and quality has led to rejection of India-made products abroad. This has damaged reputation of Indian products and hurt export of food products.

What steps have been taken so far?

- Ministry of Commerce and Industries has directed e-commerce platforms to remove products with high sugar content (like Bournvita) from the **health-drinks category**.
- The Ministry of Commerce has asked for further details from Singapore and Hong Kong about their findings. It is hoped corrective steps will be taken based on the information shared by these nations.
- The Spices Board has begun to implement mandatory ethylene oxide residue testing for spice consignments.
- Some companies have **announced reduction in the sugar content** in their products including Mondelez (Bournvita) and Nestlé.

What should be the way forward?

- Rising cases of **juvenile diabetes** should push FSSAI to **make standards** related to sugar content in the processed foods **more stringent**.

- There is a need for a stronger standard and regulation in the processed food industry in general.
- **Front-of-Pack Nutrition Labelling:** The FSSAI is contemplating the introduction of front-of-the-pack nutrition labels. This change will help consumers make more informed choices by clearly **displaying nutritional information** on product packages.
- **Indian Nutrition Rating System:** In September 2022, FSSAI proposed an **Indian Nutrition Rating System**, a star rating method to **assess the nutritional profile of packaged foods**. This system could rate items from half a star to 5 stars, providing a quick and understandable assessment of food quality. These initiatives should be **implemented at the earliest**.
- The Government should also follow the Supreme Courts observation about taking **strong action against consumer goods companies that indulge in misleading advertisements** for products related to children and babies.

9. India-Nepal Border Dispute

News: The new 100 Nepali Rupee note will feature a map of Nepal containing some areas belonging to India. This has sparked controversy.

What is the Border Dispute Between India and Nepal?

- The India-Nepal border dispute is largely over a 372-sq-km area that includes Kalapani, Limpiyadhura, and Lipulekh at the India-Nepal-China trijunction in Uttarakhand's Pithoragarh district.
- Additionally, Susta Region in West Champaran district, Bihar is also disputed.

Kalapani Region

- The **Treaty of Sugauli** signed by the Kingdom of Nepal and British India (after Anglo-Nepalese War) in 1816 located the **Kali River as Nepal's western boundary with India**. The Kali River in the Kalapani region demarcates the border between India and Nepal.
- The discrepancy in **locating the source of the Kali river** has led to boundary disputes between India and Nepal. Each country has produced its own maps supporting their own claims.

Nepal's stand

- Nepal is of the view that the **river which flows to the west of Kalapani is the main River Kali**. They also believe that River Kali originates at either Limpiyadhura or the nearby Lipulekh pass, which are both within the Nepalese territory.



India's stand

- India believes that the River Kali originates from a smaller rivulet named Pankhagad. It lies on the southern portion of Kalapani. Hence, it is the true border, and the Kalapani territory lies in India.

Lipulekh and Limpiyadhura Region

- Lipulekh and Limpiyadhura (Limpiya pass) located on the Nepal-Tibet border. Lipulekh is the shortest route to reach Taklakot, a Tibetan township of China.
- Nepal claims that the Indian army has encroached on both regions after the offering of the territories by King Mahendra in 1962.

Susta Region (West Champaran, Bihar)

- Susta, is a 145-sq-km area that had fallen on the Indian side after the **River Gandak changed course**.
- Through the 1816 Treaty of Sugauli, the west side of the Gandak river belongs to Nepal and the eastern part of the river belongs to India. But due to **frequent change of course by the Gandak river**, the Susta region at present belongs to the Eastern part. This has not been accepted by Nepal.



What steps have been taken for the resolution of India-Nepal Boundary Dispute?

- In the 1980s, India and Nepal set up **the Joint Technical Level Boundary Working Group** to delineate their boundary. The group demarcated every border **except Kalapani and Susta area**.
- Several efforts were made in the 1990s and 2000s, including at the highest level (Prime Ministers) to resolve the dispute. However, there has been **no positive outcome**.
- In 2014, the Prime Ministers of two countries agreed to set up a boundary working group for speedy settlement of the border issue in Kalapani and Susta. However, the issue has not been resolved between the two countries.
- A **Constitutional Amendment Bill** has been passed by **Nepal's Parliament** to **legitimize the alteration to the country's map** with the addition of Kalapani, Lipulekh and Limpiyadhura.

What is the need to resolve the dispute?

Both India and Nepal are dependent on each other for various reasons and resolution of dispute is essential for cordial relationship between the two countries.

- Strategic Location:** Nepal shares a border of about 1850 km with 5 Indian States. It is an important buffer State (between India and China) and is central to India's security interests.
- Security:** India plays a crucial role in ensuring the security and stability of Nepal, supporting its defence and border management.
- Energy Cooperation:** Nepal's hydropower can contribute to India's renewable energy requirements. This will help India achieve its climate action (Panchamrit) obligations.
- Regional Stability:** A stable and friendly Nepal is essential for India's overall regional stability and influence. It will also help to counter the growing Chinese influence in the region.

- **Connectivity and Economic Dependence:** Nepal relies on India for trade and transportation of goods, as well as access to sea routes. Good connectivity can boost India-Nepal Trade which can also help in the development of backward border regions of UP and Bihar.
- **Cultural and Religious Ties:** India and Nepal share a deep cultural and religious heritage, which strengthens their social bonds.
- **Assistance and Support:** During times of crisis, such as the 2015 earthquake, India has acted as the first responder and has provided significant aid and support to Nepal.
- **Infrastructure Development:** India's involvement in infrastructure projects, such as hydropower, contributes to Nepal's economic growth and development.

What are the challenges in resolving border disputes?

- **Cartographic Disagreements:** India and Nepal have disputes over the historical maps issued by the British Surveyor General of India in 1819, 1821, 1827, 1856, 1921 and 1947.
- **Frequently Change in River Courses:** Since the boundaries have been demarcated based on the drainage pattern of the rivers, the **meandering of these rivers has resulted in boundary disputes**.
- **Growing Chinese Influence:** There has been an increase in the Chinese influence in the domestic affairs of Nepal. This has also resulted in the aggravation of the border disputes.
- **Anti-India Feeling:** The 134-day blockade of Nepal in September 2015 and the Madhesi issue has created significant distrust against India in Nepal. This has led to the prolongation of the border dispute between India and Nepal. It has prompted Nepal to sign a **trade and transit agreement with China** in order to create a fallback source for the supply of essential goods.

What should be the way forward?

- **Establishment of Permanent Mechanism of Boundary Dispute Resolution:** A permanent mechanism of boundary dispute resolution must be established between India and Nepal for peaceful resolution of disputes through diplomatic channels.
- **Addressing the Geographical and Ecological Concerns:** A consultative approach must be evolved where ecological concerns and the changing geographical patterns of the rivers are addressed.
- **Mutual Addressal of Concerns:** The Government of Nepal has to shed its rigid stance of territorial nationalism. Government of India should be more accommodative to Nepal's concerns, to arrive at a mutual consensus to resolve the boundary concerns.

The India-Nepal relationship is a unique relationship, built by friendship and cooperation with deep cultural and civilizational links. The border dispute is one of the important issues to solve to take India and Nepal relations to another level. Both countries should take steps to overlook the recent differences and work together to resolve the dispute as early as possible.

10. India's Global Rise Amidst Regional 'Decline'

News: India's diplomacy faces a unique challenge. India's stature is rising globally but at the same time, India's neighbouring countries have gradually drifted towards China.

What are the reasons behind India's global rise?

- India's inclusion in the key global institutions like G-20, G-7, Quad, BRICS, and SCO highlight India's geopolitical significance and powerful global presence.
- India's global rise is attributed to growth in absolute power. Factors like **economic growth, military capabilities** and a **young demography** are driving this power.

- **Large size of Indian market**, which is expected to expand in the future due to favorable demography, has induced many developed nations to court India.
- **Flux in the geopolitics** (America's relative decline and China's rising stature) has improved the importance of rising powers like India.
- Increased **global focus on the Indo-Pacific**, where India plays a central role, has helped boost India's global standing.

What factors have led to decline in India's regional power?

India's influence in the immediate neighbourhood has relatively declined in the last few decades, characterized by deteriorating relationships with Maldives and Nepal.

- **China's Rise:** China has become an economic superpower. It has used its economic might to enhance its influence in India's neighbourhood by offering economic cooperation and finance.
- **India's Disproportionate Size:** India is disproportionately larger than all its neighbouring countries, in terms of size, economy and military strength. This makes them wary of India's role and intentions, and they look to other countries to balance India's influence.
- **Bargaining by Neighbouring Countries:** Smaller nations in India's neighbourhood have used China as a bargaining chip and as a hedge against India.
- **Domestic Politics of Neighbouring Countries:** Political parties (in the neighbouring countries) often portray India as a Big Brother, accusing the party in power/Government as being agents of India, for electoral benefits. This has happened in Maldives, Nepal and Bangladesh. This negatively impacts India's image among the common people.

What are the implications of this paradox for India?

- It weakens India's case as a **potential global power**. If India isn't able to maintain prominence in its periphery, how can it be a pivotal power in international politics.
- Rising Chinese influence is **detrimental to India's strategic interests** in its neighbourhood. India's relationship with China has undergone bitterness in recent years due to the border crisis. China may use its influence to undermine India's interest in the neighbouring countries.

What steps can be taken by India to regain its regional prominence?

- India should **focus on its strengths** rather than trying to match China's might in every aspect e.g., India can reclaim Buddhist heritage to build stronger ties with its neighbours (Bhutan, Sri Lanka etc.).
- **India's soft power** need to be **utilized innovatively** to maintain influence in the region, like promoting informal communication among political and civil society figures in countries where India is reluctant to engage directly in conflicts (e.g., in Myanmar).
- India should leverage its **maritime advantages in the Indo-Pacific** to address its **continental handicaps** by engaging smaller South Asian nations in the Indo-Pacific strategy e.g., India and its partners like the US, Japan etc. can find ways of engaging and partnering with Sri Lanka, the Maldives, and Bangladesh as part of their larger Indo-Pacific strategy. *(Experts use the term Continental Handicap to describe China military superiority over India in the Himalayan region due to terrain. Southern slopes of Himalayas are steeper posing significant challenge to India, while the terrain in Tibet is relatively plain making large scale mobilization of forces very easy for China).*
- India should **enhance economic cooperation** with neighbours through initiatives like **BBIN** and **BIMSTEC**. India's focus should be on implementation and outcomes.

General Studies Paper III

1. Wealth Redistribution in India

News: Wealth redistribution has become one of the central themes of the election campaigns in the ongoing General Elections 2024.

What has been Government's Approach to Wealth Redistribution in India?

- The Constitution of India contains several provisions for equitable distribution of wealth (**Preamble** (social and economic justice), **Directive Principles** (Article 39)). The Government has taken several steps for wealth redistribution post-Independence.
- **Right to Property** was removed from Fundamental Rights and **made a Constitutional Right**.
- The Government adopted a **Socialist Model of Economy** after Independence.
 - Policies like **Nationalisation of banking and insurance** sectors, extremely **high rates of direct taxes** (up to 97% in the 1970s), **Estate duty** on inheritance, **tax on wealth** and the **Monopolies and Restrictive Trade Practices Act, 1969** (MRTP Act) that curbed unfair trade practices, were adopted.
 - The steps were aimed at **reduction of inequality** and **redistribution of wealth** among the poorer sections.
- However, **these measures stifled growth** and also resulted in the **concealment of income/wealth**.
- Taxes like **estate duty** and **wealth tax** generated revenue that was **much less than the cost incurred on administering them**.

What has been the Government policy in the post-liberalisation era?

- Indian economy adopted the **modern liberal welfare economist model**, with the Government **opening up the economy to private players**, raising resources through taxes and **redistributing them using a welfarist approach**.
 - The Indian economy moved from **closed economy** model towards **liberalization/privatization** in the '90s.
- The **New Industrial Policy** was adopted in 1991 to **empower market forces**, improve efficiency and rectify deficiencies in the country's industrial structure.
- The **MRTP Act was repealed**. It was replaced with the **Competition Act, 2002** and income tax rates were reduced considerably.
- **Estate duty was abolished in 1985** and **wealth tax** was abolished in 2016.
- The market driven economy has resulted in **additional resources for the Government** that has helped in bringing people out of abject poverty e.g., India has registered a **significant decline in multi-dimensional poverty** from **29.17% in 2013-14** to **11.28% in 2022-23**.
- However, these policies have not been able to address the **growing problem of inequality** in India. There has been concentration of wealth in the hands of few.

What is the need for redistribution of wealth in India?

- **Rising Wealth and Income Inequality:** According to a report by the World Inequality Lab, the top 10% of the country's population has a share of 65% and 57% of the wealth and income respectively as of 2022-23. The bottom 50% have a share of 6.5% and 15% of the wealth and income, respectively.
- **Reduction of Inter-generational Inequalities:** Concentration of wealth **perpetuates inequality and poverty**. Those lacking wealth are **unable to acquire education and other resources** (skills, capital etc.). Those born in poor families continue to remain poor. Wealth redistribution will provide the poor with necessary resources for **upward mobility**. (Refer EPIC March 2024 (click) for World Inequality Lab Report: Income and Wealth Inequality in India 1922-2023).

What are the challenges to redistribution of wealth in India?

- **Political Resistance:** Redistributive policies face resistance from **powerful interest groups** and vested interests, including wealthy individuals and corporations.
- **Large Informal Economy:** Redistribution of wealth fails to reach informal economy, which are characterized by low wages, lack of job security, and limited access to social protection. This makes it challenging to effectively address the inequality.
- **Deep-rooted Social Inequalities:** There are deep-rooted caste, gender, religious, and ethnic inequalities in India. The social inequalities perpetuate economic disparities and hinder the effectiveness of redistributive policies, as **marginalized groups face barriers** in accessing resources and opportunities.
- **Capacity Constraints:** India's institutional capacity to effectively implement redistributive policies is limited by **bureaucratic inefficiencies**, **inadequate infrastructure**, and **resource constraints**. Corruption and leakages in the welfare schemes have limited the benefits accruing to the poor.

Challenges Associated with Wealth and Inheritance Tax

- **Complexity:** Estate Duty was prevalent between 1953-85. Rate was ~85%. This complicated implementation. Tax administration in India lacks fairness, adherence to the rule of law, and suffers from the arbitrary power of tax officials.
- **Low Revenue:** Wealth Tax was prevalent between 1957-2015. It had contributed only INR 800 crore between 1956-2012. Taxes on Estates and Inheritances are common in advanced economies but they contribute only 0.5% to tax income of OECD countries.
- **Disincentives:** High tax on wealth and inheritance disincentivises wealth creation and entrepreneurship.
- **Tax Avoidance:** There is tendency to avoid taxes by exploiting loopholes.
- **Relocation:** Businesses may relocate to friendly jurisdictions such the UAE (Dubai), Cayman Islands, Singapore, or Ireland or other tax havens. This hampers domestic economic growth besides loss of tax revenue.

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What should be the way forward?

- **Introduction of Inheritance Tax with Higher Threshold:** An inheritance tax with higher threshold can be introduced for redistribution of wealth. A moderate inheritance tax of 10-15% (like other Asian nations such as the Philippines, Taiwan and Thailand) on India's 101 billionaires (older than 65 years old) who collectively own INR 10.54 trillion can create a financial base of wealth redistribution. (*Read more on Inheritance Tax in India here*).
- **Strengthening of Institutional Capacity:** The governance mechanisms must be strengthened to ensure the efficient delivery of welfare services and benefits. Leakages in welfare schemes can be plugged through the use of technology.
- **Socio-Political Consensus:** Socio-Political consensus must be created on **progressive taxation** and welfare programs to address income inequality and promote equitable wealth distribution.
- **Reframing of Government Policies:** The Government policies must be reframed in line with the current economic model so that **innovation and growth are not curtailed**, while the **benefits of the growth reach all the sections of the society**, especially the marginalized sections.

2. Adopting a Living Wage Approach in India

News: The Government is seeking technical assistance from the ILO to bolster its capacity for systemic data collection, a move intended to establish a framework for calculating and implementing a living wage. The Government aims to transition from the minimum wage to the living wage by 2025.

What is the current situation regarding minimum wage in India compared to other countries?

- India's National Floor Level Minimum Wage (NFLMW) of **INR 176 (US\$ 2.1) per day** was last updated in 2017.
- It is one of the lowest in the Asia-Pacific region. It's lower than countries like China (US\$ 11.9), Vietnam (US\$ 6.9), and even Bangladesh (US\$ 3.7). Brazil's minimum wage is closer to that of developed economies like Australia (US\$ 14.8) and the UK (US\$ 14.1).

What are the issues with the current minimum wage in India?

- Disparity:** The Government regularly updates dearness allowance (DA) for the Central Government employees to compensate for the inflation. However, the **minimum wage remains unchanged**. This leads to a **disparity between the minimum wage and the cost of living**.

Living Wage vs Minimum Wage

A living wage considers essential expenses such as housing, clothing, food, education, healthcare, and overall standard of living.

In contrast, minimum wages are based on labor productivity and skill levels.

Living wages are generally higher than minimum wage.

- Disparities in Minimum Wages across States:**

There are widespread disparities in prescribed minimum wages across States with INR 176 in Nagaland and INR 673 in Delhi. States like Karnataka (INR 581), Goa (INR 523), Maharashtra (INR 503) have high wages while West Bengal (INR 378), Rajasthan (INR 259) have low minimum wages.

- Insufficient Minimum Wages Across States:** The current monthly minimum wages across States are **not adequate for a family to maintain a decent standard of living**, especially with rising inflation.

What is the importance of Adopting Minimum Wage or Living Wage?

- Social Importance:** Increasing the minimum wage or transitioning to a living wage could **alleviate poverty, reduce inequality, and improve living standards**.
- Economic Importance:** Increased incomes will **boost spending and stimulate the economy**. This may also enhance the demand for affordable housing and home ownership over time. It will have **multiplier effect** across the economy.

What concerns have been raised about the hikes in the minimum wage?

- Concerns about Hiring:** Opponents of minimum wage hikes fear **negative impacts on hiring**, especially by smaller enterprises. However, studies from other countries show mixed results, indicating uncertainty about the impact in India.
- Implementing a Fair Living Wage:** Introducing a mandatory fair living wage requires **strict enforcement of wage regulations**. Ensuring compliance across different employment statuses, genders, and skill levels would be challenging.



| WHAT'S THE DIFFERENCE? | WAGE FLOOR |
|--|--|
| LIVING WAGE Takes into account basic expenses such as housing, food, clothing, education and healthcare, and standard of living | ₹176 a day Current national wage floor, not revised since 2017 |
| MINIMUM WAGE Based on labour productivity and skillsets | Not binding, so it's even less than that in a few states |
| Living wages higher than minimum wages | ₹375 a day Wage floor proposed by Anoop Satpathy panel in 2019 |
| | Was put on backburner with outbreak of pandemic |
| | New panel fired up report to set wage floor |

- **Inflation:** Increase in wages will raise the general demand level. There are concerns that a sudden rise in minimum wage can contribute to a **large rise in inflation**.

What should be the way forward?

- **Governmental Support:** In the initial phase after wage hike, the Government can provide support like **tax waivers** to **ease the economic strain on smaller businesses** due to higher wages.
- **Reforms in Social Security Contributions:** Experts suggest that enhancing minimum wages should not be accompanied by increased salary deductions for social security benefits like provident fund and ESIC (Employees' State Insurance Corporation). Instead, the government must abolish ESIC contributions by employees and reduce the employer's ESIC contribution from 3.2% to 1.5%.
- **Regular Inflation Adjustments:** Once established scientifically, the minimum or living wage should be adjusted for inflation periodically, preferably every 2 years.

Strict implementation of living wage could help more individuals transition to formal employment while raising living standards and supporting economic growth.

3. Concerns Related to Household Savings in India

News: The trend of savings in India has changed in recent times. Household debt is rising, which can have profound consequences for the economy.

What is the current trend of savings in India?

- **Rate of Domestic Savings:** India's savings rate has historically been strong, peaking at 35% of GDP in 2012 and currently ~30%. (Savings in the total economy including household, private corporate and the public sector).

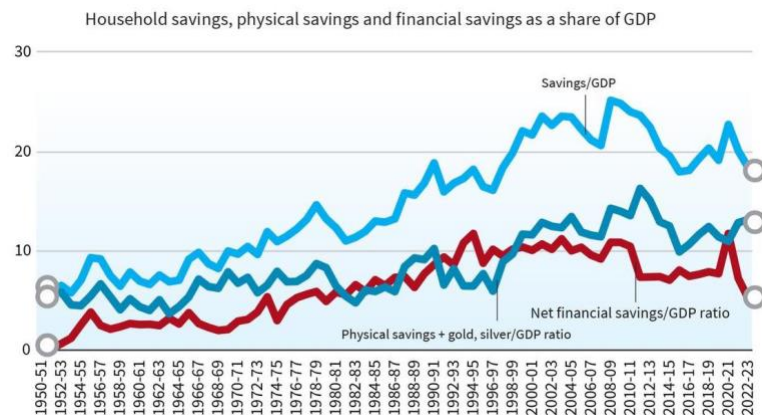
- **Fall in the Household Savings:** Household savings have shown a declining trend. India's household savings has decreased from 22.7% of GDP in 2020-21 to 18.4% in 2022-23. The post-1991 average has been 20.5%.

- **Physical savings have slightly increased.** The household physical investment to GDP ratio has moved from 12.6% to 12.9%.

- A significant portion of household savings (~60%), is invested in **physical assets** such as **housing, land, agriculture, and gold**.

- **Financial savings** have significantly decreased, with the gross financial savings to GDP ratio falling from 7.3% to 5.3% in 2022-23.

- **Rising Household Borrowing:** The household borrowing has risen from 3.1% of the GDP in 2019 to 4.8% in 2024. The borrowing has been primarily for consumption (instead of investment).
- **Interest payments have increased,** contributing to higher household debt and affecting overall net financial savings despite stable consumption rates.



Source: The Hindu. Trend of total household savings, financial and physical savings. After peaking around 2010, the ratio has fallen. Financial savings have witnessed a more dramatic fall.

What are the reasons for decline in financial savings?

- **Increased Consumption:** Households are either borrowing more or using their savings to fund higher consumption.
- **More Physical Investment:** Households are investing more in physical assets, slightly reducing their financial savings.
- **Higher Interest Payments:** Increasing interest rates have led to higher interest payments, prompting households to either borrow more or dip into their savings, which lowers their net financial savings.

What are the major concerns related to savings in India?

- **Reduced Funds for Borrowing:** The preference for physical savings means less money is available in the financial system for borrowing by the Government and organized/corporate sectors.
- **Increased Cost of Capital:** With fewer financial savings, the **cost of borrowing increases** for businesses and the Government, impacting investment and economic growth.
- **Interest Rate Management:** To lower borrowing cost for the corporates, the RBI keeps interest rates low. Low interest rates affect the value of financial savings (lower interest income) and **encourages more physical savings** (land and gold).
- **Rising Debt Burden:** Rise in debt levels of households impact their financial stability and increase their vulnerability to economic shocks.
- **Lower Consumption:** Higher debt level (and interest payments) lower the disposable income. This leads to lower consumption. Low consumption for prolonged periods will lead to economic slowdown as private sector cuts down the production due to fall in demand.
- **Possibility of Middle-Income Trap:** The consumption-oriented debt pattern makes investment capital more expensive and could potentially lead to a middle-income trap, where economic growth stagnates, and the economy struggles to move to a higher income bracket.

What should be done?

- **Increase Financial Savings:** Financial savings should be encouraged over physical savings. This will ensure more capital is available for investment by corporate sector. It will boost economic growth.
- **Managing Household Debt:** Government policies should focus on **curbing non-essential borrowing** and promoting savings.
- **Strengthen Financial Policy:** The Government should modify fiscal policy to avoid **financial repression**. This will lower the borrowing cost for private investment. *Financial repression refers Government policies that divert funds away from private sector towards the Government to allow it (Government) to repay its debts.*

4. The Importance of Blue Economy for India

News: 'Blue Economy' is being termed as one of the major pillars for economic growth of India to achieve the Viksit Bharat status by 2047.

What is 'Blue Economy'?

- World Bank defines blue economy as the **sustainable development of ocean resources** for economic growth, improved livelihoods, and jobs while **preserving the health of the ocean ecosystem**.
- The concept was first given by Gunter Pauli in 2010 in his book 'The Blue Economy, 10 years, 100 innovations, 100 million jobs'.
- Oceans contribute to around **3-5% of Global GDP** and over **80% of international goods transportation**. The UN has declared the period 2021-2030 as the 'UN Decade of Ocean Science for Sustainable Development'.

Activities Under Blue Economy

- The Blue Economy encompasses a diverse range of activities that are critical for sustainable development.

| Activity | Details |
|--------------------|--|
| Renewable Energy | <ul style="list-style-type: none"> Renewable and Sustainable marine energy resources like off-shore wind and tidal energy . |
| Fisheries | <ul style="list-style-type: none"> Sustainable management of fisheries ensures a continuous supply of fish for greater revenue while simultaneously contributing to the restoration of fish stocks. |
| Maritime Transport | <ul style="list-style-type: none"> Sustainable, safe and secured maritime transport connects nations and facilitates trade. |
| Tourism | <ul style="list-style-type: none"> Ocean and coastal tourism offer recreational opportunities, contribute to job creation and economic growth. |

Extent of Blue Economy in India

- India has a coastline of more than 7500 km spread across 9 States. India has an **Exclusive Economic Zone (EEZ)** of more than 2.2 million square km. India's blue economy accounts for ~4% of the GDP and is estimated to increase over the period of time.

What is the significance of Blue Economy for India?

Blue economy can contribute to India's economic growth in numerous ways.

Oceanic Resources

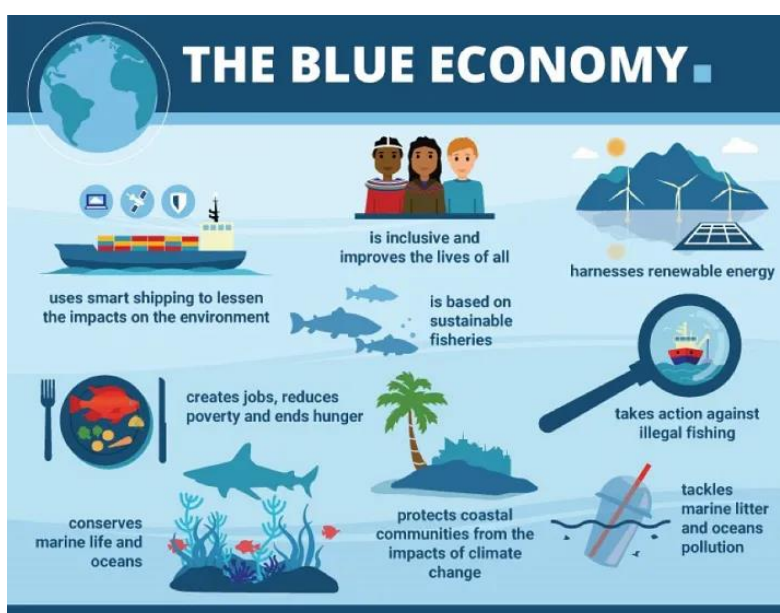
- Fisheries:** Indian marine fisheries constitute a major portion of India's agri-allied exports. India produced ~3.7 MMT of marine fisheries in 2019-20.
- Rare Earth Minerals:** The continental margins of India have an extensive variety of heavy and rare earth minerals like ilmenite, magnetite, monazite, zircon, and rutile.
- Hydrocarbons:** The oceanic sea beds are a major source of hydrocarbons. India has 26 sedimentary basins, spread across a total area of 3.4 million square km.
- Renewable Energy:** Renewable energy in offshore regions has tremendous potential in the form of offshore wind, waves, ocean currents, tidal currents, and thermal energy.

Ports, Shipping, and Marine Tourism

- Port-led Development:** India is focussing on port-led development with vast network of port connectivity.

India has more than 200 ports, of which 12 are major ports that handled 541.76 million tonnes in FY21.

- Shipping and Maritime Transport:** India has the largest merchant shipping fleets among the developing countries. ~95% of India's trade by volume and 68% by value is moved through maritime transport. Shipping sector has the potential to provide sustainable livelihood opportunities.
- Coastal Tourism:** Coastal Tourism has contributed largely to the development of India's tourism sector and livelihood creation.



Ocean Science and Services

- **Observations, Data, and Information Services:** The data set and information services help in providing information regarding Marine Fishery Advisories, Ocean State Forecasts, Tsunami and Storm Surge Early Warnings, Sea Level Rise, Oil Spill Trajectories etc. They are key to enhancing the safety of lives and livelihoods of coastal communities.
- **Conservation of Marine Biodiversity:** Sustainable use of oceans helps in the conservation of marine and coastal biodiversity.

Employment Opportunities

- Blue economy provides an avenue for employment generation to India's youth population in various fields like Fishing and Aquaculture, Marine Tourism, Shipbuilding etc.

What are the challenges associated with Blue Economy in India?

- **Overfishing:** Overfishing has emerged as a major challenge in India's coastal waters. It has led to depletion of fish stocks and harming of the marine ecosystem including in the Palk Bay because of use of **bottom trawlers**.
- **Marine Pollution:** Pollution from sources such as oil spills, plastic waste, and industrial effluent harm the marine ecosystems and have negative impacts on the blue economy. Industrial units situated near coast like the Petroleum Refinery in Chennai leads to high effluent discharge into the seas.
- **Lack of Infrastructure:** The lack of ports, airports, and road connectivity has hampered the development and expansion of economic activities in these regions.
- **Piracy and International Conflicts:** The piracy in the Indian Ocean region near the Red Sea and unsecured sea lanes of transport are a major threat to the development of Indian Shipping Industry. Further, the strings of pearls of China and conflicts over maritime boundaries are also a major challenge. India and Sri Lanka have a dispute over maritime boundaries that limit the utilization of marine resources.
- **Climate Change:** Rising sea levels, warming of oceans and amplification of cyclones pose risks to coastal communities and also have negative impacts on the blue economy.

What initiatives have been taken by the Government for the development of Blue Economy?

| Initiative | Details |
|---|---|
| Sagarmala Project | <ul style="list-style-type: none"> • It aims for holistic port infrastructure development along the 7,516-km long coastline through modernisation, mechanisation and computerisation. • The components include Coastal Infrastructure Development, Coastal Industrial Development, Coastal Community Development and Development of Coastal Tourism. |
| Integrated Coastal Zone Management Plan | <ul style="list-style-type: none"> • ICZM is a process for the management of the coast using an integrated approach, to achieve the goal of sustainable management of coastal regions. |
| Deep Ocean Mission | <ul style="list-style-type: none"> • It is a program to explore and harness the depths of the ocean. • The mission aims to address scientific and economic challenges associated with ocean exploration and resource utilization. |
| O-SMART | <ul style="list-style-type: none"> • The scheme encompasses a total of 16 sub-projects addressing ocean development activities such as Services, Technology, Resources, Observations and Science. |

What should be the way forward?

- **Skill Development Initiatives:** Skill development initiatives along with the **preservation of traditional knowledge** are integral to harnessing the full potential of the blue economy and ensuring prosperity for all.
- **Blue Diplomacy Cadre:** The Government must aim to develop a 'blue diplomacy cadre' through the use of policies and platforms such as SAGAR, IORA, BIMSTEC etc. in the Indo-Pacific region. This will be helpful in peaceful resolution of all international disputes and securing global maritime transport routes.
- **Coastal and Marine Spatial Planning:** This scientific approach should be used to analyse and allocate coastal and marine resources over space and time. It will help in sustainable fisheries development and optimum use of oceanic mineral resources.
- **Proper waste Disposal Policies:** Proper waste disposal policies related to elimination of plastic waste and marine litter, that prevent pollution, accumulation of marine debris must be enacted and implemented.
- **Research and Funding:** Funds must be provided for R&D in the emerging fields of blue economy such as marine biology, marine technology, marine chemistry, geology, shipping, oceanography.

5. Vaccine Regulation in India

News: The major Global Pharmaceutical Manufacturer AstraZeneca has admitted that its COVID-19 vaccine (Covishield) can cause a rare side effect of blood clotting and low platelet count. ~175 crore doses of the vaccine were administered to Indians. It has put spotlight on vaccine regulations in India.

How are vaccines regulated in India?

- In India, the regulations for the approval of new drugs, which include vaccines, are governed by the **New Drugs and Clinical Trial Rules, 2019**.
- The steps in the vaccine approval process include:
 - Identification and development of an appropriate **vaccine strain** that is potentially **safe** and **immunogenic**.
 - Full characterisation of the vaccine strain by **in-vitro experiments**.
 - **Pre-clinical studies** in **small animals** such as mice, rabbits, guinea pigs to determine safety and dose regime.
 - **Preclinical studies** in **large animals** to determine safety, protective efficacy and potential dose and formulation.
 - **Phase-I human clinical trials** on **less than 100 individuals** to establish the **safety of the vaccine**.
 - **Phase-II human clinical trials** on usually **less than 1,000 individuals** to determine the **immunogenicity** or immune protection.
 - **Phase-III human clinical trials** in **several thousands** to determine **vaccine efficacy**.
 - **The regulatory approval is accorded after the successful completion of phase III studies.**
 - **Phase-IV human clinical trials** refer to **post-marketing surveillance studies**. This data is analysed for long-term decision-making.

Which Acts and Regulatory Bodies are associated with regulation of vaccines in India?

The manufacture of vaccines in India is strictly controlled by a hierarchy of regulatory bodies.

- Guidelines provided by the **Indian Council of Medical Research (ICMR)** set the **rules of conduct for clinical trials**. These guidelines address **ethical issues** that arise during Phases I-IV of every vaccine study.
- The **licences and permissions** required for the manufacture of any vaccine are obtained under the **Drugs and Cosmetics Act, 1940**.
- Clinical study reports after the completion of each phase of the trial (Phase I, II, III, IV) are furnished to the **Central Drugs Standard Control Organisation (CDSCO)**.

- Upon successful completion of all 3 phases of the trials (Phase I, II, III), a **market authorization application** is filed by the manufacturer, as per Rule 122B of Drugs and Cosmetics Rules 1945 (Rules).

Relaxation Provided During Pandemic

- **Emergency Use authorizations (EUA)** were provided to the vaccines for early remedy of the growing malaise of COVID-19. Special provisions for accelerated approval for a vaccine were employed, for the vaccines which showed '**Remarkable Efficacy**' during Phase-II trials.

What are the challenges associated with the Vaccine regulatory approvals in India?

- **Challenges with Clinical Trials:** The clinical trials in India have been plagued by the problems of mistrust, arbitrary decree, opacity and lax regulations. There have been reports of **animal cruelty** in clinical trials.
- **Delays in Approval:** The procedure for receiving regulatory approval is time consuming. The **regulatory and bureaucratic delays** have been a sore point in urgent situations like epidemics or emergencies.
- **Primarily Focussed on Foreign Approval:** India's regulatory framework has been primarily focused on analyzing formulations that have received foreign regulatory approval and determining their appropriateness for India. '**Emergency Use Authorizations (EUA)**' generally use foreign regulatory approvals.
- **Inadequate Regulation:** Poor regulation of vaccine floods the market with poor-quality fake medications. The lack of efficiency, safety, and potency standards endangers the life of patients.
- **Inadequate Monitoring:** The inadequate monitoring of **adverse drug reactions** and lack of proper **post-market surveillance** hampers the proper detection and reduction of possible dangers from the adverse reactions of vaccines.

What should be done to improve vaccine regulation in India?

- **Strengthening of Regulatory Oversight:** The Government must augment the resources and capacity building of regulatory agencies like CDSCO and the Drug Controller General of India like FDA in the United States or the EMA in the European Union. This will help in proper regulatory scrutiny.
- **New Drugs and Clinical Trials Rules During Health Emergencies:** There should be clear guidelines on the process to be followed for vaccine approval during exigencies and epidemics.
- **Single Regulatory Agency:** The establishment of a single regulatory body will enhance oversight and quicken the approval process for medications.
- **Post-Market Surveillance:** Systems for post-market surveillance like VAERS in the United States, will enable us to detect cases of rare adverse events and ensure timely responses to emerging safety concerns.
- **Pharmacovigilance:** The current gaps in the regulatory landscape can be filled by creating effective pharmacovigilance programs and encouraging transparency and accountability.

6. Impact of Large Solar Power Plants

News: The Government has pushed for solar power to fulfill India's Climate Action obligations. However, large solar plants have several negative impacts which must be addressed.

What are the impacts of the large-scale solar parks?

Positive Impacts

- **Steady Income for Landowners:** In regions like Pavagada, Karnataka, farmers benefit from leasing their drought-stricken land to solar parks, providing a **reliable annual income**.
- **Renewable Energy Production:** Solar parks significantly **contribute to India's renewable energy output**, helping reduce dependency on fossil fuels and aiding in the pursuit of Net Zero Emissions by 2070.
- **Employment Opportunities:** Large-scale renewable energy projects can generate job opportunities at the local level, contributing to employment growth in the regions where they are established.

Negative Impacts of Large-Scale Solar Parks

- **Land Requirements:** At present, 214 sq. km of land is under solar parks. However, estimates suggest that up to 75,000 sq. km may be needed, to reach Net Zero greenhouse gas emissions by 2070.
- **Loss of Common Lands:** Near Bhadla, Rajasthan, solar parks have led to the **loss of sacred common lands** and grazing areas, negatively affecting local farmers and pastoralists.
- **Competition for Resources:** Large solar power plants require huge amount of water for solar panels. This demand for water will compete with local demand (for drinking etc.) impacting water security.
- **Biodiversity and Ecosystem Disruption:** Construction of solar parks can lead to loss of biodiversity, especially in sensitive ecosystems like deserts, impacting overall ecological balance. The Great Indian Bustard is facing existential threat due to large solar and wind projects in Rajasthan.

What should be the approach going ahead?

- **Expand Community Engagement:** Solar Park developments should **involve local communities** in planning and decision-making to **align projects with local needs** and prevent conflicts, similar to the community leasing in Pavagada.
- **Revise Legal Frameworks:** Laws should be strengthened to require Environmental and Social Impact Assessments for solar parks to prevent adverse effects on local communities and ecosystems.
- **Promote Agrivoltaics:** Agrivoltaic systems that combine agriculture with solar energy, providing dual land use for energy production and farming should be utilized. They maximize land efficiency and support local economies.
- **Enhance Training Programs:** Targeted training programs should be developed to equip local populations with new skills, ensuring they benefit from shifts in employment opportunities due to renewable energy projects.

7. Global Warming and Mass Coral Bleaching Events

News: According to the US National Oceanic and Atmospheric Administration (NOAA), the fourth global mass coral bleaching event has been triggered by extraordinarily warm ocean temperatures. It can have serious consequences on marine ecosystems and livelihoods of coastal communities.

What are Corals and Coral Reefs?

- Corals are small (0.25-12 inches), **soft-bodied marine invertebrates** (not possessing a spine). They belong to the group cnidaria.
- They are **sessile animals** which permanently attach themselves to the ocean floor.
- Each individual coral animal is known as a **polyp**. A polyp lives in groups of hundreds to thousands of genetically identical polyps that form a 'colony'. They use their tiny tentacle-like hands to catch food from the water and sweep into their mouth.
- The coral polyps have microscopic alga called **zooxanthellae** living within their tissues.
- The corals and algae have a **mutualistic relationship**.

Hard and Soft Corals

Hard corals are called **hermatypic** or '**reef building**' corals. They extract calcium carbonate from the sea-water to build hard, white coral exoskeletons.

Soft corals attach themselves to older skeletons built by their ancestors. Soft corals add their own skeletons to the hard structure over the years gradually forming coral reefs. They are the largest living structures on the planet.

Sessility

Sessility is the biological property of an organism describing its **lack of a means of self-locomotion** (i.e., unable to move by itself). Sessile organisms **can move via external forces** (such as water currents), but are usually permanently attached to something.

- The coral provides the zooxanthellae with the compounds necessary for photosynthesis. In return, the zooxanthellae supply the coral with organic products of photosynthesis, like the carbohydrates, which are utilized by the coral polyps for synthesis of their calcium carbonate skeletons.

Symbiotic Relationships Between Species

Mutualism: Both species benefit from the relationship.

Parasitism: One species benefits, other is harmed.

Commensalism: One species benefits, other is neither benefitted nor harmed.

- In addition to providing corals with essential nutrients, **zooxanthellae are responsible for the unique and beautiful colours of corals.**
- Coral reefs in India are located in 7 regions: Goa coast, Kerala coast, Palk Bay, Gulf of Kutch, Gulf of Mannar, Lakshadweep islands and Andaman and Nicobar islands.

What is the significance of Corals?

- **Marine Biodiversity:** Corals are called Rainforests of the Sea. Coral reefs support over 25% of marine biodiversity, including fish, turtles and lobsters, while taking up 1% of the seafloor. The Great Barrier Reef contains over 400 coral species, 1,500 fish species, 4,000 mollusc species and 6 of the world's 7 sea turtle species.
- **Economic value:** Coral structures provide economic goods and services worth about US\$ 375 billion each year. More than 500 million people across the world dependent on coral reefs for food and income.
- **Coastal Protection:** Coral reefs absorb up to 97% of the energy from waves, storms, and floods, which prevents loss of life, property damage, and soil erosion.

Loss of corals thus disturbs ecosystems, causes loss of marine biodiversity, causes economic loss to coastal communities (loss of tourism, fishing etc.) and increases vulnerability of coastal areas to storms and surges.

What is Coral Bleaching?

- When corals are stressed by changes in conditions such as temperature, light, or nutrients, they **expel the symbiotic algae** (zooxanthellae) living in their tissues, **causing them to turn completely white**. This is called coral bleaching.
- Bleached corals can survive depending on the levels of bleaching and the recovery of sea temperatures to normal levels. If heat-pollution subsides in time, over a few weeks, the **zooxanthellae can come back** to the corals and restart the partnership. But severe bleaching and **prolonged stress in the external environment can lead to coral death**.
- There have been **3 Mass Coral Bleaching Events** in the past; **1998** (~8% of corals destroyed globally), **2010** (~35% corals destroyed) and **2014-17** (~56% of corals affected globally).
- Fourth global bleaching event is currently underway. ~ 54 countries have confirmed bleaching.

What factors cause Coral Bleaching?

- **Rise in Sea Temperature:** The rise in global warming has led to increase in the sea temperatures which has resulted in the destruction of corals.
- **Ocean Acidification:** Oceans have absorbed a large amount of carbon dioxide from the atmosphere. This has increased the acidity of ocean water. This inhibits the coral's ability to create calcareous skeletons, which is essential for their survival.
- **Solar and Ultraviolet Radiation:** Changes in tropical weather patterns result in less cloud cover and more radiations which induce coral bleaching.
- **Infectious Diseases:** Penetration of bacterium like vibrio shiloi inhibits photosynthesis of zooxanthellae. These bacteria become more potent with elevated sea temperatures.

- **Chemical Pollution:** Increased nutrient concentrations affect corals by **promoting phytoplankton growth**, which in turn supports increased numbers of organisms that compete with corals for space.
- **Human Induced Threats:** Over-fishing, pollution from agricultural and industrial runoff, coral mining, development of industrial areas near coral ecosystems adversely impact corals.

What initiatives have been undertaken to protect Corals?

| Initiative | Details |
|------------------------------------|--|
| International Organisations | <ul style="list-style-type: none"> • International Coral Reef Initiative, Global Coral Reef Monitoring Network (GCRMN), Global Coral Reef Alliance (GCRA) and The Global Coral Reef R&D Accelerator Platform have been established to deal with the issue. |
| Biological Restoration | <ul style="list-style-type: none"> • It uses methods for coral growth and transplanting to assist the restoration of a coral reef. • It includes asexual propagation and Coral Gardening. • It involves the construction of artificial reefs, or relocation of rocks/dead coral heads. |
| Structural Restoration | <ul style="list-style-type: none"> • The goal is to increase the amount of reef structure and habitat available for the corals and other reef organisms to grow on e.g., the Bio rock technology. |
| Physical Restoration | <ul style="list-style-type: none"> • It addresses the conditions in which the corals are growing to improve their health, growth rates, or reproductive ability. |

What should be the way forward?

- **Check Unplanned Development:** Halting unplanned coastal development would play a significant role in reversing the decline of reefs.
- **Sustainable Fishing:** Promoting sustainable fishing and ecotourism can help conserve corals.
- **Minimal use of Chemical Fertilisers:** Minimising the use of chemically enhanced fertilizers, insecticides, pesticides, and herbicides which are non-degradable and harm corals is needed.
- **Measures for Prevention of Global Warming:** All possible measures to prevent further warming of the planet should be undertaken since climate change is the greatest global threat to coral reef ecosystems.

8. Rising Incidents of Forest Fires in India

News: Forest fires are common in the dry months of March-May. However, this year the forest fire incidents in Uttarakhand were particularly devastating. Forest fires are worsening in terms of intensity and frequency.

What is the Status of Forest Fires in India?

- A forest fire is an **uncontrolled fire** that destroys large parts of the forest.
- In India, forest fires are most common during the November-June period. The Peak fire season typically begins in late February and spans about 12 weeks.
- According to the **India State Forest Report (ISFR)**, ~10.7% of the forest cover is very high to extremely fire prone and another 11.6% of forest cover is highly fire prone.
- States like Mizoram, Tripura, Meghalaya, and Manipur in the North-Eastern Part of India **exhibit the highest forest fire probability** in terms of its **frequency of occurrence**.

What are the reasons for Forest Fires in India?

Natural Causes

- **Lightning:** A lightning strike on power cables, trees, etc. can produce a spark triggering forest fires.

- **Volcanic Eruptions:** Hot magma in earth's crust is usually expelled out as lava during volcanic eruptions. The hot lava then flows into nearby fields or lands to start wildfires.

- **Heat Patterns:** Rising temperatures due to global warming make the forests more vulnerable to forest fires. Increased atmospheric temperatures and dryness (low humidity) provide favourable circumstances for a fire to start and spread.

- **Lack of Soil Moisture:** The dryness in the soil triggers fire in forests.

- **Natural Availability of Materials:** Availability of large quantities of dry wood, logs, stumps, dead leaves, dry grass and weeds in forest lands are also reasons of forest fires.

Anthropogenic Factors

- **Smoking:** Smoking is the leading cause of forest fires globally. Throwing away the cigarette butts without completely extinguishing them can lead to wildfires.

- **Campfires:** During camping or outdoor activities, people normally leave lit fires or combusting materials unattended which can cause wildfires.

- **Burning Debris:** Wastes and trash on several occasions are burned to ashes as a way of reducing the accumulation of rubbish. This also leads to forest fires.

- **Slash and Burn Cultivation:** This is one of the major reason for the fire in India's Northeastern region.

Higher Frequency of Forest Fires in March-April

Forest Fires are most frequent in March-April (sometimes till May).

Less Moisture: The soil moisture levels are low due to dry season since October. Forest soil loses the capacity to control the fire.

Combustible Materials: Low air and soil moisture results in dry wood, logs, dead leaves which increase the frequency and intensity of fires.

What initiatives have been taken by the Government to check forest fires in India?

| Initiative | Details |
|--|--|
| Forest Fire Alert System (FFAS) | <ul style="list-style-type: none"> • Forest Survey of India (FSI) has developed a FFAS to monitor wildfires in real-time. |
| MODIS (Moderate Resolution Imaging Spectroradiometer) Sensors | <ul style="list-style-type: none"> • Using these sensors, the real time information on forest is collected and sent to the Forest Survey of India. The FSI forwards the data by email to state, district, circle, division, range and beat levels. People in the locality receive SMS alerts. |
| National Master Plan for Forest Fire Control | <ul style="list-style-type: none"> • The Government has prepared the National Master Plan for Forest Fire Control. The Government aims to introduce a coordinated and integrated fire-management programme. |

What is the impact of forest fires?

- **Loss of Ecosystems and Biodiversity:** Forest fires destroy the habitats and the symbiotic relationships of diverse flora and fauna, leading to loss of ecosystems and biodiversity.

- **Forest Degradation:** Forest fires reduce the quality of certain forest features like soil fertility, biodiversity, and ecosystems. Forest fires reduce the ability for **carbon sequestration**.

- **Impact on Livelihood:** According to the 2011 census, 1.70 lakh villages in India have proximity to forests. The livelihood of several crores of people is dependent on fuelwood, bamboo, fodder, and small timber. Forest fires directly impact their livelihood.

- **Air Pollution:** Forest fires cause formation of huge clouds of smoke leading to massive air pollution.

- **Soil Degradation:** Forest fires kill beneficial soil microorganisms that are responsible for breaking down the soil and promoting soil microbial activities. The wildfires also make soils vulnerable to soil erosion.

- **Destruction of Wetlands:** Forest fires can lead to the destruction of wetlands within forests, which are protected by the forest.

What should be the way forward?

- **Capacity Development:** Capacity development of forest departments officials at different levels (national, regional, local) should be undertaken to effectively combat forest fires.
- **Forest Control Manuals:** Forest fire control manuals should be created for the field staff. It will help in early detection, reporting and controlling the fires.
- **Comprehensive Forest Fire Policy:** A cohesive policy or action plan should be formulated to set forth the framework for wildfire management. The policy should also incorporate the dimension of climate change.
- **Indigenous Knowledge:** Indigenous knowledge and techniques of local and tribal people should be used in comprehensive wildfire management.
- **Infrastructure Creation:** The infrastructure to support the firefighters should be improved e.g., construction of watchtowers and crew stations, hiring seasonal fire watchers to spot fires etc.
- **Development of Technology:** Modern firefighting techniques such as **radio-acoustic sound system** for early fire detection and **Doppler radars** should be adopted. The Government must aim at developing a National Fire Danger Rating System (NFDRS) and Fire Forecasting System for faster detection and control of fires.

9. Earthquake Preparedness in Taiwan

News: Taiwan witnessed a major earthquake of magnitude 7.4 recently. Yet the damage to life and property was minimal. In 1999, a magnitude 7.3 earthquake had led to deaths of more than 2,400 persons. This has been possible due to improvements in protocols related to Earthquake preparedness.

How has Taiwan improved its earthquake preparedness?

- **Strengthening Building Codes:** Following the devastating 1999 Ji-Ji earthquake, Taiwan implemented stringent building codes to enhance the **structural integrity** of buildings. This led to minimal damage during the 2024 Hualien earthquake, despite it being nearly as strong.
- **Establishing Early Warning Systems:** Taiwan has developed one of the most advanced **earthquake-monitoring networks** and **early warning systems** in the world. These systems provide critical early alerts that help reduce casualties and damage.
- **Public Awareness and Training:** Regular awareness campaigns and drills have **significantly improved public understanding** of earthquake risks and preparedness.
- **Legislative Reforms:** The **Disaster Prevention and Protection Act** was passed, and national centers were established to **coordinate earthquake response** and training, improving overall disaster management.
- **Innovative Technologies in Construction:** Key structures in Taiwan, such as Taipei 101, employ advanced technologies like **seismic dampers** and **base isolation systems** to mitigate earthquake effects. Notably, Taipei 101 uses a **tuned mass damper**, a large steel sphere that acts like a pendulum to stabilize the building during quakes. This technology played a crucial role in preventing damage during recent seismic events.

What can India learn from Taiwan?

- **Implementing Building Codes:** India can adopt Taiwan's approach of **enforcing stringent building codes**, ensuring safer constructions.
- **Enhancing Infrastructure Safety:** India should prioritize **earthquake-resistant infrastructure**, especially in vulnerable regions like the Himalayas, to mitigate risks effectively.
- **Improving Emergency Response:** Following Taiwan's lead, India can establish better emergency response systems and public awareness campaigns to minimize casualties and damages during earthquakes.

Factly

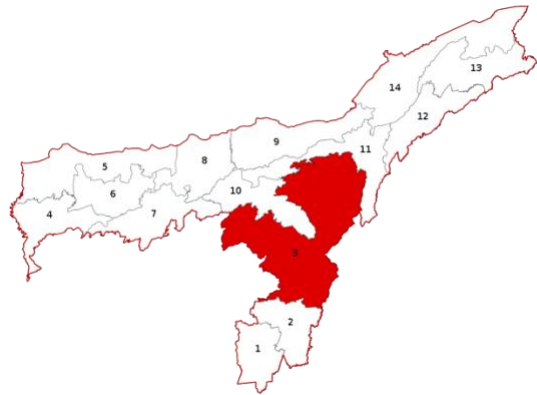
Polity

1. Article 244A of the Constitution of India

News: In the tribal-majority Diphu Lok Sabha Constituency in Assam, candidates have committed to implementing Article 244A of the Constitution.

About Article 244A of the Constitution

- Article 244A was introduced by **The Constitution (Twenty-Two Amendment) Act, 1969**.
- It grants the Parliament the authority to **establish an Autonomous State within Assam**, encompassing tribal areas such as Karbi Anglong. In the autonomous region, there can be a separate governing body like a **Legislature** or a **Council of Ministers (CoM)** or **both**.
- This arrangement represents a **significant advancement** compared to the governance structure outlined in the **Sixth Schedule**.
- Unlike the Councils established under the Sixth Schedule, which have limited authority over law enforcement and financial matters, **Article 244A provides for greater autonomy**, particularly in terms of law and order control, to tribal areas.
- The Parliament Law (to establish Legislature or CoM) may also:
 - Specify the matters enumerated in the **State or the Concurrent List** with respect to which the **Legislature of the Autonomous State shall have power to make laws** (such matters can be excluded from the purview of the Legislature of Assam).
 - Define the matters with respect to which the **executive power of the Autonomous State** shall extend.
 - Provide that **any tax levied by the State of Assam shall be assigned to the Autonomous State** for the amount attributable to the Autonomous State.



Source: Wikimedia Commons. Location of Diphu Lok Sabha Constituency within the State of Assam.

About the Diphu Lok Sabha Constituency

- Diphu is the least densely populated among Assam's 14 Lok Sabha constituencies.
- It is designated as a **reserved constituency for Scheduled Tribes (STs)**.
- It encompasses 6 Legislative Assembly segments across 3 tribal-majority hill districts of Assam: Karbi Anglong, West Karbi Anglong, and Dima Hasao.
- It is governed under the **Sixth Schedule** of the Constitution.
- These districts are under the jurisdiction of **two Autonomous Councils**: the **Karbi Anglong Autonomous Council (KAAC)** and the **North Cachar Hills Autonomous Council**.
- The electorate in this constituency comprises diverse communities including the **Karbi** (the 3rd largest tribe in the State), **Dimasa**, **Hmar**, **Kuki**, **Rengma Naga**, **Zeme Naga**, **Bodo**, **Garo**, **Assamese**, **Gorkha**, and others.

2. Electoral Spending by Political Parties

News: India's Electoral Laws put limit on electoral expenditure by individual candidates but not by the political parties. Experts argue that this distorts the level playing field for the smaller political parties.

Expenses in Elections

- **Media Advertising:** Both national and state-level parties spent a lot of their “general party propaganda” budget on media advertisements. This is more than what they spent on rallies and other activities.
- **Digital Platforms:** A study examined the role of digital platforms like Google and Meta, where big spenders, primarily national parties, allocated disproportionately higher budgets for advertisements, while state parties had a negligible presence.
- **Third-Party Campaigners:** Bigger national political parties hired non-party campaigners, individuals or groups participating in campaign activities without being formally registered as political parties.

Impact of Unlimited Expenditure

- Lack of spending limit for political parties **favours national parties** which are wealthy, tilting the competition in their favour.
- Larger parties have greater presence in the digital and other media domains. Hence, they occupy greater space in electorate’s consciousness. Consequently, people are **most likely to vote for the larger parties**.
- This observation highlights the **need to regulate overall party spending** to ensure **fair access** to the media platforms and a **level playing field** based on the strength of ideas rather than financial resources.
- The unchecked spending and the content shared by third-party campaigners raises questions about **transparency and responsibility**. Without rules on how much third parties can spend, especially since the electoral bond scheme is scrapped, there’s a chance that **untraceable money could get into elections** and lead to secret agreements.

Solutions

- The Election Commission had released a Report titled ‘**Proposed Electoral Reforms**’ in 2016. The Report had advocated for the introduction of **expenditure ceilings for political parties in India**.
- The Report had recommended adopting ideas from countries like Australia and the UK, where **third parties must register formally**, disclose their spending, and follow different spending limits.

By adopting these steps, India can aim for **global standards of fairness in elections**, which would increase people’s trust and confidence in democracy.

3. Disruption of Polling Process: Powers of the Election Commission

News: The Election Commission has the power to invalidate the elections under certain circumstances.

Disruption of Normal Polling Process

- Under **Sections 58 and 58A** of the **Representation of People Act, 1951 (RPA)**, the Election Commission of India (ECI) has the power to invalidate the polls under certain circumstances.
 - **Intentional Destruction of EVMs:** **Section 58** of the Act empowers the ECI to conduct fresh polls if intentional destruction occurs.
 - The process involves immediate notification by the **Returning Officer (RO)** to the ECI and Chief Electoral Officer, followed by a formal declaration of void poll and scheduling of a new one.
 - Contesting candidates are informed, and voters participate with **fresh inked marks** to distinguish from the original poll.
 - **Booth-capturing:** **Section 135A** of the RPA defines booth capturing as punishable under law. Section 58A allows for immediate action by the Presiding Officer, closing of EVMs and notifying the RO, who informs the ECI. The ECI may void the poll at the affected station or countermand the entire constituency’s election, depending on the severity.

- **Natural Disasters or Disruptions:** **Section 57(1)** enables the Presiding Officer to adjourn polling due to emergencies like violence, natural disasters etc. ECI's approval is required for resumption. Only remaining voters are eligible to cast their votes upon resumption.
- **Death of a Candidate:** **Section 52** addresses the adjournment of polls due to the death of a recognized party's candidate. If a candidate passes away at any time after 11.00 AM on the last date for making nomination (provided that the nomination is valid) until the commencement of the poll, the elections are adjourned. The RO informs the ECI, postponing the poll. The ECI then requests the party to nominate a replacement within 7 days. The candidate list is updated accordingly.

4. Star Campaigners During Elections

News: Star campaigners are considered vital in attracting the electorate during elections.

About Star Campaigners

- A star campaigner is a **celebrity vote seeker** in an election for a party. Star Campaigners may include **top** (and popular) **leadership of political parties** or celebrities (like movie stars).
- According to the **Representation of People Act, 1951** (RoPA), star campaigners have to be members of the political parties that appoint them. (*The term Star Campaigners is not included in the Act, it is popular usage only*).

Legal provisions Related to Star Campaigners

- **Section 77** of the RoPA, 1951 provides for law relating to expenditure incurred by 'leaders of a political party'.
- According to the Act, a recognised political party (National or State) can appoint a maximum of 40-star campaigners, whereas a registered unrecognised political party can appoint up to 20.
- These names must be shared with the ECI and Chief Electoral Officer (CEO) of the States within 7 days from the announcement of election dates.
- The RoPA, 1951 states that money spent by 'leaders of a political party' for travelling, (air or other means), to campaign for their party, **doesn't get included as part of a candidate's election expenses for that party**.
- However, this is applicable only if the **star campaigners limit themselves to general campaigning** for the party. The expenses of star campaigners get apportioned to candidate's expenditure if:
 - In any rally/meeting, the star campaigner seeks votes in the name of contesting candidate(s) or shares the dais with them.
 - The star campaigner incurs boarding/lodging expenses while campaigning for any candidate(s).
 - If a candidate travels with the star campaigner, then 50% of the travel expenditure of the star campaigner shall also be apportioned to the candidate.
- The major issue with the provision is that the **reported expenses of star campaigners are often much lower than the actual spending** because of inaccurate assessment of the expenses.
- Political parties **bypass the expenditure limit per candidate** (INR 95 lakhs or 70 lakhs) by engaging star campaigners. This benefits the **larger political parties** because they have both money power and a long list of star campaigners.

5. Election Commission's Guidelines on Use of Social Media in Political Campaigns

News: The ECI has issued guidelines to regulate the use of social media platforms by political parties and their representatives during election campaigning.

About the Guidelines

- **Prevention of Misinformation:** The ECI has asked the political parties to combat the misuse of AI and deepfake technologies that distort information during campaigns.

- **Specific Prohibitions:** Parties have been instructed to avoid publishing deepfake audio and videos, spreading misinformation, posting derogatory content towards women, using children in campaigns, and depicting violence or harm to animals.
- **Removal of False Content:** Parties are required to promptly remove any fake content from their platforms within 3 hours of notification.
- **Legal and Ethical Compliance:** The advisory stresses adherence to the Information Technology Act, 2000, the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, the Indian Penal Code, and the Representation of the People Acts of 1950 and 1951.
- **Reporting and Accountability:** Parties must report unlawful information and fake user accounts to the respective platforms and escalate persistent issues to the Grievance Appellate Committee as specified in the rules.

6. Definition of a 'Pregnant Person'

News: The Supreme Court has broadened the definition of 'pregnant persons' beyond the cis-gender women to include non-binary and transgender men.

About the Definition of 'Pregnant Person'

- The SC has expanded the definition of the term 'Pregnant persons' to include all individuals capable of pregnancy, regardless of gender identity.
- In the **A (Mother of X) v. State of Maharashtra (2024)**, this term was used over 40 times by the bench led by Chief Justice D.Y. Chandrachud.
- The definition covers non-binary people and transgender men, in addition to cisgender women.
- The SC ruling aligns with its **Handbook on Combating Gender Stereotypes**, which emphasizes unbiased legal language. (Refer EPIC August 2023 (click) for Supreme Court's Handbook on Combating Gender Stereotypes and Gender Justice).
- Chief Justice D.Y. Chandrachud stated outdated terms hinder the law's transformative role and equality for all genders.
- The decision follows the Court's earlier Judgment urging **legislative safeguards for same-sex couples**.

Implications of the Judgment

- Using gender-neutral terms **promotes legal recognition and protection for all** who can experience pregnancy.
- Transgender and non-binary individuals often **face discrimination in healthcare and legal settings**. The ruling sets a precedent for inclusivity.
- The SC's decision may **influence legislative safeguards for same-sex couples**, as it did in its Judgment on same-sex marriage.
- This change could **gradually shift social and legal understandings** of gender and family toward inclusivity.

7. World Press Freedom Index, 2024

News: The World Press Freedom Index, 2024 has been released by Reporters Without Borders (RSF).

About the World Press Freedom Index

- The World Press Freedom Index (WPF) is an **annual ranking** of countries compiled and published by Reporters Without Borders (RSF). RSF has published it since 2002.
- It compares the **level of freedom enjoyed by journalists and media** in 180 countries and territories.
- RSF evaluates countries based on various aspects related to press freedom like **Media independence, Legal framework, and Safety of journalists**.

- The ranking is based on 5 indicators: **Political, Legislative, Economic, Sociocultural** and **Safety**.

Highlights of the World Press Freedom Index, 2024

- India has been **ranked 159 out of 180 countries**. This is marginally better performance compared to 2023 when India was ranked 161. India has been placed alongside countries like the occupied Palestinian territories, UAE, Turkey, and Russia, **indicating poor press freedom**.
- India has consistently ranked over 100 since 2003, showing a long-term trend of limited press freedom. India's rank has deteriorated from **128 in 2003 to 159 in 2024**.
- **Scandinavian countries** (Norway, Denmark, Sweden) **top the rankings** with the highest press freedom. Eritrea, Syria, and Afghanistan rank the lowest.
- Among BRICS nations, **Brazil and South Africa rank higher than India**, whereas China and Russia are lower. In South Asia, India ranks lower than all countries except Bangladesh.
- The global trend shows a decline in press freedom, with an average drop of 7.6 points globally, accompanied by an **increase in political repression of journalists and media**.
- Press freedom remains robust primarily in **European Union countries**, which recently implemented their first **Media Freedom Law** (EMFA).

8. Internet Shutdowns in India, 2023: AccessNow Report

News: India has registered highest number of internet shutdowns globally for the 6th consecutive year.

About Internet Shutdowns in India in 2023

- India recorded the highest number of Internet shutdowns worldwide for the sixth consecutive year, with 116 incidents in 2023.
- The frequency of prolonged shutdowns (lasting over 5 days) increased dramatically, from 15% of all shutdowns in 2022 to over 41% in 2023.
- The Government often imposed these shutdowns due to reasons such as **communal tensions, violence, and examinations**.
- The longest Internet shutdown occurred in Manipur. The State experienced 47 shutdown orders.
- Shutdowns are increasingly being **implemented on a regional basis**. In 2023, 64 orders affected multiple districts within the same State, including a State-wide shutdown in Punjab.
- The Report emphasized the **profound impact on marginalized groups**, particularly women in Manipur. The lack of Internet access also hindered efforts to document and report atrocities like murder, rape, and arson.
- There was **inconsistent compliance with the Supreme Court's Guidelines** for publishing Internet shutdown orders, adding to the challenges of accountability.
- Over the past 10 years, India has seen over 500 Internet shutdowns, reflecting a frequent use of the provision to shutdown internet.
- Myanmar recorded the 2nd-highest number of shutdowns (37), following its 2021 military coup. Iran, Palestine, and Ukraine also featured prominently in the report with numerous shutdowns.

Policy

1. National Curriculum for Early Childhood Care and Education, 2024

News: The Ministry of Women and Child Development (MoW&CD) has released the National Curriculum for Early Childhood Care and Education 2024 titled 'Aadharshila'.

About the National Curriculum for Early Childhood Care and Education, 2024

- *Aadharshila* (translated as foundation stone) is a detailed **48-week curriculum** meant for learning in the age group of 3-6 years children in the *anganwadis*.
- The curriculum aims to **develop key skills** such as listening, vocabulary, imagination, narration, instruction following, creativity, social skills, self-expression, and self-esteem.
 - These competencies prepare children for a **smooth transition into Grade 1**.
- The program is **tailored for different ages**, detailing required materials, age-appropriate specifications, variations, and teacher guidelines, including targeted educational objectives and competencies.
 - Activities are designed to observe and respond to the children's interests.
- The curriculum is structured around a **weekly play calendar**. Children aged 3-6 years participate in this mixed-age group setting at the *anganwadi*.

Design of the Curriculum

- It starts with **4 weeks of initiation** involving academic activities to ease children's transition from home to the *anganwadi* center through engaging and playful interactions.
- This is followed by **36 weeks** of varied activities such as exploration, free play, conversations, creative arts, and reflection.
 - It also includes **storytelling focused on themes** like conflict resolution and cooperation, along with singing and crafting.
 - Children are introduced to various concepts such as colors, shapes, numbers, sensory uses, body parts, and personal relationships.
 - They engage in activities that develop **listening, basic numerical skills, sound recognition** and **imitation**, and knowledge about seasons, festivals, and food.
- The last **8 weeks** focus on reviewing and reinforcing previous learning through worksheets and performance assessments.
- The framework is expected to **bridge foundational literacy and numeracy gaps** which may arise in later school years.

2. Promotion of Education in Mother Tongue in Schools: CBSE Circular

News: The Central Board of Secondary Education (CBSE) has issued a circular instructing schools to prioritize educational material focusing on learning in students' mother tongues.

About the CBSE's Initiative

- CBSE has urged schools to utilize educational materials **emphasizing learning in students' mother tongues or regional languages**.
- The initiative is supported by the collaboration between the **National Council for Educational Research and Training (NCERT)** and the **Indian Institute of Languages**.
- They have developed **52 entry-level primers** tailored to various mother tongues and local languages spoken across India. These primers are available in languages such as Bhutia, Bodo, Garo, Khandeshi, Kinnauri, Kuki, Manipuri, Nepali, Sherpa, and Tulu. These serve as basal readers for local languages and introduce numerals to children attending *bal vaticas* and *anganwadis*.
- Schools are encouraged to promote the use of these primers among teachers and students to **foster strong language skills in their native languages**.
 - The aim is to **preserve linguistic diversity** and **promote multilingual education**.
- This initiative aligns with the **National Education Policy, 2020**, and the **National Curriculum Framework, 2022**, which advocate for **teaching and learning in local languages**.

3. A Study on the Working of the Public-Funded Health Insurance (PFHI) Schemes

News: A study on PFHI Schemes in Chhattisgarh has revealed that the programmes have not increased hospital service usage. They have not reduced out-of-pocket costs (OOPE) for hospitalised patients.

Key Findings of the Study

- **Ineffective in Reducing Out-of-Pocket Expenditures:** The *Ayushman Bharat Pradhan Mantri Jan Arogya Yojana* (PMJAY) in Chhattisgarh did not decrease the out-of-pocket expenditure for hospitalised patients.
- **No Increase in Hospital Utilization:** Data show that the scheme did not lead to an increased utilization of hospital care among the enrolled individuals compared to those not enrolled. In Chhattisgarh, enrolment in Public Funded Health Insurance schemes increased from 40% in 2014 to 68% in 2019, with no such schemes existing in 2004.
- **Issue of Double-Billing:** The study suggests the occurrence of double-billing where hospitals may be claiming payment from the insurance scheme and also charging patients directly for the same services.
- **Insurance Coverage and Hospital Access:** From 2014 to 2019, **hospital access in Chhattisgarh increased similarly for both insured** (3.3% to 6%) and **uninsured individuals** (2.9% to 5.7%), indicating that Public Funded Health Insurance (PFHI) schemes like PMJAY have not significantly improved access.
- **Private vs Public Hospitalizations:** The study shows that **hospitalizations at private hospitals increased for insured patients and decreased for the uninsured**.
 - Among those enrolled in PFHI schemes, the rate of hospitalizations in private hospitals rose from about 33% to 45% between 2014 and 2019. Among those who were not enrolled, this share reduced from about 54% to 29%.
- The report studied enrolments in 3 Public-Funded Health Insurance (PFHI) schemes, *Rashtriya Swasthya Bima Yojana* (RSBY), PMJAY and *Mukhya Mantri Swasthya Bima Yojana* (MSBY) introduced in the State across various years.

4. Unique ID for Organ Donation

News: The Union Health Ministry has recently issued the directive to eliminate commercial dealing in organs, especially those involving foreign citizens.

About the Government Directive

- **NOTTO-ID for Donors and Recipients:** All organ transplants, whether from a living or deceased donor, will receive a unique **National Organ and Tissue Transplant Organisation (NOTTO) ID** for both the donor and recipient.
- **Role of Hospitals:** To prevent illegal organ trading, hospitals need to create this ID using the NOTTO website.
- **Role of State Governments:** The State Governments need to **enhance monitoring** and stop malpractices, especially with organ transplants involving foreigners. Local authorities must scrutinize more closely.
- **Regular Inspection:** State authorities must monitor registered hospitals performing transplants to ensure quality and proper follow-up for donors and recipients. Any violation of the **Transplantation of Human Organs and Tissues Act (THOTA), 1994** and its rules will be investigated.

About National Organ and Tissue Transplant Organisation (NOTTO)

- It is a National level organisation set up under the **Directorate General of Health Services, Ministry of Health and Family Welfare**, Government of India.
- It has been established under the **Transplantation of Human Organs (Amendment) Act, 2011**.
- Its functions include:

- It serves as the **central hub for coordinating and connecting nationwide activities** related to organ and tissue procurement, distribution, and donation/transplantation registry in India.
- It lays down **policy guidelines and protocols** for various functions.
- It handles the **dissemination of information** to all concerned organisations, hospitals and individuals.

5. Cashless Scheme for the Treatment of Victims of Road Accidents

News: The Union Government has launched a pilot programme to provide cashless treatment to the victims of road accidents.

About the Scheme

- The scheme provides up to **INR 1.5 lakh of cashless treatment** (per person) to the victims of road accidents for a maximum period of 7 days from date of accident.
- The scheme will cover **all road accidents caused by use of motor vehicle on any category of road**.
- It ensures one week of hospitalization under the Ayushman Bharat program. All accident victims will receive coverage **regardless of their insurance status**.
- Costs will be reimbursed through the **Motor Vehicle Accident Fund**, which was set-up in January 2022 to **compensate hit-and-run victims**.
- The scheme **aims to reduce treatment delays** as hospitals often turn away victims when they are unsure of payment of the medical bills. Talks are going on with insurance companies to use part of premium paid by vehicles owners for 3rd-party coverage.
- The **National Health Authority (NHA)** will be the **implementing agency** for the program, in coordination with police, hospitals, State Health Agencies (SHAs) etc.
- The Scheme has been launched under **Section 162 of the Motor Vehicles Act, 1988** which provides for the Union Government to make scheme for the cashless treatment of victims of the accident **during the golden hour**. (Refer EPIC September 2022 (click) for The Issue of Road Safety in India).

Need for Cashless Scheme

- **Urgent Medical Attention:** Many lives are lost due to road accidents in India. Immediate care could save lives, but financial uncertainty often causes hospitals to delay treatment.
- **Confusion Regarding Payments:** Accident victims are sometimes denied or face delayed treatment while hospitals figure out payment details. Even insured patients wait hours for cashless approval.
- The Motor Vehicle Accident Fund will reimburse costs promptly, **reducing confusion over bill payments**.

Economy

1. B-READY Index

News: The World Bank is set to launch the B-READY (Business Ready) Index in September 2024.

About the B-READY Index

- The B-READY Index is a new metric designed by the World Bank to **assess business environments and investment climate in the economies** worldwide. It is set to be launched on September 25, 2024.
- B-READY will replace the now-defunct **Ease of Doing Business Index** and plans to cover 180 economies.
- This index will focus on **broader qualitative assessments**, including **regulatory quality** and **environmental considerations**.
- It will assess the **regulatory framework** and **public services** directed at firms, and the efficiency with which regulatory framework and public services are combined in practice.

- India is gearing up for the B-READY Index through proactive steps taken by the **Department for Promotion of Industry and Internal Trade (DPIT)**. DPIT is conducting bi-monthly meetings with nodal ministries to evaluate responses to over 1,300 questions from the B-READY questionnaire.

Importance of B-READY Index to India

- **Addressing Subdued FDI:** India has seen limited success in attracting foreign direct investment (FDI), making the B-READY Index crucial for enhancing its investment climate.
- **Improving Business Environment:** The B-READY Index aims to go beyond the former Ease of Doing Business metrics by **including qualitative assessments** that more accurately reflect the business landscape. This will prompt the Government to take appropriate steps to get top ranking and **attract investments**.
- **Policy and Implementation Gaps:** Examples like Apple's vendors leaving India and Vinfast's subsidy issues highlight the need for clearer policies and better communication, issues the B-READY Index seeks to address.
- **Encouraging Multinational Presence:** A refined index could help attract more multinationals, as current policy uncertainty has deterred significant investments.

2. RBI Rules for Payment Aggregators

News: The RBI has proposed new regulations for offline payment aggregators (PAs) to enhance safety.

About Payment Aggregators (PAs)

- PAs are entities responsible for **enlisting merchants** and **streamlining process of collecting payments from customers** for the purchase of goods and services. They unburden the merchants from creating a payment integration system of their own.
- **Methods Used by PAs:** PAs utilize various payment channels like **online QR codes** or **physical point-of-sale machines (PoS)** to collect payments on behalf of the merchants. Subsequently, PAs settle the accumulated funds with the respective merchants.
- **Types of PAs:** Two major types of PAs are **Online Point of Sale (PA-O)** and **Physical Point-of-Sale (PA-P)**. The revised definition of payment aggregators has been modified to include physical point-of-sale payment providers such as Innoviti Payments, Pine Labs, and MSwipe. Thus they have been now been subjected to regulatory oversight. (Refer EPIC February 2024 (click) for Features of Payment Aggregators).



New RBI Guidelines for PAs

- Non-bank PoS providers must notify RBI in 60 days and submit authorization applications by May 31, 2025.
- Banks must close accounts for non-bank payment aggregators by October 31, 2025, unless authorized.
- Net-worth requirements for PAs facilitating face-to-face transactions have been changed. PAs net worth requirements will be increased to INR 25 crore by March 2028.
- **Medium merchants**, defined as physical or online merchants with **annual business turnover of less than INR 40 lakhs** who are not registered under the GST, would also have to **undergo contact point verification**.
- PAs have to **bolster risk management with KYC norms**, tailored for small and medium-sized merchants.
- All PAs must **join the Financial Intelligence Unit (FIU) to report suspicious transactions**.
- Starting August 1, 2025, only card issuers and networks can **store card data for face-to-face transactions**.

3. Green Taxonomy

News: The RBI's latest Monetary Policy Report gives primacy to the impact of climate shocks on the economy's financial stability. This reflects RBI's step towards the adoption of the system of green taxonomy.

About Green Taxonomy

- It is a framework used to determine **environmentally sustainable investment** in the economy. It helps classify whether the economic activities are green and environmentally sustainable.
- It aims to increase investment in **green activities** and **assets** and facilitate the detection of greenwashing practices.

Importance of Green Taxonomy

- It helps the financial markets to **align their investments** with the **goal of net-zero emissions**.
- It also helps in the **cultivation of an environmentally sustainable economy**. It also helps to reorient capital towards environmentally sustainable economic activities.
- **Options Before RBI and Finance Ministry**
 - The RBI and Finance Ministry can draw lessons from the ASEAN region. **ASEAN countries have adopted a dynamic green taxonomy**, which is continuously updated according to the evolving sustainable practices in different sectors.
 - RBI has taken positive steps towards green taxonomy by issuing **Sovereign Green Bonds** and expanding **participation in green government securities** by **Foreign Institutional Investors (FIIs)**.



4. Corporate Governance Charter for Start-ups

News: The Confederation of Indian Industry (CII) has launched Corporate Governance Charter for Start-ups.

About the Charter

- The Charter has been launched for Start-ups to provide suggestions on corporate governance tailored for startups and **offer guidelines suitable for different stages of a startup**.
- Its aim is to **enhance governance practices** in the startups.
- **Role of the Charter**
 - The CII Charter has been crafted to assist start-ups in **addressing governance requirements throughout their journey**, spanning from establishment to public listing.
 - It allows start-ups to **measure their governance progress**, with score changes indicating improvements in governance practices as assessed against the scorecard from time to time.
 - The guidance provided to startups will be structured across four key stages: Inception, Progression, Growth and Going Public.
 - **Each stage emphasises particular governance principles** that may need extra focus during that phase of the startup journey.

5. Delisting of Shares

News: An investor of Reliance Capital Ltd. (RCL) has challenged specific regulations related to SEBI's norms for delisting shares. RCL is currently undergoing insolvency proceedings.

About Delisting of Shares

- Delisting of Shares refers to the **removal of a publicly traded company's stock from a stock exchange**.
- A company can choose to delist its shares voluntarily or involuntarily.
 - A company can voluntarily delist its shares **if it wants to go private or merge with another company**.
 - A company can also be delisted if it **fails to meet the exchange's listing requirements or violates the exchange's rules** (involuntary).
- If a company intends to delist its securities, it **must purchase back 90% of the total issued shares**. The company is typically required to notify its shareholders and the exchange before proceeding with the delisting.

Challenge to SEBI's Norms

- SEBI's norms for the delisting of shares **provide exemption** in cases where the **delisting is done according to the Insolvency and Bankruptcy Code (IBC)-approved resolution plan**. The petitioner has argued that this exemption in delisting of shares, **fails to protect the interest of investors**.
- Such an exemption **leads to overnight zero value of equity shares** in case of a company that undergoes delisting. This results in failure of protecting the interest of public shareholders (investors lose their money as value of equity shares falls to zero).

6. Swing Trading

News: The Stock market has experienced significant volatility (large changes in prices) during the ongoing Lok Sabha elections. Swing Trading has become an online buzz amidst the market fluctuations.

About Swing Trading

- Swing trading involves **holding stocks for more than a day**, usually for several days or weeks. The primary goal of swing trading is to profit from **short to medium-term fluctuations in stock prices**.
- Swing traders capitalise on both **upward and downward movements** in the market, seeking to take advantage of trends and momentum.
- Swing traders employ **technical analysis** to **forecast price changes** and **identify trading opportunities**. Common Strategy include **trend following** (predicting market direction) or **mean reversion** (buying or selling based on historical price data).
 - Swing traders focus on stocks with **high trading volume** and **price volatility**.
 - They use **fundamental analysis** and technical indicators such as **RSI** (Relative Strength Index) and **MACD** (Moving Average Convergence Divergence) to evaluate stocks.



Source: FBS. The diagram shows variation of price of a stock with time. Trades buy stock when the price is trending low and sell when it rises.

- They establish trades by setting **stop-loss orders** to **minimize losses** and **target prices** to **secure profits**, based on key price levels of support and resistance.
- Traders **buy stocks at support** (low prices) and **sell at resistance** (high prices), capitalizing on the expected price swings between these levels.

Advantages of Swing Trading

- **Flexibility:** Swing trading allows traders to adapt their strategies and positions based on market fluctuations.
- **Time Efficiency:** It is generally less time-consuming than **day trading**, as it doesn't require constant market monitoring.
- **Profit Potential:** It offers opportunities to capture profits from short- to medium-term price movements in the market.

Disadvantages of Swing Trading

- **Market Knowledge:** It requires a **thorough understanding of market dynamics** and technical analysis, which can be complex.
- **Missed Long-Term Gains:** Swing traders may miss out on the larger profits that can come from holding positions over a longer term, as they typically capitalize on shorter market movements.

7. Performance of Indian Exports and Target to Achieve US\$ 1 Trillion Goods Exports by 2030

News: The Ministry of Commerce has set a target of achieving US\$ 1 trillion goods exports by 2030.

About India's Export Performance

- **Good and Services Export Data:** In FY 21-22, India achieved notable milestones in both goods and services exports. The **good/merchandise exports** reached **US\$ 422 billion** and the **service sector exports** reached **US\$ 254 billion**.
- However, India's merchandise exports declined by 4.7% in 2023-24, while that of other Asian countries declined by 6.8%. In FY 2023-24, India's exports were valued at **US\$ 437.1 billion**.
- **Exports of electronics surged by 24%** due to incentives like the **Production Linked Incentive (PLI) scheme**, highlighting a successful sector amid broader challenges.
- The Ministry of Commerce has set the target for Indian export sector to **contribute 25% of India's GDP by 2047**. The target for India's GDP is to grow to **US\$ 30 trillion by 2047**.

Trends in Global Trade

- According to the United Nations Conference on Trade and Development, the value of global merchandise trade has been decreasing, falling by 4.6% in 2023.
- However, the first quarter of 2024 showed some signs of recovery in global trade.
- **Geopolitical tensions**, such as Ukraine War, caused a spike in commodity prices initially but these prices have been declining more recently, further impacting global trade values.

Challenges to Indian Exports

- There has been **rise in the cost of raw materials** and there has been **fall in demand in certain key export markets** amidst the **global uncertainties** and turmoil like the Israel-Gaza war, Russia-Ukraine war.
- The **stricter environmental laws** like **EU's Carbon Border Adjustment Mechanism (CBAM)**, which penalize products with **high carbon footprints**, will dampen Indian exports. CBAM can raise the costs of Indian exports by 20-35%.

- **Decline in Labour-Intensive Sectors:** Exports in sectors like gems and jewellery and textiles have significantly decreased, needing strategic focus to revive these industries.

8. India's Imports from China Cross US\$ 100 Billion

News: According to a report by the Global Trade Research Initiative (GTRI), India's imports from China crossed US\$ 101 billion in 2023-24 from about US\$ 70 billion in 2018-19.

India's Rising Imports from China

- India's imports from China crossed US\$ 101 billion in 2023-24 from about \$70 billion in 2018-19.
- India's imports from China have **increased 2.3 times faster** than India's total imports over the last 15 years.
- China is the top supplier in the eight major industrial sectors, including machinery, chemicals, textiles and pharmaceuticals.
- China's share in India's major imports include textiles (42% of India's imports), machinery (40%), electronics and electrical products (38%), Chemicals (29%), plastics (26%) and automobiles (23%).

Concerns

- **Trade Deficit:** Between 2018-2019 and 2023-24, India's exports to China remained stagnant at ~US\$ 16 billion annually, while imports experienced a significant surge. This has led to a **cumulative trade deficit of US\$ 387 billion over the last 6 years**.
- **Over-dependence on China:** In certain categories, there is **over-reliance on imports from China**. This indicates **lack of diversification** which poses risks in case of any disruption in the India-China trade.
- **Strategic Implications:** The GTRI Report suggests that there is a critical need for India to reassess its import strategies to mitigate economic risks, strengthen domestic industries and reduce reliance on single-country imports, particularly from potential adversaries like China.

9. Non-Market Economy Status

News: Vietnam has been pushing the US to change Vietnam's 'non-market economy' status to 'market economy'. The change will help Vietnam avoid high taxes imposed by the US on imports from Vietnam.

Designation as Non-Market Economy

- The US designates Non-market Economy based on several factors:
 - Country's currency convertibility.
 - Wage rates determination by free bargaining between labour and management.
 - Ease of FDI inflow.
 - State control over the ownership of plants and machineries, price and output decisions.
 - Human rights.
- At present, the **US has designated 12 countries as non-market economies**. This includes **Russia, China, Vietnam** and some **former Soviet Republics** like **Armenia, Azerbaijan, Belarus, Georgia** etc.

Implications of Designation as a 'Non-market Economy'

- The non-market economy label allows the US to **impose anti-dumping duties on goods imported** from designated countries. The level of anti-dumping duties is determined by relying on the prices of import from a third country e.g., in case of Vietnam's exports to the US, the anti-dumping duty is imposed taking into consideration the final export landing price of goods from Bangladesh.
- The domestic US industry is opposed to change of status for Vietnam.

- They cite **State-control of Vietnam's economy**. They argue that Vietnam has **weak labour laws** and there are restrictions on land ownership.
- **China's State firms have invested heavily in Vietnam**. There are concerns that removal of Vietnam from the 'non-market economies' list, will let **China easily circumvent US tariffs on their goods**.

10. Drip Pricing

News: The Department of Consumer Affairs asked consumers to reach out to the Ministry if they observe 'drip pricing'.

About Drip Pricing

- It is a marketing strategy where initially **only a part of a product's or service's total cost is shown**.
- The **full price is disclosed progressively** as the customer moves through the purchase process e.g., in the adjacent image, the display price is INR 4,700; the final price the customer pays is INR 5,130.
- This strategy often involves **concealing essential fees like taxes or booking fees**, or **excluding necessary add-ons** such as internet access or amenities that are essential for the use of the product or service.
- The price advertised in print, emails, or on websites, known as the '**headline price**', may not accurately represent the total cost that the consumer will ultimately pay.
- Businesses use drip pricing to **attract customers** by **starting with a lower price**, and hoping that they will continue with the purchase even after seeing additional costs later.



Implications

- Drip pricing can **make it difficult for consumers to compare prices effectively**.
- Drip pricing may **put sellers who offer more transparent pricing at a disadvantage**.

11. Bima Vistaar

News: The Insurance Regulatory and Development Authority of India (IRDAI) has proposed Bima Vistaar, an all-in-one affordable mass product which aim to target the rural areas in India.

About Bima Vistaar

- It is a comprehensive insurance product that **combines life, health, accident, and property coverage**. It is provided by both public and private insurance companies.
- It has been initiated by the **IRDAI** as part of its Vision 2047.
- It aims to address the essential insurance needs of India's rural

Cover drive for the uninsured

The Insurance Regulatory and Development Authority is driving multi-pronged changes to expand citizens' safety nets



■ A new bundled insurance product Bima Vistar to provide life, health, accident and property cover through a single, simple policy



■ A Bima Sugam platform as a one-stop shop for customers, integrating insurers and distributors



■ Linking digital death registries to platform so claims can be settled within hours or a day



■ Permitting insurers to sell value-added services with policies; for example, a yoga class bundled with a health scheme



■ Women to lead campaign to spur insurance penetration in each Gram Sabha



■ Roping in States to form insurance committees and expand coverage across districts

■ Move will also allow smaller, micro and regional insurers to reach different strata of society

population with a **single, affordable product**. It has been made accessible at INR 1,500 per policy.

Features

- This product forms part of IRDAI's **Bima Trinity initiative**. It includes:
 - **Bima Sugam** which includes online insurance marketplace.
 - **Bima Vistaar** which is a comprehensive bundled policy.
 - **Bima Vaahak** which works as a distribution channel.
- IRDAI is banking on the troika to help further its goal of '**Insurance for All**' by 2047.
- It is a **benefits-based policy**. This means that if the event were to occur, the pre-decided amount (the sum insured) will be paid out to the policyholder, or her nominees and the policy will cease to exist.
- **Policy cost**: The policy offers life cover for INR 820, health cover for INR 500, personal accident cover for INR 100, and property cover for INR 80. If taken as a family floater, it costs INR 2,420, with an extra INR 900 for additional family members.
- The initiative has several benefits like **improved access to affordable insurance products, increased insurance penetration** and **promotion of financial inclusion**.

State of Insurance Sector in India

- According to the Economic Survey 2022-23, India's **life insurance density** increased from US\$ 11.1 in 2001 to US\$ 91 in 2021. **Insurance density** is the ratio of premiums collected by insurance companies to the country's population.
- The Indian insurance market is poised to emerge as one of the fastest-growing globally in the coming decade. India is currently the 10th largest insurance market globally and is expected to rise to the 6th by 2032.

12. National Savings Certificate (NSC)

News: National Savings Certificate is a scheme to promote savings while providing tax benefits.

About National Savings Certificate (NSC)

- The NSC is a **fixed-income investment scheme** by the Government of India. It is designed to **encourage investment and tax savings**, especially for **low- to mid-income investors** (low-risk investment).
- Investments qualify for tax savings under **Section 80C** of the Income Tax Act, up to INR 1.5 lakhs annually.
- NSCs can be **purchased at any post office**. They can be bought in an individual's name, for a minor, or jointly with another adult.
- The certificates earn a fixed annual interest, revised quarterly by the Government. The investment matures after 5 years.
- There is **no maximum limit on the amount that can be invested**.
- They can be **used as collateral for loans** in Banks and NBFCs. Investors can nominate a family member (including minors) to inherit the certificate in case of their demise.
- **Premature withdrawal is not allowed** except under specific conditions such as the death of the investor, court orders, or forfeiture by a pledgee who is a Gazetted Government Officer.
- Only individual Indian citizens who are residents of India are eligible. There **is no age restriction for purchasing NSCs**.
- Hindu Undivided Families (HUFs), trusts, and private and public limited companies cannot invest.

13. Balanced Fertilization

News: Balanced Fertilization is essential for high agricultural productivity. Fertilizer use in India has been skewed toward Nitrogen-based fertilizers and needs to be corrected.

About Balanced Fertilization

- It refers to the process of **supplying essential nutrients to crops in the right proportion**. The nutrients are supplied taking into consideration the **soil type** and the **specific requirements of the crop at different growth stages**.
- Essential Nutrients**
 - Primary** nutrients include **nitrogen (N)**, **phosphorus (P)**, and **potassium (K)**.
 - Secondary** nutrients include **Sulphur (S)**, **calcium**, and **magnesium**.
 - Micronutrients** include **iron**, **zinc**, **copper**, **manganese**, **boron**, and **molybdenum**.

Challenges related to Balanced Fertilisation

- Price Controls:** Restoration of price controls on non-urea fertilizers like the Diammonium phosphate (DAP) has led to lowering of its prices as compared to other nutrient balanced complex fertilisers like 10:26:26:0 and 12:32:16:0 NPKS complex fertilisers. Farmers tend to **overuse cheaper fertilizers** irrespective of their utility or need.
- Vague Prices:** The fertiliser prices are vaguely fixed without considering the market demand and supply e.g., the Muriate of Potassium (MOP) price is not feasible either for the farmers for direct application in the field nor to the fertiliser firms to make complex fertiliser. Hence, it is not being used in the farms, leading to potassium deficiencies.

Steps Required to Promote Balanced fertilisation

- Rationalization of Prices of DAP and MOP:** The landed prices of imported urea, DAP and MOP have fallen due to ongoing Russia-Ukraine war. The Government should use the opportunity to rationalize MRPs of fertilizers domestically and promote balanced fertilization.
 - The Government can also consider to bring urea under the **Nutrient-Based Subsidy (NBS) scheme**.
- Crop-specific Usage of Fertilisers:** The fertiliser usage must be restricted to particular crops e.g., DAP usage should be restricted to rice and wheat.
- Granular Form of Fertilisers:** The fertilisers must be marketed in granular forms as it **prevents adulteration** and **ensure slower release of nutrients**. (SSP in granular form slows release of Phosphorous).

International Relations

1. India-Iran Sign Pact on Chabahar Port

News: India and Iran have signed a 10-year contract to operate the Chabahar Port.

About the India-Iran Port Agreement

- Chabahar port is located in **Sistan-Baluchistan province** of Iran. It is a **deep-water port** with significant strategic value.
- India-Iran have signed a **10-year contract** for the operation of the Chabahar port.
- The contract was signed between **Indian Ports Global Ltd. (IPGL)** and **Iran's Port and Maritime Organisation (PMO)**.
- IPGL plans to **invest ~US\$ 120 million** in **equipping the port** and its infrastructure.
 - India has offered a credit window worth US\$ 250 million for Chabahar-related infrastructure projects. (*Read More about the Agreement here*).



- An MoU for Chabahar port development was signed in May 2015, with the contract executed in May 2016 during Indian PM's visit to Iran.
- The agreement has been termed as a historic milestone for the maritime sector.
 - It is expected to **foster trade, marine cooperation**, and **transshipment**, while boosting **trilateral trade between India, Iran, and Afghanistan**.
 - The port serves as a **vital trade artery connecting India with Afghanistan and Central Asian countries**. Its development will **enhance regional connectivity** and **promote economic development** in the region.
 - The agreement signifies India's commitment to further invest in Chabahar port, enhancing its efficiency and capacity. India aims to utilize the port for **humanitarian aid shipments**, demonstrating its commitment to **regional development** beyond commercial interests. *(Read More about Chabahar Port).*

2. Diplomatic Passport

News: A politician from Karnataka accused in a sexual-abuse scam has escaped from India using his diplomatic passport.

About Diplomatic Passport

- Diplomatic and Official passports are issued to **people holding diplomatic status** or fulfilling certain other criteria.
- It has **maroon cover** and is **valid for 5 years or less**.
- It is issued by the MEA's Consular, Passport & Visa Division. It is **issued to 5 categories of people**:
 - Those with diplomatic status.
 - Government-appointed individuals travelling abroad for official business.
 - Officers working under the branches A and B of Indian Foreign Service (IFS).
 - Relatives and immediate family of officers employed in IFS and MEA.
 - Selected individuals authorized to undertake official travel on behalf of the Government.
- Diplomatic passport holders enjoy **specific privileges and immunities**:
 - Exemption from arrest, detention.
 - Exemption from certain legal proceedings within the host country.
- The **Passport Act 1967** provides for the **ground of revocation of diplomatic passports**:
 - If the holder is in wrongful possession.
 - If it was obtained by the suppression of material information.
 - Interests of the sovereignty and integrity of India, or friendly relations of India with any foreign country.
 - Conviction by a court in India and sentenced to imprisonment for not less than two years, after the issue of the passport.
 - Orders from a court during proceedings with respect to an offence allegedly carried out by the passport holder before a criminal court.

Exemption of Visa Requirements

- India has operational **visa exemption agreements** (for holders of diplomatic passports) with 34 countries. These countries include Germany, France, Austria, Afghanistan, Czech Republic, Italy, Greece, Iran and Switzerland.
- India has signed agreements with 99 other nations where holders of service and official passports, in addition to diplomatic passport holders, can enjoy visa exemption for stays up to 90 days. Countries in this list include Bahrain, Brazil, Egypt, Hong Kong, Oman, Singapore, and the United Arab Emirates.

3. Schengen Visa

News: The EU has eased norms to offer Indians multiple entry Schengen visa with longer validity. Indian nationals can now be issued long-term, multi-entry Schengen visas valid for two years.

About Schengen Visa

- It is an official document necessary for non-Europeans to travel to all 29 countries which are part of **Schengen area**.

- The Schengen area consists of **29 European countries** of which **25 are EU States** (Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Germany, Estonia, Greece, Spain, France, Italy, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland and Sweden, along with Iceland, Liechtenstein, Norway and Switzerland).

- Schengen visas **permits holders to freely move within the Schengen zone for short visits**, capped at 90 days within any period of 180 days.
- These visas **do not authorize employment**.

The Schengen Area

EU Schengen Countries

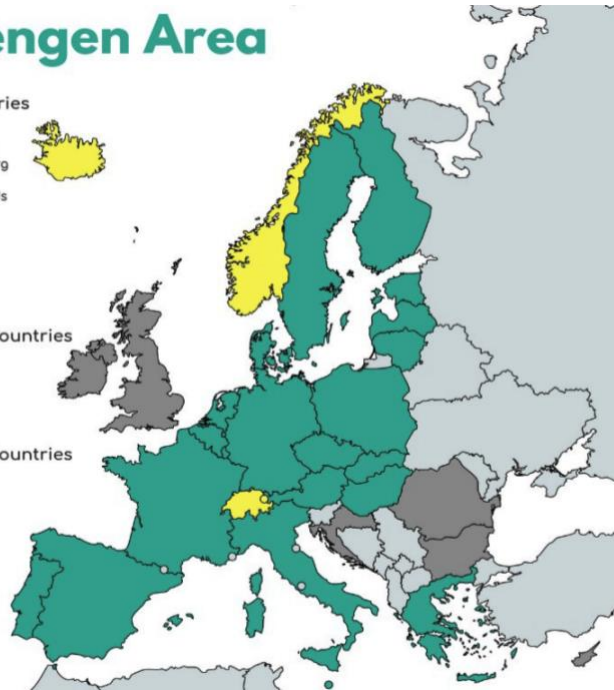
Austria
Belgium
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Poland
Portugal
Spain
Slovakia
Slovenia
Sweden

Non-EU Schengen Countries

Iceland
Liechtenstein
Norway
Switzerland

Non-Schengen EU Countries

Bulgaria
Croatia
Cyprus
Ireland
United Kingdom
Romania



Significance of New Visa Multiple Entry Visa System

- The new visa system will **facilitate easier access for Indian nationals to multi-year visas**. This will be available to all those with a **proven travel history** and provided their passport's validity permits.
- This measure was adopted within the framework of the **EU-India Common Agenda on Migration and Mobility**. This aims to broaden the collaboration on migration policies between the EU and India.
- It emphasizes the **enhancement of people-to-people connections** in light of India's significance as an EU partner.

4. Accreditation of NHRC Deferred by GANHRI

News: The Global Alliance of National Human Rights Institutions (GANHRI) has deferred the accreditation of the National Human Rights Commission (NHRC) for the second consecutive year.

About GANHRI

- The Global Alliance of National Human Rights Institutions is a **global network of National Human Rights Institutions** (NHRIs, like the National Human Rights Commission (NHRC) in India) which **coordinates the relationship between NHRIs and the United Nations Human Rights System**.
- It is unique as the only **non-UN body** whose internal accreditation system, based on compliance with the **1993 Paris Principles**, grants access to UN committees.

- GANHRI is constituted as a **non-profit entity under Swiss law**, and has one member of staff representing it at the United Nations Office at Geneva.
- The **Office of the United Nations High Commissioner for Human Rights (OHCHR)** provides secretariat support to the GANHRI.

About the Accreditation by GANHRI

- 'A' status accreditation provides NHRC with **international recognition and protection**.
- Institutions accredited '**A' status** (meaning full compliance with the Paris Principles) are accorded speaking rights and seating at human rights treaty bodies and other **UN organs**, mainly to the **Human Rights Council**.
- The GANHRI accreditation system is overseen by the **Sub-Committee on Accreditation (SCA)** with the support of the OHCHR.
- The accreditation process involves a thorough assessment against criteria set out in the **Paris Principles**, focusing on NHRI's mandate, autonomy, independence, pluralism, resource adequacy, and investigative powers.

Reasons for Deferral of Accreditation to NHRC

- GANHRI cited concerns over **transparency in the process of appointing members to the NHRC**.
- GANHRI raised objections regarding the **appointment of police officers** to oversee investigations related to cases involving violation of human rights. This practice might compromise the **independence and integrity** of investigations, raising doubts about the impartiality of the NHRC.
- The NHRC's member panel was criticized for **lacking adequate representation of gender and minority groups**. Inclusivity is essential for ensuring that diverse perspectives are considered in addressing human rights issues effectively.

5. Concerns Associated with UK's 'Rwanda Bill'

News: Human Rights Groups have raised concerns regarding the UK's Safety of Rwanda (Asylum and Immigration) Bill that allows the UK Government to send asylum seekers to Rwanda for processing. The Bill has been passed by the UK Parliament.

About the UK's Rwanda Bill

- The **Safety of Rwanda (Asylum and Immigration) Bill** ('Rwanda Bill') allows the UK to send asylum seekers to Rwanda for processing if they **entered the UK illegally after January 1, 2022**.
- Under the new law, the asylum seekers would have their asylum claims processed in Rwanda, instead of UK.
 - If successful, the asylum seekers could be **granted refugee status and allowed to stay in Rwanda**.
 - If not, they could apply to settle in Rwanda on other grounds, or **seek asylum in another 'safe third country'**.
 - No asylum seeker would be able to apply to return to the UK.
- The Act aims to **deter people from using dangerous routes**, like small boats across the English Channel, **to enter the UK**.
- Rwanda will receive **substantial financial compensation from the UK** for hosting these processing centers.
- The British authorities have already **initiated deportations of asylum seekers to Rwanda** under a voluntary return scheme as per a new immigration law.

Implications of the Law

Political

- The Rwanda Bill is seen as a strategy to **assert UK sovereignty over its borders**.

- It reflects a trend in Western politics where strict border control is used to **gain electoral support**. The UK PM has said that international courts will not dictate UK domestic policy.

Economic

- The Rwanda Bill fosters an emerging '**asylum economy**', where rich nations, like the UK, pay poorer countries to process asylum seekers.
- This arrangement is **economically beneficial to Rwanda**, which receives substantial financial payments from the UK.

Social

- The Rwanda Bill may **compromise the rights and safety of asylum seekers**.
- Outsourcing asylum processing to poorer countries like Rwanda raises **ethical concerns** about exploiting vulnerable populations and perpetuating a **neo-colonial economic dynamic**.
- There are concerns about the safety and human rights of asylum seekers deported to Rwanda. Asylum-seekers can face harassment and exploitation in Rwanda which suffers from **political instability**.

Similar Provisions in Other Countries

- The UK's Rwanda Bill is similar to **Australia's offshore processing in Nauru**, where Australia paid Nauru to handle asylum seekers, making up two-thirds of Nauru's revenue in 2021-2022.
- Western countries, including the EU and the USA, have established **refugee-blocking** and **processing arrangements in third-world countries**, reflecting a trend in **using external territories for immigration control**.
- These practices illustrate a broader Western strategy of **managing immigration by outsourcing** to economically dependent nations, often **under the guise of maintaining border security and sovereignty**.

Science and Technology

1. Solar Storms and Carrington Event

News: A powerful solar storm struck the Earth recently. It created vivid display of colours in the skies of the Northern Hemisphere.

About Solar Storms

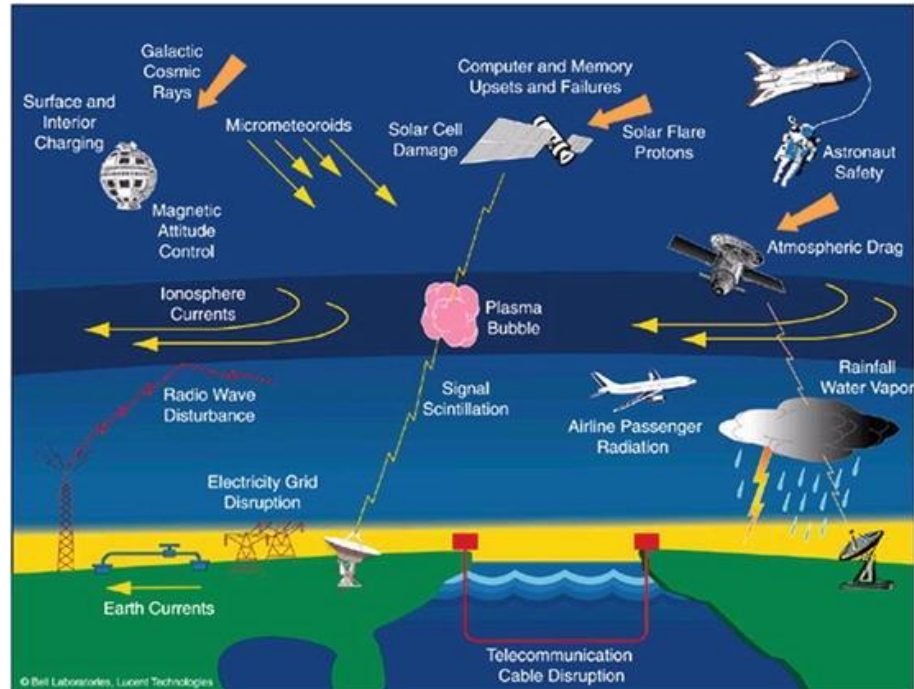
- Solar flares are intense **storms of plasma** that occur on the **sun's surface**.
- Solar storms **release a surge of charged particles into the space**. This phenomenon generates a **solar wind** that carries a magnetic field across space.
- Solar storms originate from **magnetic distortions on the sun's surface**, creating dark patches called **sun-spots**. The sunspots are the birthplace of **solar flares** and **coronal mass ejections (CMEs)**.
- During solar cycle, the sun's magnetic field lines in the corona can become entangled. This **magnetic entanglement** causes the field lines to snap back to their original positions, **releasing vast bursts of plasma and magnetic fields**, known as CMEs. These CMEs can take days to reach Earth and **cause geomagnetic storms upon arrival**. (Refer this NOAA link for infographic on Solar Storms).

Earth's Defence Mechanism Against Solar Flares

- The Earth is **shielded by its own magnetic field**, known as the **magnetosphere**. It is the outermost layer of our atmosphere. This shield helps to **block most of the solar flares**. However, when really strong solar flares happen, they can sometimes get through this shield.
- Strong flares introduce **charged particles into the lower atmosphere**, leading to natural phenomena like the **Aurora Borealis** (Northern Lights). (Refer EPIC May 2023 (click) for Auroras in Ladakh).

Impact on Technology

- They can cause **significant damage to satellites**.
- Strong solar storms have the potential to disrupt the **communication networks** and **navigation services** which are essential for modern society to function.
- Strong flares can severely affect power grids by making **their protective measures ineffective**, and can lead to large-scale disruption in normal life.
- Solar activity can also heat up the Earth's atmosphere.



Future Risks and Protective Measures

- The Sun's evolving nature suggests that **solar storms could intensify in the future**, increasing risks for satellite-based, radio, and electrical infrastructure.
- **Enhanced global monitoring** and **predictive capabilities** via solar observatories could mitigate some risks by **allowing timely interventions**.
- Innovations in AI and **potential shielding technologies** are being explored to improve defences against these cosmic threats.

Recent Activity in the Sun

- The Sun experiences an **11-year cycle** called the **solar cycle**, characterized by alternating periods of increased and decreased solar activity.
- The peak of this cycle, known as **the solar maximum**, is marked by **higher frequency of sunspots** and **solar storms**.
- During this phase, the Sun's magnetic field becomes more tangled and chaotic, leading to more intense solar activity.

About Carrington Event

- The Carrington Event was observed by Richard Carrington on September 1, 1859. It was the **largest recorded geomagnetic storm**. This massive solar flare was equivalent to 10 billion atomic bombs, and hurled electrified gas and particles at Earth.

2. Voyager Spacecraft

News: NASA has announced that its Voyager 1 probe has resumed transmitting valuable data to ground control. It had stopped the transmission of signals in November 2023.

About Voyager 1 Spacecraft

- Voyager 1 space probe was launched by NASA on September 05, 1977.

- Its primary objective was **exploration of the solar system** beyond the neighborhood of the outer planets to the **outer limits of the Sun's sphere of influence**, and “**possibly beyond**”. Voyager 1's mission involved flybys of Jupiter and Saturn, focusing on studying their moons, rings, and magnetic fields.
- In August 2012, Voyager-1 **entered interstellar space**, becoming the **first human-made object to exit the solar system**.
- Significant discoveries by Voyager 1 include identifying a thin ring around Jupiter and two previously unknown Jovian moons (Jupiter's), **Thebe** and **Metis**. At Saturn, it found 5 new moons and a newly designated ring, the G-ring.
- At present, it is **15.13 billion miles** (24.35 billion kms) **away from the Earth**. The distance between the earth and Sun is ~150 million kms. It is ~162 times as far from the Earth as the Sun (162 Astronomical Units).

About Voyager 2 Spacecraft

- Voyager 2 space probe was launched by NASA on August 20, 1977, as part of the Voyager program.
- Its primary mission was to explore the outer planets of the solar system and their moons, followed by an interstellar mission.
- It is the only spacecraft to conduct **close-range studies of all four giant planets** (Jupiter, Saturn, Uranus and Neptune) **in the solar system**. It was the first human-made object to fly by Neptune, where it discovered 5 moons, four rings, and a feature known as the “Great Dark Spot”.

About Interstellar Space

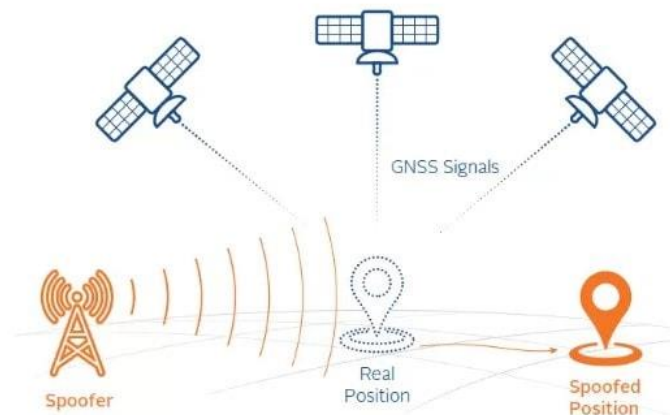
- It is the **area between the stars**.
- It contains vast quantities of neutrinos, charged particles, atoms, molecules, dark matter and photons.

3. GPS Spoofing

News: Israel reportedly used GPS Spoofing to protect itself against the missiles attack by Iran.

About GPS Spoofing

- GPS Spoofing (also called GPS Simulation) involves broadcasting **false GPS signals to deceive a GPS receiver**.
- False signals trick the receiver and the **receiver interprets incorrect location** of the object.
- This cyberattack undermines the reliability of GPS data, affecting navigation, time synchronization, and other applications.



Working of GPS Spoofing

- GPS satellites send signals that Earth-based receivers analyse to determine their location by calculating the time it takes for these signals to arrive.
- GPS spoofing takes advantage of the weak signal strength of GPS satellites. **Fake GPS signals**, being stronger, can easily **overpower the weak authentic signals**, resulting in inaccurate location data on the receiving device.
- Attackers gain knowledge of a victim's GPS setup and transmit counterfeit GPS signals that mimic the authentic ones.

Real-World Implications

- Misleading navigation systems can lead vehicles on **incorrect routes** to the **wrong destinations**.
- Deception in location-based apps can affect services like ridesharing and food delivery, causing delays and inefficiencies.

4. Neural Processing Unit (NPU)

News: Apple has launched the M4 Chip with the iPad Pro. Its key features include a 16-core Neural Engine which is equivalent to a Neural Processing Unit.

About Neural Processing Unit (NPU)

- A Neural Processing Unit is a specialized processor designed to accelerate **neural network processes**. These neural networks are **fundamental to machine learning algorithms for data processing**.
- They are part of the semiconductors specifically designed for machine learning operations, which enables AI features such as generating text or images.
- NPUs excel in **AI-related tasks like speech recognition, natural language processing, and image or video editing processes** such as object detection.
- They enable efficient handling of complex AI operations, enhancing performance in consumer gadgets like smartphones, laptops, and tablets.
- NPUs play a crucial role in **efficiently deploying AI-powered applications directly on hardware**.

Differences Between NPU, CPU, and GPU

- **CPU (Central Processing Unit):** It processes instructions one at a time and ideal for tasks requiring sequential data processing. It is best for general computing, applications, and systems operations.
- **GPU (Graphics Processing Unit):** It is capable of multiple calculations simultaneously, optimized for graphics and complex computations. It focuses on graphic rendering and resolution upscaling and are also used in AI development stages.
- **NPU (Neural Processing Unit):** It is similar to GPUs but **exclusively optimized for neural network and AI computations**. It is more efficient and is less power-consuming for AI tasks, and running refined AI models on devices. (Refer EPIC February 2022 (click) for Artificial Neural Networks).

5. AlphaFold 3 and the Role of AI in Drug Development

News: Google's DeepMind has launched AlphaFold 3. It can predict structures of proteins.

About AlphaFold

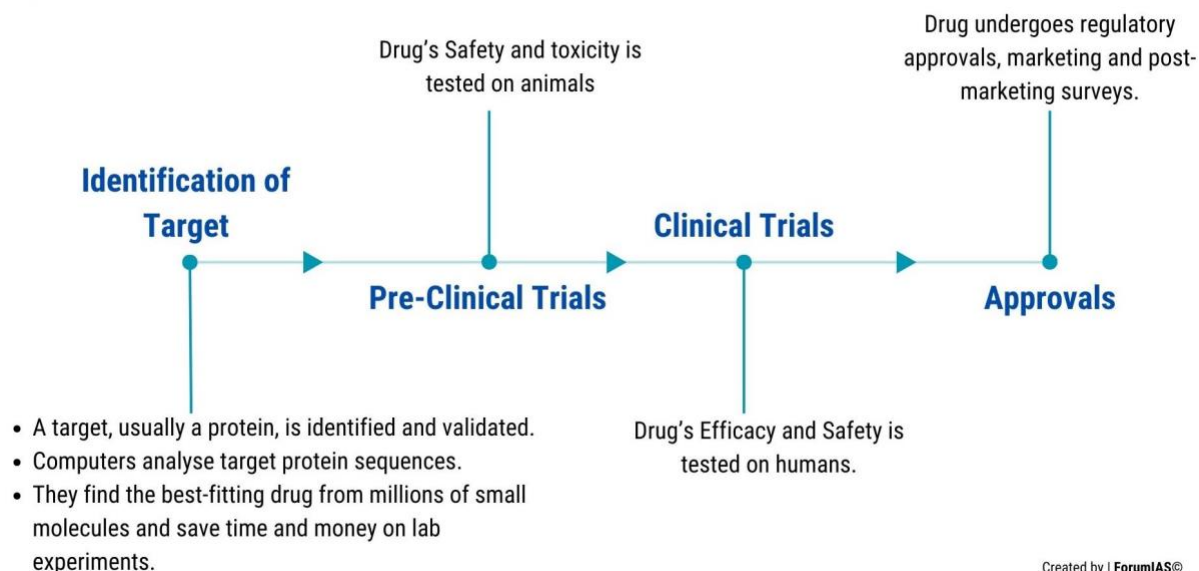
- It is an AI tool developed by Google's **DeepMind** in 2018 to **predict how proteins fold**.
- It aims to **identify the 3D shapes of proteins** based on their **amino acid sequences**, which is crucial for understanding **biological functions** and **disease mechanisms**.
- The initial release in 2018 came 5 decades after the protein-folding problem was identified. It has been followed by improved versions, AlphaFold 2 and AlphaFold 3, which can also model DNA, RNA, and other molecules.
- AlphaFold 3 has **~80% accuracy** in predicting protein structures, showcasing significant advancement.

Importance of Protein Folding

- Proteins need to fold into specific shapes to perform their biological functions properly.
- **Protein Misfolding** is believed to be the primary cause of **Alzheimer's disease, Parkinson's disease, Huntington's disease, Creutzfeldt-Jakob disease, cystic fibrosis, Gaucher's disease** etc.

- It can also cause **many other degenerative and neuro-degenerative disorders**.
- Knowledge of protein structures aids in the **development of drugs** by providing insights into how they interact with the body.

Process of Drug Development



Due to a **high failure rate**, the discovery phase limits the number of drugs that progress to the pre-clinical and clinical phases.

Utility of AI in the Drug Development Process

- AI can speed up target discovery by cutting down time and **increasing prediction accuracy**.
- Tools like AlphaFold and RoseTTAFold use deep neural networks to predict 3-D protein structures.
- AlphaFold 3 and RoseTTAFold All-Atom can predict interactions for proteins, DNA, RNA, small molecules, and ions.
- In a test of 400 drug-target interactions, AlphaFold 3 accurately predicted interactions 76% of the time.
- These AI tools save money and **avoid time-consuming lab experiments**.

Drawbacks/Limitations of AlphaFold 3 and AI Tools

- AI tools have limited accuracy when predicting protein-RNA interactions.
- AI tools **only aid in target discovery and drug-target interaction phases**, not in pre-clinical or clinical development phases.
- Diffusion-based architectures in AI models can cause **hallucinations**, leading to **incorrect predictions** due to **insufficient training data**.
- The code for AlphaFold 3 is not publicly available, limiting independent verification and broader use, research and innovation.
- AI-derived molecules might not succeed in later drug development phases, despite initial promising predictions.
- AlphaFold 3 can predict how proteins fold but does not explain why they fold in that specific way, a task remaining for human scientists.

6. Network-as-a-Service (NaaS) Model

News: India's internet economy is rapidly advancing. Network-as-a-service (NaaS) offers the potential to enhance the pace of growth and improve the everyday user experience.

About Network-as-a-service (NaaS)

- It is a **cloud service model** where customers **lease networking services from cloud providers**.
- With NaaS, customers can manage their own networks **without the need for maintaining large physical networking infrastructure**.
- By utilising **software-based networking functions**, NaaS vendors enable companies to establish fully virtualized networks **without hardware** which are **solely relying on internet connectivity**.
- It serves as an alternative to traditional networking configurations like VPNs, MPLS connections, and on-premise hardware such as firewall appliances and load balancers.

Advantages of NaaS

- **Greater Customization and Flexibility:** Cloud-based networks offer greater customization and flexibility. This allows IT teams to **reconfigure networks on demand** through software.
- **Easy Capacity Expansion:** NaaS provides **scalability advantages** over traditional hardware-based services. It enables easy capacity expansion **through vendor subscriptions**.
- **Access:** Cloud-based networks offer **remote access** from any device with an internet connection which potentially eliminates the need for VPNs.
- **Low Maintenance:** Cloud providers handle network maintenance, including software and hardware upgrade, reducing the burden on enterprises.
- **Enhanced Security:** NaaS **bundles networking and security services** and this leads to tighter integration and enhanced network security.
- **Economical:** Utilizing cloud services results in **cost savings** by **eliminating the need for purchasing and maintaining hardware**, leveraging the vendor's existing infrastructure.

Challenges of NaaS

- **Compatibility issues** may arise due to the NaaS vendor's infrastructure not being compatible with legacy systems (i.e., existing) like older hardware or on-premise applications.
- **Migration complexities** may arise in enterprises with on-premise data centers, posing a challenge in the transition to the NaaS model.
- **Vendor lock-in risk** is a concern as reliance on specific service provider can lead to significant repercussions if their infrastructure fails or prices increase.

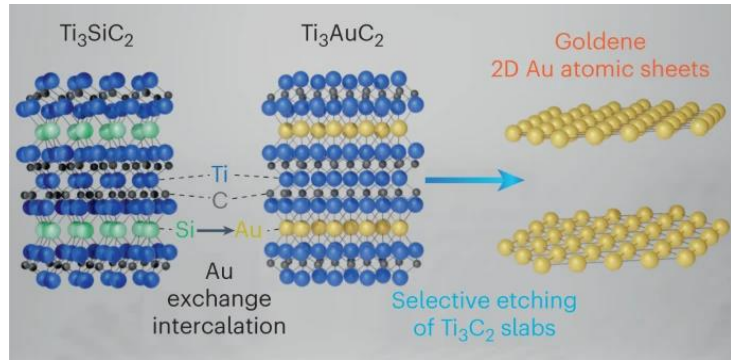
7. Goldene: 2-D Sheet of Gold

News: Scientists have developed a free-standing, single-atom-thick sheet of gold. This is the first time a metal has been transformed into a 2D sheet. The breakthrough offers several new opportunities in the future.

About Goldene

- It is a **2-dimensional allotrope of gold**. It consists of a single layer of gold atoms arranged in a 2D structure.
- It exhibits **semiconductor properties** when fabricated into this single-atom-thick layer. Generally, Gold is known for its excellent conductivity, but it behaves differently in its Goldene form.
- The sheets of Goldene are roughly 100 nanometres thick (1 nanometer = 10^{-9} m).
- Goldene has been created by creating a single layer of silicon between **titanium carbide layers** and then replacing it with monolayer of gold.

- This is done with the help of an age-old **Japanese technique** using a chemical popularly known as **Murakami's Reagent**.
- The potential applications of Goldene and the process include:
 - **Electronics Industry:** Goldene's ultra-thin and lightweight properties could significantly reduce the amount of gold needed in electronics.
 - **Catalysis:** As a catalyst, Goldene offers economic benefits over traditional 3D gold due to its efficiency and reduced material usage. This could be useful in various chemical processes.
 - **Extension to Other Metals:** The technique developed to create Goldene could be adapted to produce 2D sheets of other precious metals like iridium and platinum, expanding the range of applications.
 - **Special Properties for Advanced Applications:** Goldene has a unique structure where each atom connects to six others, not twelve. This could lead to specific uses in **turning carbon dioxide into other materials**, **producing hydrogen**, and **purifying water**.



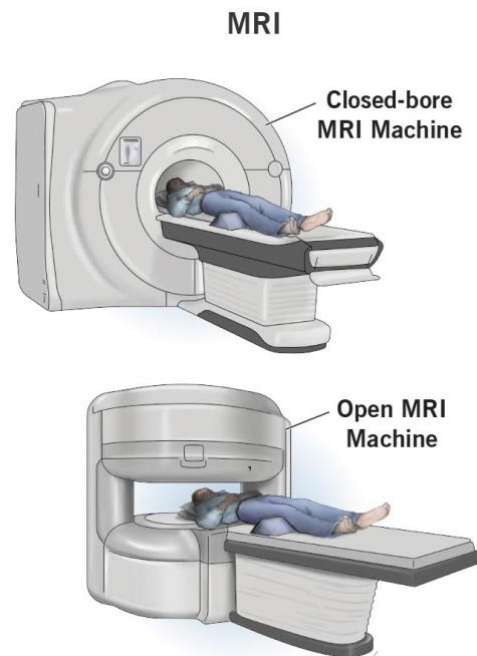
Source: Nature.com. Process of creating 2D Goldene layer.

8. Magnetic Resonance Imaging (MRI)

News: The Magnetic Resonance Imaging (MRI) market is projected to hit US\$ 9.8 billion by 2028.

About Magnetic Resonance Imaging (MRI)

- It is a **non-invasive medical imaging technique** that provides detailed images of **internal structure in the human body**, including organs, bones, muscles, blood vessels and joints.
- MRI works using the **magnetic properties of hydrogen atoms**, which are abundant in **body's fat and water content**.
- The procedure involves 4 main parts:
 - **Superconducting Magnet** generates a strong magnetic field around the targeted body part.
 - **Radio frequency pulses** excite hydrogen atoms, raising their energy level.
 - **Larmor Frequency** is the specific frequency at which the **hydrogen atoms resonate** and **absorb radio waves**, varying by magnetic field strength and tissue type.
 - After the pulse, hydrogen atoms emit energy as they revert to their normal state, which is captured by a detector and **converted into images by a computer**.



Significance of MRI

- It is used to obtain **images of soft tissues** within the body. It is widely used to image the brain, the cardiovascular system, the spinal cord and joints, various muscles, the liver, arteries, etc.
- MRI is particularly crucial for **diagnosing and monitoring various cancers**, such as prostate and rectal cancer.

- It is also essential for tracking **neurological conditions** including Alzheimer's disease, dementia, epilepsy, and stroke.
- Functional MRI is used to track changes in blood flow in the brain which helps to understand how neuronal activity shifts.

Benefits of MRI

- **Versatile Imaging:** An MRI can take images of the body virtually from all useful directions and in very fine details as needed.
- **Safety:** MRI uses **magnetic fields and radio waves** instead of ionizing radiation. **It is safer** compared to X-Rays and CT Scans.
- **No Residual Effects:** MRI scans are **non-invasive**. Magnetic fields do not have lasting effects on the atoms in the body after the scan. Hence, there are **little or no health risks** (except for pregnant women).

Challenges associated with MRI

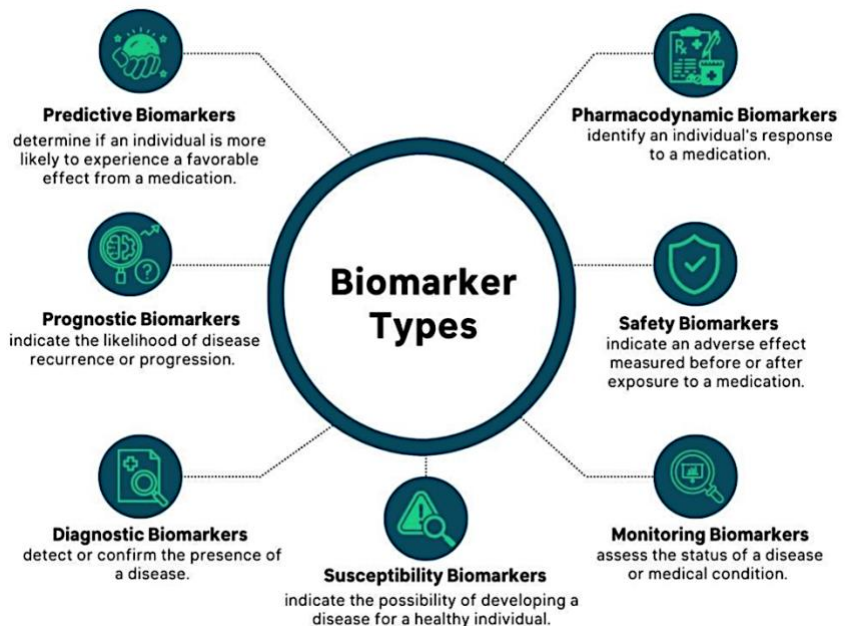
- **Cost:** MRI machines are expensive. The cost of scan is high, leading to high expenses for patients.
- **Discomfort and Noise:** Patients endure discomfort and noise while remaining still inside the MRI bore. It is especially challenging for claustrophobic individuals.
- **Limitations:** Strong magnetic fields in MRIs pose risks for individuals with **metallic implants or embedded objects**, potentially excluding them from undergoing scans.

9. Biomarkers

News: Researchers have suggested screening of blood biomarkers as a possible method for potential detection of cancer in its early stages.

About Biomarkers

- According to WHO, Biomarker is defined as **any measurement which reflects an interaction between a biological system and a potential hazard**. The potential hazard may be physical, chemical or biological.
- A biomarker (biological marker) is an objective measure that **captures what is happening in a cell or an organism at a given moment**. Biomarkers are also called **signature molecules**.
- Biomarkers can serve as **early warning systems for health** e.g., high levels of lead in the bloodstream may indicate a need to test for nervous system and cognitive disorders. High cholesterol levels are a common biomarker for heart disease risk.
- Biomarkers consist of biomolecules like carbohydrates, proteins, lipids, genes, DNA, RNA, platelets, enzymes, and hormones.



- Biomarkers play a crucial role in disease diagnosis, appropriate drug prescription, determination of dosage, and drug development.
- According to researchers, a new **AI-powered test** can be used to accurately and quickly **detect 3 major types of cancer**, by using only a single spot of dried blood. This dried blood spot can serve as a **bio-marker for cancer detection**.

10. Thrombosis with Thrombocytopenia Syndrome (TTS) Associated with COVID Vaccines

News: A rare side effect, thrombosis with thrombocytopenia syndrome (TTS) has been linked to the COVID-19 vaccine developed by Oxford-AstraZeneca.

About Thrombosis with Thrombocytopenia Syndrome (TTS)

- It is a rare condition that involves **simultaneous occurrence of blood clots** (thrombosis) **and a low platelet count** (thrombocytopenia). Thrombosis is the formation of a **blood clot**, which can **reduce normal blood flow in an affected blood vessel**.
- It has been linked to **adenoviral vector COVID-19 vaccines** like Covishield developed by Oxford-AstraZeneca. It is also known as '**vaccine-induced immune thrombotic thrombocytopenia**' (VITT).
- Various symptoms are linked to TTS, such as **shortness of breath**, chest or limb pain, tiny red spots or bruising on the skin beyond the injection site, headaches, and numbness in certain body regions. **TTS may result in restricted blood flow due to clot formation**.
- TTS can lead to **severe clotting at unusual sites** such as brain or gut, with higher risks in younger populations (Tier 1 cases). The incidence of TTS has been marginally higher among individuals under 60 years.
- Reports indicate a range from 0.2 to 17.6 cases/million doses over a 21-day period, with significant regional variations. The fatality rate due to TTS varies, between 0.1 to 1.3 deaths/million doses in different countries.

Global Response to TTS Caused by Vaccine

- South Africa and over 20 European nations, temporarily halted the use of the vaccine, especially among younger adults, early in 2021.
- The US opted not to approve the vaccine, despite having several million doses stockpiled.
- The European Medicines Agency and WHO conducted reviews and concluded that the **benefits of the vaccine outweighed the risks**, emphasizing the importance of communicating the specific risks associated with the vaccine.
- The case highlights the ethical complexities of balancing public health safety and analysing the severity and rarity of the side effects.

11. Bacterial Pathogens Priority List (BPPL)

News: The latest Bacterial Pathogens Priority List (BPPL) updated by the WHO notes that critical priority pathogens pose major threat to the global healthcare system.

About Critical Priority Pathogens

- The WHO has updated its Bacterial Pathogens Priority List (BPPL). It includes 15 families of **antibiotic-resistant bacteria**.
- These are categorized into **critical, high, and medium priority groups** to help prioritize responses.
- Critical Priority Pathogens are bacteria **that pose significant global health threats** because they can **resist current treatments** and **spread their resistance to other bacteria**.
- The list highlights that certain high-priority pathogens like **Salmonella** and **Shigella** carry a **particularly high burden in low- and middle-income countries**.

- These pathogens include **gram-negative bacteria** that are resistant to **last-resort antibiotics** and **Mycobacterium tuberculosis** that is resistant to Rifampicin.
- AMR occurs when bacteria, viruses, fungi, and parasites no longer respond to medicines. This makes infections harder to treat and increasing the risk of spread of diseases, severe illness, and death. The misuse and overuse of antimicrobials are significant drivers of AMR.
- Pathogens like antibiotic-resistant *Neisseria gonorrhoeae* and *Enterococcus faecium* are known for causing persistent infections and showing resistance to multiple antibiotics. This necessitates targeted research and public health interventions.

About WHO Bacterial Priority Pathogens List

- The WHO Bacterial Priority Pathogens List (WHO BPPL) serves as an essential resource in the **worldwide battle against antimicrobial resistance**.
- This 2024 version has updated the 2017 edition and enhances the ranking of antibiotic-resistant bacterial pathogens to meet the changing threats posed by antibiotic resistance.

12. Irradiation Techniques to Improve Shelf Life of Food Items

News: The Government is piloting an irradiation technology project to extend the shelf life of onions and reduce post-harvest losses.

About the Irradiation Project

- Irradiation facilities are being established in Maharashtra. These facilities are expected to treat around 25,000 tonnes of onions.
- The project will operate under **public-private partnerships**, supported financially by the **Ministries of Agriculture and Food Processing**.
- Irradiation involves using **ionizing radiation**, such as **gamma rays**, to treat food items. This process is applied to onions to **prevent sprouting and microbial growth**.
- The primary goal is to **extend the shelf life** of onions and **reduce post-harvest losses**.
 - Typically, about 25% of onion crops are lost post-harvest; irradiation aims to reduce this to 10-12%.
 - Onions can be stored for **~7.5 months with irradiation**, compared to only **~4 months with conventional cold storage methods**.
 - The use of irradiation results in a recovery rate of nearly 84% for Grade A onions, significantly higher than the 56% recovery rate with traditional storage.
- The technology is set to **stabilize the supply chain of onions, reduce losses**, and aid in procurement efforts of the Government to **control prices**.

Environment

1. Summer 2023 was the Hottest in 2000 Years: Research

News: According to new research published in the journal Nature, summer 2023 in the northern hemisphere was the hottest on record and the warmest in almost 2,000 years.

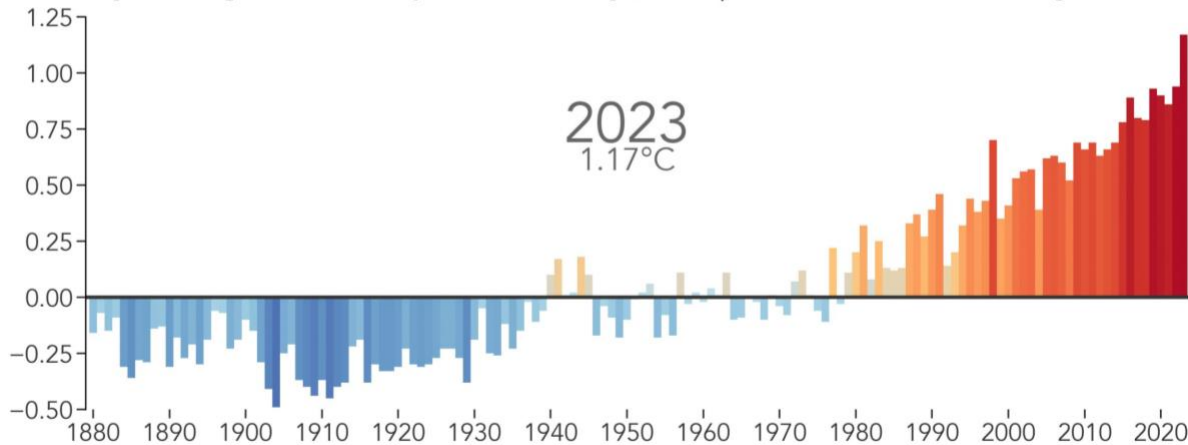
Key Highlights of the Research

- Research indicates that the summer of 2023 experienced the **highest temperatures in nearly 2,000 years**, surpassing the hottest summers recorded since the 1940s and even historical data going back to the mid-1800s.

- **Significant Temperature Rise:** The temperatures of Summer 2023 across lands between 30°-90° North latitude were on average 2.07° Celsius above the pre-industrial levels.
- **Impact of El Nino:** The El Nino climate pattern significantly contributed to last year's heat, leading to prolonged and more severe heatwaves and drought conditions.
- **Health Impacts of Heatwaves:** Deadly toll of heatwaves has resulted in 150,000 deaths annually between 1990 and 2019 across 43 countries. More than half of these have occurred in Asia.

Summer 2023 Continues Long-Term Warming Trend

June, July, and August Global Temperature Anomaly (°C compared to the 1951-1980 average)



Source: NASA. The above chart shows deviation of June, July and August temperatures (global) from the 1951-1980 average. There has been a consistent warming trend since 1980.

2. State of the Climate in Asia 2023 Report

News: The World Meteorological Organization has published the 'State of the Climate in Asia 2023' report.

Key Highlights of the Report

- Asia has faced the **most number of disasters** in the world in 2023. There have been recorded instances of 79 events associated with **extreme weather, climate, and water-related hazards**. These events have affected over **nine million people** in the region and directly resulted in the **loss of over 2,000 lives**.
- The majority of disasters in Asia are related to **floodings and storms**. Over 60% of the 2,000 deaths have been associated with flooding and more than 15% of the deaths were linked to storms.
- **Asia has warmed faster than the global average**. This warming trend has nearly doubled since the 1961-1990 period.
- Deterioration of climate change indicators, such as **rise in surface temperatures, glacier retreat, and sea level rise**, will have significant consequences for Asia's **economy, ecosystems, and human lives**.

3. Warming of the Indian Ocean

News: According to the Indian Institute of Tropical Meteorology (IITM), the Indian Ocean has become warmer by 1.2°C (1950-2000) and climate models expect it to heat up further (1.7°C-3.8°C) from 2020-2100.

Key Findings of the Study

- **Increase in the Overall heat content of the Indian Ocean:** There has been a rise in the overall heat content of the Indian Ocean, as the **heat penetrates beyond the surface and heats deeper layers**.

- At present, the heat content is rising at 4.5 zetta-joules per decade. The future projections suggest an increase in the heat content to 16–22 zetta-joules per decade. (Zetta = 10^{21}).

Impact of the Increased Heating of the Indian Ocean

- **Rising sea levels:** In the Indian Ocean, thermal expansion alone accounts for more than half of the sea-level rise. This surpasses the effects of glacier and sea-ice melting combined.
- **Disruption of Indian Monsoon:** Projections suggest a 66% rise in extreme dipole events which can lead to deficient Monsoon rainfall in India.
 - It can lead to an **increase in severe cyclones** and make the **monsoon more erratic**.
 - There could be longer periods of drought followed by intense rainfall and flooding on the mainland.
- **Induce Marine Heatwaves:** This heating of the Indian ocean can give rise to near-permanent marine heatwaves. The study warns of that marine heatwaves could rise from an average of 20 days per year to **220–250 days per year**.
 - A marine heat wave is a coherent area of extreme warm sea surface temperature that persists for days to months. Marine heatwaves are caused by an increase in the heat content of oceans.
- **Impact on Biodiversity:** The prolonged heating could lead to a near-permanent heatwave state in the tropical Indian Ocean, causing **coral bleaching and harming the fisheries sector**.

4. Decrease in Solar Radiation for Producing Solar Power

News: An Indian Meteorological Department (IMD) study has observed a ‘decreasing trend’ in solar radiation available for conversion to electricity at several locations in India.

Key Findings of the Study

- The analysis reveals that there is an **alarming decreasing trend in solar radiation available** for cost-effective conversion into electricity using solar panels in various locations across India.
- The decline has been attributed to **increased aerosol load and clouding**, which are caused by factors such as **carbon emissions, fossil fuel combustion, and dust**.
- The efficiency of solar panels is affected by the exposure to sunlight they receive. Aerosols play a role in reducing impact of sunlight by **absorbing and redirecting sunlight away from the Earth’s surface**.
 - They also contribute to the formation of dense clouds, which further obstruct sunlight.
- The **Solar Photovoltaic (SPV) Potential** has generally declined across various stations, such as Ahmedabad, Chennai, Goa, Jodhpur, Kolkata, Mumbai, Nagpur, New Delhi, Pune, Shillong, Thiruvananthapuram, and Vishakhapatnam.
- Although India’s largest solar parks are situated in the northwest region, cities in these regions are also experiencing a decrease in SPV potential.

Status of India’s Installed Solar Power Capacity

- At present, India’s **installed solar power capacity is ~82 GW** (April 2024). This accounts for around 17% of its total installed electricity.
- The Government aims to obtain nearly half of India’s electricity needs from non-fossil fuel sources by 2030. This would require around 500 GW of power generation.
- The Government plans to **install at least 40 GW of solar capacity annually from 2021 onwards**. India has added about 13 GW in the past 5 years. The Government is expecting the annual addition of solar capacity to range between 25–40 GW in the coming years.
- The Government has announced an initiative to finance rooftop solar installations in at least 1 crore (10 million) households across the nation.

5. Carbon Farming

News: The carbon farming approach aims to optimize carbon capture by utilizing practices that enhance the removal of CO₂ from the atmosphere and its storage in plant material and soil organic matter.

About Carbon Farming

- Carbon Farming is an agricultural method that **integrates the management of carbon capture and storage into farming practices**.
- It is designed to **reduce greenhouse gas emissions**, enhance the carbon content of soil, and improve overall agricultural productivity and ecosystem health.
- Carbon farming can involve **multiple strategies**. Each practice is tailored to fit different agricultural landscapes and climatic conditions, making **carbon farming versatile and widely applicable**.

Carbon Farming Practices and Their Benefits

- **Rotational Grazing:** It involves rotating livestock across different pastures. This technique helps to maintain soil health and increase carbon sequestration in the soil.
- **Agroforestry Practices:** It is a land use practices where trees or shrubs are grown around or among crops or pastureland.
 - **Silvopasture:** It involves integrating trees, pasture, and livestock. It sequesters carbon and also diversifies farm income.
 - **Alley Cropping:** It involves planting rows of trees or shrubs between crops to provide shade, reduce erosion, and enhance carbon storage.
- **Conservation Agriculture**
 - **Zero Tillage:** It reduces soil disturbance to maintain soil structure and organic content.
 - **Crop Rotation and Cover Cropping:** It involves alternating crops and using cover crops to improve soil health and biodiversity.
 - **Crop Residue Management:** It includes practices like stubble retention and composting to help enhance soil organic matter.
- **Integrated Nutrient Management:** It involves use of organic fertilizers and compost to promote soil fertility and reduce greenhouse gas emissions.
- **Agro-Ecological Approaches**
 - **Crop Diversification and Intercropping:** These practices improve ecosystem resilience by diversifying plant species, which helps in pest control and nutrient balance.
- **Livestock Management:** It involves optimizing feed quality, managing animal waste, and using rotational grazing to reduce methane emissions and increase carbon storage in pastures.
- **Management of Excessive Carbon Through Additional Carbon Sinks:** The launch of '4 per 1000' initiative during the COP21 (2015) climate talks in Paris highlights the particular role of sinks in mitigating greenhouse-gas emissions. As the oceans and the atmosphere are filled with carbon, and they approach their saturation points, **carbon farming can help in effective sequestration**.

Challenges Related to Carbon Farming

- **Geographical and Climatic Limitations:** Optimal carbon sequestration requires long growing seasons and sufficient water, and it is thus challenging in hot, dry areas where water is scarce.
- **Soil and Biodiversity Constraints:** Effective carbon sequestration is hindered by poor soil quality and limited biodiversity.
- **Water Resource Management:** Plant growth is restricted in arid region due to water scarcity. This impacts carbon sequestration and makes water-intensive practices like cover cropping impractical.

- **Economic and Financial Barriers:** Adopting carbon farming can be costly in the initial stages and thus **deter its adoption** among small-scale and resource-poor farmers.
- **Policy Support and Community Engagement:** Effective carbon farming requires robust policy support and active community involvement for successful adoption and scalability.

6. Disappearance of 6 Million Trees in India

News: According to an analysis by researchers at the University of Copenhagen using satellite imagery, India may have lost around 5.8 million fully grown trees in agricultural lands between 2019-2022.

Key Findings of the Study

- During 2018-2022, it was observed that **11% of the large trees identified in 2010-2011 were no longer visible**. This data may indicate their disappearance.
- However, it's important to note that this doesn't indicate a general reduction in trees outside of forests because research was specifically concentrated on large individual trees.
- Major losses (up to 50%) were noticed in certain areas of **Telangana, Maharashtra, and eastern Madhya Pradesh**. In certain hotspot regions, as many as 22 big trees disappeared per square kilometre.
- The majority of losses have probably happened between 2018 and 2020.

Methodology Adopted by Copenhagen Researchers

- The analysis tracked individual large trees (not overall tree cover) in farmlands using high-resolution satellite imagery and machine learning.
- The researchers combined satellite imagery from **RapidEye** and **PlanetScope** repositories. These satellites have **resolutions of 3-5 metres**, allowing them to detect individual trees.
- In contrast, the **FSI relies on data from the Sentinel satellite**, which has a coarser resolution of **10 meters**, enabling the detection of blocks of trees rather than individual ones.

Reasons for the Loss in Indian Farmlands

- Conversion of farmland with trees to **paddy cultivation**. Established agroforestry systems are being replaced by paddy expansion that is supported by new water sources.
- Large trees are removed. Trees are now cultivated in **separate plantations that have lower ecological value**.
- Some loss is also a natural part of **agroforestry management cycles**.

7. Impact of Climate Change on Workers and Labour Productivity

News: According to a report of International Labour Organization (ILO), over 70% of workers worldwide face climate change risks, leading to hundreds of thousands of deaths yearly.

Key Findings of ILO Report

- ILO in its report titled '**Ensuring Safety and Health at Work in a Changing Climate**' observed that many workers are already facing climate change risks at work, and these numbers may increase in the future.
- The ILO identifies **excessive heat, solar ultraviolet radiation, extreme weather events, workplace air pollution, vector-borne diseases, and agrochemicals** as the key impacts of climate change on workers.
- The **number of workers facing rising temperatures** has increased in the last 20 years to **70.9%**. It also mentioned other climate risks, like **UV radiation and air pollution**, affecting **~1.6 billion people each**.
- **Air pollution** leads to about **860,000 work-related deaths yearly for outdoor workers**.
- **Excessive heat** causes around **18,970 occupational deaths annually**, while UV radiation causes roughly 18,960 deaths due to non-melanoma skin cancer.

- The report mentions that **technologies aimed at combating climate change**, such as **solar panels** and **lithium-ion batteries** for electric vehicles (EVs), can sometimes **pose new risks because they contain harmful chemicals**.
- The report highlighted that the **working poor**, those in **informal jobs**, **seasonal workers**, and **employees of small businesses** will be the **most affected by changes in climate**.
- Most impacted sectors include Agriculture, MSMEs, Construction and Gig workers.

Laws Regulating Workers' Safety

- India has more than 13 central laws regulating working conditions across sectors, including the **Factories Act, 1948**.
- These various laws have been consolidated into a single code that is **Occupational Safety, Health, and Working Conditions Code, 2020** (OSH Code, 2020).
- There are several concerns with the laws including poor implementation, lack of Government oversight for unregistered MSMEs, regulatory gaps and lack of proper redressal for workers' concerns.

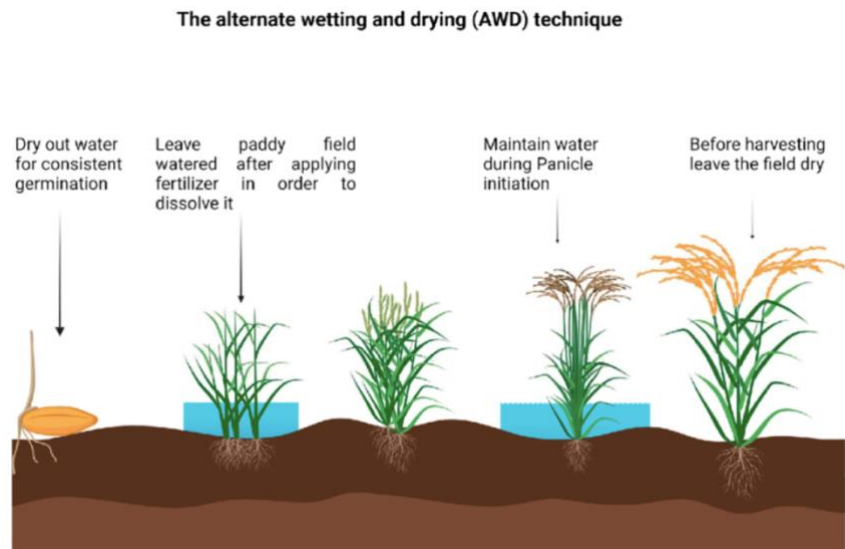
A universally recognized regulatory framework is required to ensure that work and workers are resilient to climate changes. This is because the connection between labour productivity, human health, and climate change is often overlooked.

8. Alternate Wetting and Drying Technique

News: According to a Food and Agriculture Organisation report 2023, rice paddies contribute 8% of all human-made methane in the atmosphere. Farmers in Vietnam are reducing methane emissions by using the alternate wetting and drying technique to grow rice.

About Alternate Wetting and Drying (AWD) Technique

- It is a **water-saving technology** that rice farmers can apply to reduce the water usage in irrigated fields.
- In AWD, irrigation water is applied to flood the field a certain number of days after the disappearance of ponded water. Hence, the **field is alternately flooded and dried**.
- The number of days of non-flooded soil in AWD between irrigations can vary from 1 day to more than 10 days depending on the soil type.
- They also employ large **drones to spray organic fertilizer** onto the knee-high rice seedlings below.



Benefits of AWD Technique

- It **produces less methane** and is thus environment friendly.
- Using the drone to fertilize the crops reduces labour costs.
- It also guarantees the **precise application of fertilizers**. Excessive amounts can lead to the release of nitrogen gases from the soil, contributing to **Earth-warming effects**.

9. Forests are National Assets: SC Judgment

News: The Supreme Court has said that forests in India are a national asset and a major contributor to the nation's financial wealth.

About the SC Judgement

- The SC Judgment was based on an **appeal filed by the State of Telangana against a High Court decision** about “graciously gifting” forest land to a private person.
- The State's forest officials had filed conflicting affidavits in the Court. The SC ordered INR 5 lakh in costs from both the State government and the private persons.
- The State was asked to open an enquiry against its own forest officials.
- The SC noted that depletion and **disappearance of forests** would ultimately **lead to a massive extinction of organisms**.
- The SC held that concepts of **carbon credit** and **green accounting** to evaluate a nation's wealth had become a reality. A country with surplus forest cover can sell its additional carbon credits to those lacking in forests. This underlines the significance of forests in **contributing to the financial wealth of a country**.
- The Judgment said that forests serve as a **major sink** of carbon dioxide (CO₂).
- The value of mitigation has been conservatively estimated to be **US\$ 5 per tonne of CO₂** (locked in forests). The huge sink of about 24,000 MT of CO₂ is **worth US\$ 120 billion, or INR 6 lakh crores**.
- The SC referred to a 2022-2023 report of the Reserve Bank of India on the macroeconomic impact of climate change and changing patterns of rainfall. The report had noted that:
 - The factors, climate change and rainfall pattern, could cost the economy 2.8% of its GDP and **depress the living standards** of nearly half of population by 2050.
 - India could lose anywhere around 3% to 10% of its GDP annually by the year 2100 due to climate change.

10. Global Biofuel Alliance

News: The Ministry of Petroleum and Natural Gas has stated that the Global Biofuel Alliance (GBA) has initiated a work plan for formulating policy frameworks.

About the Global Biofuel Alliance

- It was launched on the sidelines of the 2023 G20 summit in New Delhi in September 2023.
- The Alliance is focused on **securing the supply of biofuels, ensuring affordability and sustainable production of biofuels**.
- It aims at **facilitating international cooperation** and intensifying the use of **sustainable biofuels**. It aims to **facilitate global trade in biofuels** and **provide technical support** for **national biofuel programmes**.
- It has been initiated by India, the US, and Brazil. It has **9 member countries**: India, the US, Brazil, Argentina, Bangladesh, Italy, Mauritius, South Africa, and the UAE.
- The World Bank, Asian Development Bank, World Economic Forum, International Energy Agency, International Energy Forum, International Renewable Energy Agency, and International Civil Aviation Organization are among the organisations that have agreed to join the alliance.
- The Global Biofuel Alliance **aims to increase biofuel usage** by:
 - **Facilitating advancements** in biofuel technology.
 - **Promoting the use of sustainable biofuels** to address concerns about indirect land use change (ILUC).
 - Developing **robust standards and certifications**.
 - It will serve as a knowledge centre to **enhance global cooperation** and ensure the secure and affordable availability of biofuels.

About Biofuels

- Biofuels refer to **renewable fuels derived from biomass**: plants or agricultural, animal, domestic, and industrial biowaste. **Biofuels are significantly cleaner** than the conventional fossil fuels.
- The International Energy Agency (IEA) forecasts a significant surge in biofuel production by 2050, projecting growth of 3.5–5 times, driven by global Net-Zero targets. This presents a substantial opportunity for India.
- In 2022, a record-breaking 171.2 billion litres of biofuels were procured worldwide, with India accounting for a mere 2.7%, or 4.6 billion litres. Yet, India maintained its position as the 3rd-largest ethanol producer globally, trailing only the US and Brazil.

History, Art and Culture

1. Indian Literary Works Included in UNESCO's Memory of the World Register

News: During the 10th session of the Memory of the World Committee for Asia and the Pacific in Ulaanbaatar, Mongolia, 3 Indian literary works were included in UNESCO's Memory of the World Asia-Pacific Regional Register.

About UNESCO's Memory of the World Recognition for Indian Texts

- Three significant Indian literary works were added to UNESCO's Memory of the World Asia-Pacific Regional Register: **Ramcharitmanas**, **Panchatantra** and **Sahridayaloka-Locana**.
- These works were chosen for their **global appeal** and **profound influence** on both Indian and international audiences.

Specific Works and Attributes

- **Ramcharitmanas:** The **Ramayana** and **Ramcharitmanas** are widely read in Southeast Asian countries like Cambodia, Thailand, Sri Lanka, and Indonesia. Two versions of the **Ramcharitmanas** were submitted to UNESCO, one by Goswami Tulsidas and another translated into Arabic in the 18th century, demonstrating the **text's broad appeal in West Asia and beyond**.
- **Panchatantra:** It was selected for its universal **moral lessons**.
- **Sahridayaloka-Locana:** It is recognized for its **aesthetic significance**, authored by renowned Kashmiri scholars **Acharya Anandvardhan** and **Abhinavagupta**.

About the Memory of the World (MOW) Program

- The UNESCO Memory of the World (MOW) program is a global initiative aimed at **preserving, protecting, and enhancing access to documentary heritage**, particularly those collections that are **rare and at risk**.
- It was initiated in 1992. The program's goal is to prevent "**collective amnesia**" by **safeguarding invaluable archives** and library collections worldwide and **promoting their widespread dissemination**.

Significance of the Memory of the World Program

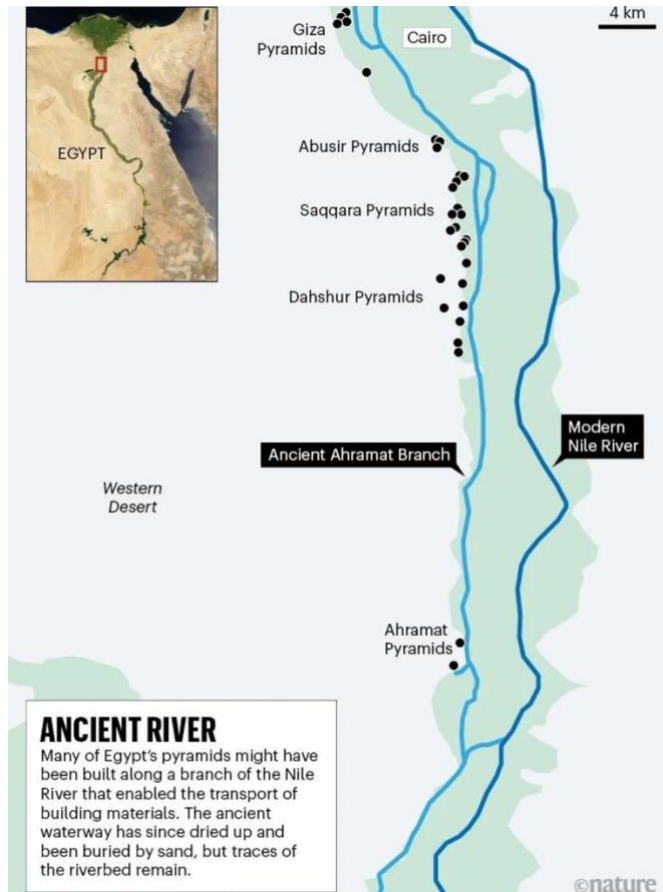
- **Recognition and Registration:** The program identifies documentary heritage of international, regional, and national importance; maintains registers for these collections; and assigns a distinct logo to recognized collections.
- **Access and Preservation:** It ensures equitable access and preservation of documents.
- **Awareness and Advocacy:** The program actively campaigns to inform Governments, the public, and the private sector about the need to preserve documentary heritage and encourages fundraising efforts.
- **Inscription Benefits:** Registering documents confirms their significance, enhances their visibility, and improves access, supporting research, education, entertainment, and ongoing preservation.

2. Construction of Egypt's Pyramids

News: A recent study on the construction techniques of the Pyramids has provided insights into how ancient Egyptians transported massive stone blocks needed for their construction.

Key Findings of the Study

- The study highlights the **critical role of the River Nile** in facilitating the construction of Egypt's pyramids.
- Researchers have identified an **extinct branch of the Nile** that **ran adjacent to the sites of pyramids**. This branch was instrumental in moving heavy materials.
- The research team used imagery by radar satellites, **historical maps**, **geophysical surveys**, and **sediment coring** to map the ancient river branch, **now buried** by sandstorms and major droughts.
- The study suggests that this branch of the Nile likely **served as a waterway for transporting stone blocks, equipment and personnel**, significantly **easing the construction process**.
- The study showed that **several causeways** leading from the pyramids connected to inlets of this Nile branch, which may have functioned as **riverine harbours**.
- The ancient Egyptians likely used **large ramps**, possibly greased with water or wet clay, along with sledges, sturdy ropes, and levers to **move the stones from the harbours to the pyramid sites**.
- This discovery supports the theory that the logistical capabilities of the ancient Egyptians, including the use of the river's natural flow, reduced the human labour needed and optimized the construction process of the pyramids.
- The study also revealed about the **advanced mathematical and architectural knowledge** of the Egyptians, as evidenced by the precise 52° gradient on each side and alignments in pyramid construction.
- The archaeological findings of well-organized living quarters, bakeries, and food remnants near the pyramids indicate that the **labourers were well-provided for**. It also indicates that the entire construction effort was managed by a **centralized authority**.



Source: Nature.com. The map depicts the now extinct branch of Nile (left, in light blue), running almost parallel to the existing channel (right). The sites of ancient pyramids are almost adjacent to the extinct channel.

3. Ban on Offering of Oleander Flowers in Kerala's Temples

News: Two temple boards in Kerala have prohibited the use of oleander flowers in offerings. This decision follows the tragic death of a woman who accidentally consumed oleander leaves.

About Oleander Flowers

- Nerium oleander is commonly known as oleander or rosebay.

- It is a globally cultivated plant found in **tropical, subtropical, and temperate regions**.
- It is renowned for its **ability to withstand drought conditions**. It is frequently used for **ornamental and landscaping purposes**. It is also used for **medicinal purposes**.
- In Kerala, it is locally known as *arali* and *kanaveeram*. It is grown along highways and beaches, serving as **natural green fencing**. Different varieties of oleander exist, each with flowers of varying colours.
- It is used in treatment of *vrana* (infected wounds), *kustha* (skin diseases including leprosy), *krimi* (microbes and parasites), *kandu* (itching).
- Despite medicinal use, oleander is toxic.
 - This is due to the properties of **cardiac glycosides** (a type of chemical) including oleandrin, folinerin, and digitoxigenin, which are present in all parts of the plant.
 - Cardiac glycosides have **therapeutic value in heart conditions** but have a narrow therapeutic window, leading to frequent **overdose and toxicity**.
 - **Toxic effects** include nausea, diarrhoea, vomiting, confusion, irregular heartbeat, and, in severe cases, death. Ingestion or inhalation of smoke from burning oleander can also be intoxicating.



Miscellaneous

1. Shrinking of Humboldt Glacier, Venezuela

News: The International Cryosphere Climate Initiative (ICCI) has reported that Venezuela's last glacier Humboldt or La Corona in the Andes has become too small to be qualified as a glacier.

About Melting of Glaciers in Venezuela

- Venezuela had 6 glaciers, located at ~5,000 metres above sea level in the **Andes mountains**. 5 of the 6 glaciers had vanished by 2011.
- Scientists had expected the last surviving Humboldt Glacier to last longer but it has shrunk at a much faster rate. Now it is less than 2 hectares in size, leading to its downgrade from a glacier to an ice field.

Causes of Melting

- **Climate Impact:** Experts attribute the accelerated rate of melting to **rising temperatures driven by climate change** and the recent El Niño phenomenon, which exacerbates the warmth.
- **Lack of Monitoring:** Political turmoil in Venezuela has hindered consistent scientific monitoring of the glacier.



Source: Wikimedia Commons. Location of Humboldt Glacier within Venezuela (encircled in red).

- The Government of Venezuela attempted to slow the melting by installing a **thermal blanket** over the glacier, but experts consider this measure ineffective.

Future Outlook

- The **International Cryosphere Climate Initiative** (ICCI) has noted that Venezuela is likely the first modern nation to lose all its glaciers. Other countries at risk of becoming glacier-free include **Indonesia, Mexico**, and **Slovenia**.
- The high-mountain region of Asia has also seen significant glacier loss due to record high temperatures and dry conditions.
- Experts warn that **glacier melting may be irreversible**, stressing the importance of protective measures to preserve remaining glaciers.

About International Cryosphere Climate Initiative

- It was established in **2009** following the **COP-15 summit in Copenhagen**. ICCI is a pivotal network aimed at cryosphere preservation.
- The initiative involves a collaboration of senior policy experts and researchers who work closely with Governments and various organizations.
- The goal is to develop and implement strategies that help **preserve as much of Earth's cryosphere as possible**.
- ICCI's efforts concentrate on the unique climate dynamics affecting **3 key cryosphere regions**: the **Arctic**, the **Antarctic**, and **high mountain areas**.
- The organization plays a critical role in adding urgency to global climate change efforts.

2. Discovery of Hidden Ocean Inside the Earth

News: Scientists have recently discovered a hidden ocean which is 700 km below the Earth's surface. The ocean is located within a mineral called ringwoodite.

About Ringwoodite

- It is a mineral that exists in the Earth's transition zone.
- It is a rare type of mineral that **forms from olivine under very high pressures and temperatures**. The heavy weight of rocks (100s of kilometres thick) and extremely high temperatures above 1,000°C (1,832° Fahrenheit) break down water into its components.
- This mineral has a special crystal structure that can soak up water and hydrogen, like a sponge. It can hold a lot of water.
- When these water-containing minerals reach specific depths, they break down through dehydration, releasing the water to create magmas. Such "**dehydration melting**" is common in the shallow mantle and **forms the source for magmas** in many volcanoes.

Significance of the Discovery

- This ocean is much **larger than all the surface oceans combined**. Its size raises questions about current theories on the source of earth's water and suggests new inquiries into Earth's formation.
- This finding strongly suggests that **Earth's water might have come from deep within the planet**. With the passage of time, it slowly leaked out from the core, explaining why earth has so much water.
- This internal water source could also play a role in **volcanic activity** and the **formation of new crust**.

3. Fossil of Huge Pre-historic Snake Found in Gujarat

News: Researchers at IIT Roorkee have reported the discovery of fossils of one of the largest snakes that ever existed. The snake likely lived 47 million years ago during a period called the Middle Eocene.

About Fossils of Prehistoric Snake

- The fossil was found in **Panandhro**, in Gujarat. It has been named as **Vasuki** after the mythical snake king Vasuki, who is seen around the neck of the Hindu deity **Lord Shiva**.
- The reptile could have been anywhere between **10-15 metres long** and may have weighed up to **2,200 pounds** (1,000 kilogrammes). It lived in the Middle Eocene period (roughly 47 million years ago).
- It belonged to the **now-extinct Madtsoiidae snake family** but represents a unique lineage from India.
 - Madtsoiidae are **Gondwanan terrestrial snakes** that lived between the Upper Cretaceous (100.5 million to 66 million years ago) and the Late Pleistocene (0.126 million years ago to 0.012 million years ago).
- These snakes moved from India across southern Eurasia and into North Africa after the Indian subcontinent collided into Eurasia around 50 million years ago
- 27 vertebrae has been found in which some of them are in their original position within the spine. The researchers believe **Vasuki resembled a large python and lacked venom**.
- The researchers also concluded that Vasuki was a **slow-moving predator** that would **control its prey through constriction** like anacondas and pythons.
- This snake lived in a **marshy swamp near the coast** at a time when global temperatures were higher than today, at roughly 28 °C.
- The diet of Vasuki given its large size, likely included crocodiles, as suggested by the presence of crocodile and turtle fossils found alongside Vasuki's remains.
 - Fossils of fish and two early whales, Kutchicetus and Andrewsiphius, were also discovered in the same area, indicating a diverse potential prey range for Vasuki.

4. Soil Nailing Technique for Slope Stabilization

News: The State Highways Department of Tamil Nadu is carrying out Soil Nailing exercise. The 'Slope stabilization using Soil Nailing and Hydroseeding method' is being conducted along major roads in the Nilgiris area of Tamil Nadu.

About Soil Nailing Exercise

- Soil Nailing is a geotechnical engineering technique that involves the **insertion of reinforcing elements into the soil** in a **specified area to strengthen it**.
- It involves **drilling steel tendons into the soil** and **grouting them** in place to form a composite structure akin to a gravity wall.
- It is most commonly used for **stabilizing slopes and landslides, supporting excavations, and repairing existing retaining walls**.



5. Global Report on Food Crisis, 2024

News: The Global Report on Food Crisis, 2024 has been released.

About Global Report on Food Crisis (GRFC)

- The Global Report on Food Crises (GRFC) 2024 is produced annually by the **Food Security Information Network (FSIN)** and launched by the **Global Network Against Food Crises**.
- Global Network Against Food Crises is a collaboration involving UN agencies, the EU, the US Agency for International Development, and non-Governmental organizations working to address food crises.
- The report examined a population of 1.3 billion across 59 countries in 2023.
- For the 5th consecutive year, the number of people experiencing acute food insecurity increased.
- **~282 million people** in 59 countries **suffered from high levels of acute food insecurity** in 2023.
- **Conflicts, extreme weather events, and economic shocks** were the main drivers worsening food crises worldwide.
- Conflict and insecurity were the primary causes in 20 countries which is directly impacting 135 million people, notably in places like the **Gaza Strip** and **Sudan**.
 - The Gaza Strip faced the most severe food crisis in the past 8 years while Sudan also experienced a significant crisis, with **almost a third of its population requiring emergency food assistance**.
- Extreme weather events affected 18 countries, with over 72 million people experiencing high levels of acute food insecurity.
- The 10 countries with the most severe food crises in 2023 were the Democratic Republic of Congo, Nigeria, Sudan, Afghanistan, Ethiopia, Yemen, the Syrian Arab Republic, Bangladesh, Pakistan, and Myanmar.
- There were **positive developments in 17 countries** in 2023, including the Democratic Republic of Congo and Ukraine, where the food situation improved.

6. Global Report on Internal Displacement, 2024

News: The Report has been released by the Geneva-based Internal Displacement Monitoring Centre (IDMC).

Key Findings of the Report

- The report is published annually and documents internal displacements caused by **conflict, violence, and disasters**.
- The number of internally displaced people increased to 75.9 million in 2023, up from 71.1 million in 2022.
- **68.3 million people were displaced due to conflict and violence** (49% increase from 2022).
 - Sudan, Syria, Congo, Colombia and Yemen collectively host ~50% world's internally displaced population.
- Displacements caused by **disasters** totalled **7.7 million** (2023). Earthquakes accounted for ~25% of these displacements.
 - 148 countries recoded displacements due to disasters, with Canada and New Zealand reporting their highest figures ever.
- There has been ~33% reduction due to weather related displacements (from 2022) due to shift from La Nina to El Nino, with La Nina typically associated with more storms and floods.
- South Asia, including India, reported its lowest internal displacements since 2018 with 3.7 million, of which 3.6 million were due to disasters. This reduction has also been linked to onset of El Nino.
- The increase in conflict and violence-related displacements in 2023 marks a reversal of the previous trend where natural disasters were the primary cause of displacement.

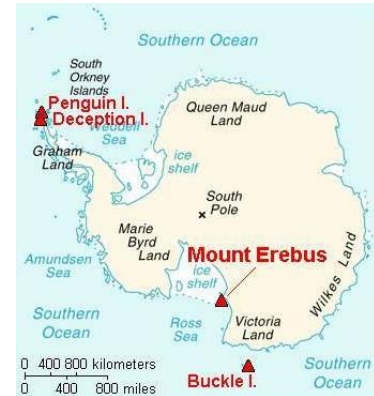
Pointly

1. Mount Erebus

Mount Erebus is an **active volcano in Antarctica**. It has been in the news for **emitting gold dust** valued at US\$ 6000 daily. It is the **most southerly active volcano on Earth**. It was discovered in 1841 by the British explorer **Sir James Clark Ross**, who named it after his ship, the Erebus. It is situated on **Ross Island**, Antarctica.

It's a **stratovolcano** that is characterized by a **conical shape** and layers of hardened lava, tephra, and volcanic ash.

It is known for its persistent **lava lake** and is one of only a few long-lived lava lakes on Earth.



2. Mount Ruang

Mount Ruang has erupted, sending an ash cloud more than a mile high into the sky. It is a **stratovolcano** located in **Ruang Island, North Sulawesi, Indonesia**. Its summit is 10,932 feet above the sea level and features a caldera approximately 2 miles wide.



3. Stratovolcano

It is a tall, steep, and **cone-shaped type of volcano**. At the top, stratovolcanoes usually have a **small crater**. They're usually found above **subduction zones** and are part of big, volcanic areas like the **Ring of Fire** around much of the Pacific Ocean. Stratovolcanoes make up about **60% of the Earth's volcanoes**. These volcanoes often suffer **explosive eruptions**. Their lavas are cooler and more viscous compared to basalt.

4. Strombolian Eruptions

They are **moderately explosive eruptions** of **basaltic magma** with moderate gas content. They consist of intermittent, discrete explosive bursts which eject **pyroclasts** as high as hundreds of feet into the air in firework-like incandescent rooster-tails. Strombolian eruptions are louder than Hawaiian eruptions, and generally are of more viscous magma.

5. Cook Islands

The Cook Islands is the leading efforts to explore deep-sea mining for minerals essential in electric car batteries. Cook Islands is a **self-governing island state** in **free association with New Zealand**. It is located in the **South Pacific Ocean**. Its capital is in Avarua on Rarotonga Island. The Cook Islands comprise **15 islands divided into the Northern and Southern Island groups**. The Cook Islands has a **unique tropical ecosystem**.



6. Hopen Island

Researchers have reported the first incident of death of a walrus due to bird flu on **Hopen Island**. Hopen Island is located in the southeastern part of the **Svalbard archipelago** (Norway). It is part of the Southeast Svalbard Nature Reserve. The island is mostly covered by **continuous permafrost**, with a very narrow beach. The island is home to a significant number of **polar bears**, especially during winter when the island is surrounded by sea ice. The island is a breeding ground for **black-legged kittiwakes**, **thick-billed guillemots**, and **black guillemots**.



7. Salas y Gómez

Scientists have recently discovered 160 marine species while exploring the Salas y Gómez region. Salas y Gómez is an **underwater mountain chain**. It is in the Southeastern Pacific Ocean. Ecosystems in this region are isolated by the **Atacama Trench**, the **Humboldt Current System**, and an extreme oxygen minimum zone. It hosts unique biodiversity with some of the **highest levels of marine endemism on Earth**. It is under consideration for being designated as a **high seas marine protected area** once the UN High Seas Treaty is approved.



8. Darfur Region

The UN has warned of starvation related deaths in the Darfur Region of Sudan as people are being forced to eat 'grass and peanut shells' due to food scarcity amidst the ongoing civil war. More than 8.7 million people, including 4.6 million children, have been displaced by the war in Sudan and 24.8 million are in need of assistance. Darfur is a region in **western Sudan**. There has been an ongoing civil war between the **Arab and African communities**. This has led to widespread violence and human rights abuses.



9. Hindon River

The Hindon River is a **tributary of the Yamuna River**, primarily fed by **rainwater**. It originates from the **lower Shivalik ranges** in the **Saharanpur District of UP**. The river flows through the **industrial belt of Western Uttar Pradesh**, covering a distance of **400 kilometres** before it **joins the Yamuna River in Noida**. Its main tributaries include the **Kali (West) River** and **Krishni River**. The Hindon River suffers from significant pollution due to urban, agricultural, and industrial waste being discharged into its waters without adequate treatment. This has made it one of the most polluted stretches in the Ganga basin. The **National Green Tribunal** has directed the Uttar Pradesh Pollution Control Board (UPPCB) to **provide a report on the pollution** of the Hindon river.

10. UN Counter-Terrorism Trust Fund

India has donated US\$ 500,000 to the UN Counter-Terrorism Trust Fund. It was **established in 2009** and subsequently incorporated into the **UN Office of Counter-Terrorism (UNOCT)** in 2017. The framework allows the UNCTF to effectively address the **evolving challenges of global terrorism** by fostering international cooperation and strengthening the capacities of vulnerable regions.

11. UN Office of Counter-Terrorism (UNOCT)

It was established in June 2017 by the **UN General Assembly**. It serves as a pivotal entity in the global counter-terrorism efforts. UNOCT provides **guidance on the counter-terrorism** mandates that the General Assembly has entrusted to the Secretary-General, coordinating efforts across the UN system. It also enhances coordination among the entities of the **Global Counter-Terrorism Coordination Compact** to ensure the effective implementation of the **4 pillars of the UN Global Counter-Terrorism Strategy** (Prevent, Pursue, Protect, Prepare).

12. Shinku La Tunnel

The Border Roads Organisation about to start building the Shinku La tunnel. The tunnel will create a reliable connection from **Manali to Leh** through the **Nimmu-Padam-Darcha** route (*Refer EPIC April 2024*). It will become the **world's highest tunnel** (15,800 ft), surpassing Mila tunnel in China (15,590 ft). It will be **4.1 km long**. The route via Nimmu-Padam-Darcha axis will provide **third connectivity option to Ladakh**. It will be an **alternative to the Manali-Leh-Kargil** route. It will fasten the transportation of large equipment to key areas like Kargil, Siachen and the LOC.

13. BrahMos Missile

India has delivered the first batch of BrahMos supersonic cruise missiles to the **Philippines**. The BrahMos is a **ramjet supersonic cruise missile** jointly developed by the DRDO and Russia's NPO Mashinostroyeniya.

The name 'BrahMos' has been derived from the combination of two rivers: the Brahmaputra and the Moskva. At present, it is the **world's fastest anti-ship**

cruise missile in operation, capable of reaching speeds of **Mach 2.8 to Mach 3**. BrahMos can hit a target up to a range of 290 kms and can be launched from submarines, ships, aircraft, or land platforms.

It has a **solid propellant booster engine**. It has a **very low radar signature**, making it stealthy, and can achieve a variety of trajectories.



14. FWD 200B

FWD-200B is **India's first indigenous bomber UAV**.

It aims to transform India into a **global drone manufacturing and technology hub**, and bolster air defense capabilities. Its objective is to reduce India's reliance on costly imports and **boost the Make in India initiative**.

It is classified as a MALE (medium-altitude, long-endurance) Unmanned Combat Aerial Vehicle. It is equipped with **optical surveillance payloads** and integrated with **precision air strike capabilities** resembling missile-like weapons. It has a pay-load



capacity of 100 kgs. It operates at a maximum speed of 200 knots (370 kmph) and can stay in the air for **12 to 20 hours straight**.

15. Chloropicrin

The US State Department has accused Russia of using Chloropicrin (a chemical weapon) against Ukrainian forces, which violates the **Chemical Weapons Convention**. Chloropicrin (Cl_3CNO_2) is a toxic organic compound. It is listed as a banned choking agent by the Hague-based **Organisation for the Prohibition of Chemical Weapons (OPCW)**.

It is a colourless to yellow oily liquid. It is irritant, like a tear gas. It has a strong, irritating odour and can enter the body through breathing, swallowing, or skin contact.

It serves as a fungicide, herbicide, insecticide, nematicide, and antimicrobial agent. It has been used as a **warfare agent during the World War I**, but now it is no longer authorized for military use. It is highly toxic and carcinogenic.

16. Eta Aquariids Meteor Showers

The Eta Aquariids meteor showers are seen in May every year and are best visible in the Southern Hemisphere. The meteor showers happen annually when **Earth passes through the orbital plane of Halley's Comet**.

It is named after the **Aquarius constellation**, where its **radiant point** is located. Radiant points are the positions in the sky from which **meteor showers appear to originate**.

The meteor shower is known for **its rapid speed**, with glowing tails persisting for several minutes. Southern Hemisphere typically witnesses 30 to 40 meteors per hour during the peak, while the rate in Northern Hemisphere is 10 meteors per hour,

Halley's Comet orbits the Sun approximately once every 76 years. It was last visible from the Earth in 1986.

17. Dragonfly Rotorcraft Mission

NASA has confirmed its Dragonfly rotor-craft mission to **Saturn's organic-rich and largest moon Titan**. It is designed to fly across the surface of Titan. It is scheduled to **reach Titan in 2034**.

It will be NASA's first to **employ a flying vehicle for scientific exploration on another planetary body**.

The rotorcraft will study **prebiotic chemical processes** that are key to understanding both Titan

and **the early Earth before life began**. It is equipped with **8 rotors** and the rotorcraft **operates similarly to a large drone**. It will be powered by a **radioisotope power system**. It will spend most of its time on the moon's surface making science measurements.



18. Nancy Grace Roman Space Telescope

It is NASA's **Infrared Space Telescope** schedule to launch in May 2027 and will be placed in Sun-Earth L2 Orbit. (India's Aditya has been placed at L1). The space observatory will gather data to settle essential questions in the areas of **dark energy**, **exoplanets** and **infrared astrophysics**. It will continuously observe hundreds of millions of stars to **detect subtle changes in brightness** that indicate the **presence of planets**, distant stars, icy objects on the fringes of our solar system, and isolated black holes. It possesses a field of view 100 times larger than Hubble, allowing for broader sky coverage in less time.

19. High Energy Photon Source (HEPS) Synchrotron

China is about to complete its High Energy Photon Source (HEPS) facility in **Huairou Science City in Beijing**. It will be the brightest **Synchrotron Radiation** source and first 4th-generation synchrotron facilities in the world.

HEPS operates by **accelerating electrons to nearly the speed of light and making them travel in a circular path**. As these high-speed electrons change direction under the **influence of magnetic fields**, they emit **Synchrotron Radiation**, which includes X-rays. These X-rays are then **harnessed for various scientific applications**. HEPS offers extremely precise imaging capabilities, enabling scientists to observe and manipulate materials at the atomic and molecular levels. It will reduce the time taken by experiments, from milliseconds to hundreds of nanoseconds. It has applications in the fields of Materials Science, Biology and Nanotechnology.

20. PREFIRE Polar Mission

NASA will soon launch 2 satellites under PREFIRE polar mission. PREFIRE stands for **Polar Radiant Energy in the Far-InfraRed Experiment**. The mission is aimed at filling the **knowledge gap about Polar regions of Earth** (the Arctic and Antarctic). It will measure the **amount of far-infrared radiation** (heat) **emitted** from the polar regions into space. PREFIRE is composed of 2 small CubeSats fitted with specialized miniature heat sensors.

At the **tropics**, Earth absorbs a lot of energy from the Sun. This **energy travels to the polar regions** with the help of **wind movement** and **water currents**. This heat is then transferred into the space.

~ **60% of the heat energy**, going outwards into space from earth is in the form of **far-infrared wave-lengths**. It has never been measured. The knowledge from the **mission will improve computer models** that are used to **predict** how Earth's ice, seas, and weather will change in a warming world.

21. Phi-3-mini

Microsoft has unveiled the latest version of its '**lightweight**' **AI model** Phi-3-Mini. It is the smallest AI model developed by Microsoft. It has performed well in various benchmarks, such as language, reasoning, coding, and mathematics. Compared to large language models (LLMs), Phi-3-mini represents a smaller, more streamlined version. Smaller AI models like this **offer cost-effective development and operation**, particularly on **devices like laptops and smartphones**. They are also ideal for tasks **requiring fast response times**, such as **chatbots** or **virtual assistants**.

Small-Language Models (SLMs) typically undergo targeted training, requiring less computational power and energy compared to LLMs. They also excel in inference speed and latency due to their compact size, making them appealing to smaller organizations and research groups.

22. GPT-4omni (GPT-4o)

OpenAI has launched GPT-4omni. It is an advanced AI model designed to interact with users through **text**, **images**, and **audio** (Earlier models could take only text as input). This is a **multimodal model**, which means it can understand and generate content in different formats. It acts like a digital personal assistant, handling tasks like real-time translations and spoken conversations. It has the **ability to interpret emotions, background noises, and visual cues from images and videos**. It responds to queries almost as quickly as a humans, within ~ 232 to 320 milliseconds. It is better at understanding and responding in multiple languages.

It can be integrated into existing services and devices, improving their functionality with AI features.

23. LLaMA 3

LLaMA stands for **Large Language Model Meta AI**. It is a family of LLMs introduced by Meta AI (Meta is the parent company of Facebook, WhatsApp and Instagram) in February 2023. The first version of the model was released in four sizes – 7 B, 13 B, 33 B, and 65 Billion parameters. According to reports, the 13 B model of LLaMA performed better than OpenAI's GPT-3, despite GPT-3 having 135 Billion parameters.

Parameter is a measure of the **size and complexity of an AI model**. A larger number of parameters implies that an AI model is **more complex and powerful**. LLaMA 3 has been released in two sizes, 8 B and 70 B parameters.

All LLaMA 3 models handle context lengths of up to **8,000 tokens**. Having more tokens means users can input more content or prompts, and the model can respond with more content.

LLaMA 3 can be used on Facebook, Instagram, WhatsApp, Messenger, and the web.

24. Zero-Day Vulnerability (ZDV), Zero-Day Attack (ZDA) and Zero-Day Exploit (ZDE)

Zero-Day Vulnerability denotes a **system or software flaw** that **remains unknown to its vendor**, lacking any available patch or mitigation at its discovery.

Zero-Day Attack refers to the **immediate exploitation of a ZDV**, with **no time-lapse** between the **vulnerability's discovery** and the **commencement of the attack**. A Zero-Day Attack transpires when threat actors swiftly develop and **deploy malware specifically designed to target the ZDV**.

Zero-Day Exploit refers to the **method employed** by hackers to **capitalize on a ZDV**, often through the deployment of **malware**, facilitating the execution of the attack. ZDE is used to undertake ZDA.

Cybercriminals actively use ZDVs to exploit vulnerabilities and profit from their malicious activities. Systems vulnerable to ZDVs remain exposed until the respective vendor **releases a patch to address the identified flaw**.

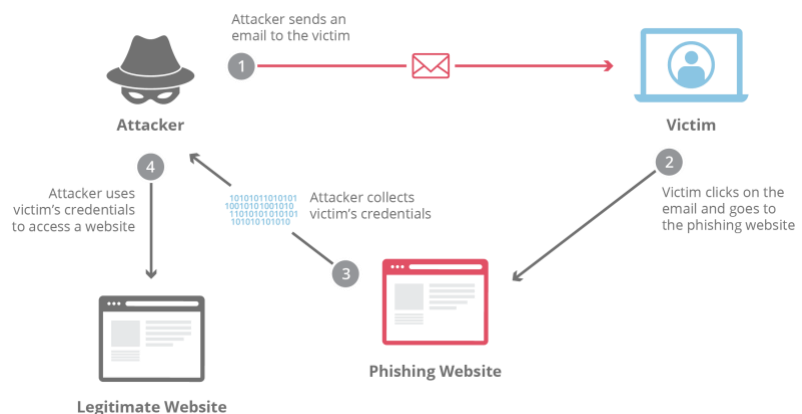
25. Phishing

It refers to an attempt to **steal sensitive information** like **usernames, passwords, credit card numbers, bank account information** or other important data to utilize or sell the stolen information.

In a phishing attack, the sender pretends to be **someone trustworthy to the recipient**, such as a family member or a

well-known figure offering giveaways. The message prompts immediate action, often with a sense of urgency and **directing the recipient to a fake website resembling a legitimate one**.

They are asked to input their login credentials which are then stolen by the attacker for **identity theft, financial fraud, or selling personal information**. The phishing email's destination URL closely resembles the legitimate one.



26. Xenotransplantation

The first person to receive a **transplant of a genetically modified pig kidney** through Xeno-transplantation has passed away approximately 2 months after the procedure.

Xenotransplantation involves **using live animal cells, tissues, or organs to treat human medical conditions**. In Xenotransplantation, animal organs, like pig kidneys, are **genetically altered** to prevent the human body from rejecting them after transplantation. This involves **removing certain animal genes** and **adding human ones** to make the organ more compatible.

There are **several associated risks** like **infection**, and other long-term health risks. Pig organs are generally used because their body structure and functions are similar to humans. Pigs are easy and cost-effective to breed. Different pig breeds offer a variety of organ sizes. This makes it easier to find a match for human recipients. (Refer EPIC January 2022 for *Xenotransplantation: Opportunities and Challenges*).

27. Antihistamines

They are common drugs used to treat short-lived allergic reactions, like a sneezing fit or an itch. An antihistamine drug functions by **targeting histamine receptors**, which are **proteins that bind to a compound called histamine** in the body. This compound is composed of **ethylamine** and **imidazole**, with the latter forming a ring structure.

Histamine performs various roles in the body through 4 types of receptors: H1, H2, H3, and H4.

The **H1 receptor** is predominantly found in **blood vessels, neurons, and smooth muscle cells**, and its blockade helps **alleviate minor allergies**.

H2 receptors are present in **gastric gland cells**. They stimulate the release of **gastric acid** for digestion.

H3 receptors are located in the central nervous system and regulate the release of **neurotransmitters**, including **dopamine** and **serotonin**.

H4 receptors control the body's **inflammatory response**, including allergic reactions.

28. Nephrotic Syndrome

Researchers from Kerala have reported a series of cases from Malappuram district where the **regular use of fairness creams** has been linked to nephrotic syndrome. It is a **kidney disorder** characterized by **excessive protein loss in urine** due to issues with the **kidneys' filtration system**, specifically the **glomeruli**. In healthy kidneys, glomeruli filter waste and excess fluids while retaining essential cells and proteins. In nephrotic syndrome, **inflamed glomeruli allow too much protein leakage**. This condition can result from various kidney diseases or systemic disorders like diabetes or lupus.

Symptoms include swelling, foamy urine, high blood fat levels, weight gain, fatigue, and loss of appetite. Treatment involves managing blood pressure control, cholesterol reduction, swelling mitigation, and infection prevention through medication and dietary adjustments.

29. FLiRT Variant of COVID-19

The COVID-19 cycle has regained momentum with the emergence of new 'FLiRT' variants. **KP.2** and **KP1.1** are descendants of the **Omicron JN.1 variant**, which proliferated worldwide.

The FLiRT variants are new strains of the SARS-CoV-2 virus that have emerged in the US. They are distant relatives of the Omicron variant. These variants were first detected in wastewater samples across the country and are descendants of the JN.1 lineage. Scientists are concerned that KP.2 and KP.1.1 may be more adept at evading the immune system due to mutations in their spike proteins.

30. West Nile Virus

It is a **mosquito-borne, single-stranded RNA virus**. It belongs to the Flavivirus family, related to viruses causing St. Louis encephalitis, Japanese encephalitis, and yellow fever.

It is primarily **transmitted through mosquito bites**. **Culex mosquitoes** are the vectors. **Birds are reservoir hosts** which maintain the virus in nature. Seasonal outbreaks coincide with bird migratory

routes and periods of high mosquito activity. **Human-to-human transmission through casual contact is not possible.** It is common in Africa, Europe, the Middle East, North America, and West Asia.

31. Salmonella Bacteria

In last 6 months, the US has rejected 31% of all spice-related shipments from MDH due to concerns related to **salmonella contamination**. It is a type of **bacteria** that causes **gastrointestinal illness and fever**, known as salmonellosis. Salmonella is a resilient bacteria capable of surviving for weeks in dry environments and months in water. It **naturally resides in the intestines of animals** and can be present in their faeces.

Humans get infected when they come into contact with **salmonella-infected animals** or **contaminated items**. Salmonella infection can lead to symptoms such as **diarrhea, fever, and stomach cramps**.

32. Peptides

Peptides are **short chains of amino acids** naturally found in the body. They are linked by **peptide bonds** and are essential for various biological functions. Peptides are **shorter than proteins**. Peptides are defined as molecules that consist of between **2 and 50 amino acids**, whereas **proteins are made up of 50 or more amino acids**. Peptides tend to be less well defined in structure than proteins.

Peptides have various functions in the body such as **reducing inflammation**, and **helping to build muscles**. Some peptides **work like hormones** and can affect different parts of the body from where they are released.

33. Amino Acids

They are the building blocks for proteins and peptides. There are **20 different amino acids** that **combine in various sequences to form proteins**. Some amino acids are produced by the body, while **9 essential amino acids** must be obtained through diet. The 9 essential amino acids are **histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine**.

34. Solar Power Production in India

According to a report by international energy analytics agency Ember, India has overtaken Japan to become the **world's 3rd-highest producer of solar power in 2023**. India generated **113 billion units (BU) of solar power** in 2023 compared to Japan's 110 BU. **China is the leading producer of solar power in the world**, with 584 BU of solar power in 2024. The US is in the 2nd spot with 228 BU of solar production. Renewable energy's share in the global electricity production has expanded from 19% in 2000 to 30% in 2023. This is driven mainly by an increase in solar and wind power.

According to NITI Aayog, **solar power constitutes ~18% of India's total installed electricity**. However, it **contributes to only 6.66% of the power production**. This reflects a gap between the potential and actual solar power produced. This gap in solar power produced is dependent on country's power demand and local circumstances.

35. Microbes Produce More Methane Emissions than Fossil Fuels

A recent study has shown that methane emissions from fossil fuels decreased from 1990 to the 2000s and have remained steady since then. The **microbes have now emerged as the main source of methane**. **Anaerobic archaea** has been identified as potential major sources of atmospheric methane. These microbes (methanogens) thrive in **oxygen-deficient environments** like the digestive tracts of animals, wetlands, rice paddies, landfills, and the sediments of lakes and oceans.

36. About Methane Emissions

Methane is the second most abundant anthropogenic greenhouse gas after carbon dioxide (CO₂). It has a higher warming potential over shorter periods. Over 100 years, **methane's global warming potential is 28 times greater than CO₂** and **84 times more on a 20-year scale**.

Methane Emissions fall into 2 main categories:

Biogenic Methane: It is produced by microbial action, particularly by methanogens.

Thermogenic Methane: It is released during the extraction of fossil fuels (natural gas or oil) from deep within the Earth's crust.

37. Unclassed Forests

The term **unclassified forests** refers to forest areas that fall outside the categories of **reserved** and **protected forests**. **Unclassified forests are not officially notified**. They include both government-owned and privately held lands, as well as community forests.

The unclassified forests benefited from legal protection on the basis of SC Judgment in the **T.N. Godavarman Thirumalpad case** (1996). This safeguard prevented their use for non-forest purposes. The Forest Conservation Act's 2023 Amendment has endangered the legal shield of unclassified forests thus making them vulnerable to diversion for non-forest activities.

38. Kalesar Wildlife Sanctuary

The Supreme Court stayed the construction of 4 proposed dams inside Kalesar Wildlife Sanctuary in Haryana.

It is situated within the **Yamunanagar District of Haryana**, in the foothills of the Shiwalik ranges of the Himalayas. It is situated near the **Rajaji National Park** (Uttarakhand) and **Simbalbara National Park** (Himachal Pradesh). **River Yamuna** lies to its east. The terrain ranges from plains to hills (~700 meters) with narrow valleys known as '**khols**' scattered between the hills. These valleys contain **seasonal rivulets**, referred to as '**soats**'. Within the sanctuary stands the **Kalesar Fort**. The park is renowned for its **Dak bungalows**, colonial-era administrative architectural structures. It was declared as a national park in 2003.

The majority of the forest is densely populated with tall **sal trees**. Other trees that are found in the forest are semul, bahera, amaltas, shisham, khair, sain, chhal and jhingan. It is home to many threatened animals like leopards, ghoral, barking deer, sambar, chital, python, king cobra, monitor lizard etc.



39. Sariska Tiger Reserve

It is situated in the **Alwar district of Rajasthan**, within the **Aravali Hills**. It is renowned for **being the first reserve globally to have successfully relocated tigers**. It was originally a royal hunting preserve for the Maharaja of Alwar. It was designated a **wildlife sanctuary in 1955** and upgraded to a **national park in 1979**. The **Ruparel River** flows through the Reserve.

The Reserve is characterized by **rocky landscapes**, arid **scrub thorn forests**, grasslands, cliffs, and **semi-deciduous forests**. It is dominated by **dhok trees**, covering 90% of the area. Other species present include salar, kadaya, gol, ber, banyan, gugal, bamboo, kair, adusta, etc. Animals species include tigers, leopards, sambhar, chital, nilgai, four-horned antelope, wild boar, rhesus macaque, langur, hyena, and jungle cats.



40. Sonai Rupai Wildlife Sanctuary

It is situated in the foothills of the Eastern Himalayas. It is known as the “Jewel of Assam”. It is bordered by the **Pachnoi River**. It is adjacent to the Doimara Reserve Forest in Arunachal Pradesh. It was declared a wildlife sanctuary in 1998. **4 perennial rivers** flow through the sanctuary: **Dolsiri, Gabharu, Gelgeli, and Belsiri**. During the rainy season, several wetlands known as “**bheels**” can also be seen.



The forests type in the sanctuary comprises **tropical ever-green, semi-evergreen and moist deciduous forests**. Hollang, mekai, dhuno, udiyam, nahar, samkothal, bheer, hollock, are the main flora found here.

The sanctuary is primarily known for its **elephant and Indian bison populations**. Other animals include **deer**, the **one-horned rhinoceros, leopards, tigers**, and some rare species of cats. It also supports endangered species such as the **White Winged Wood Duck**, along with commonly seen birds like woodpeckers, hill mynas, Indian rollers, nightjars, horned owls, and more.

41. Semal Tree

Semal trees (also called Silk Cotton Trees) in Rajasthan are facing extinction. The tree offers several benefits.

Medicinal uses: Bark, leaves and seeds used in traditional medicine to treat fever, skin cuts, wounds.

Timber: Sturdy and durable wood is used in construction and furniture making.

Landscaping: Attractive appearance makes it useful choice for decorating streets, parks and gardens.

Fiber: Fiber derived from it is used to stuff pillows due to its cotton-like appearance.

Spiritual/Cultural Significance: It is held sacred with deep religious beliefs.

It plays a vital role in the **forest ecosystem** (habitat for various species), and is used for **food, fodder and fuel** by tribal communities. It is also used to **craft musical instruments**. Its deep extensive roots help in **stabilization of soil**.

Large quantities of semal trees are being cut in south Rajasthan violating the Rajasthan Forest Act 1953 and the Forest (Conservation) Act 1980.



42. Census of Nilgiri Tahr

The census of Nilgiri Tahr was conducted recently. It has been conducted by the Forest Department of Tamil Nadu in collaboration with the **Worldwide Fund for Nature – India (WWF-India)**, **Wildlife Institute of India (WII)**, and **Advanced Institute of Wildlife Sciences (AIWC)**. **IUCN** acted as a **3rd-party observer**. The census has been conducted in the **Eravikulam National Park** and the Grass Hills in the **Anamalai Tiger Reserve**.

The census is part of **Project Nilgiri Tahr (2022-27)** of the **Government of Tamil Nadu**. Its goal is to safeguard the Nilgiri Tahr population and ensure its survival. The Project has 9 components including biennial synchronised survey across divisions, reintroduction of Nilgiri Tahr in the historic

habitats, identifying disease and diagnosis of lump affected individuals, radio collaring of Nilgiri Tahr, ecotourism etc. (Refer EPIC January 2023 for Nilgiri Tahr).

43. Leopard Cat

A Leopard Cat was seen in Maharashtra's **Pench Tiger Reserve** for the first time. Leopard Cat (*Prionailurus bengalensis*) is a member of the Felidae family. It is a forest-dwelling cat. It is noted for its **leopard-like coloration**. It exhibits varied coloration (pale tawny, yellow, red, or grey) with **distinctive black stripes**. It is widely distributed across Asia, from the Amur region in the Russian Far East to the Sunda Islands of Indonesia. Leopard cats inhabit **agriculturally utilized areas** but show a preference for **forested environments**.



They **thrive in various habitats**, including **tropical evergreen rainforests** and **low-lying plantations**, as well as **subtropical deciduous** and **coniferous forests** situated in the foothills of the Himalayas, (at altitudes exceeding 1000 meters). They are **solitary and nocturnal carnivores**.

They are classified as **Least Concern** in the **IUCN Red List**.

44. Sea Otters

A new study reveals that **sea otters use tools like rocks** to break open hard-shelled prey, which allows them to **consume larger food items** and **minimizes tooth damage**. Female otters use tools more frequently than males.



Sea otters belong to the **weasel family** and are **aquatic animals**. They are found along the **coasts of the Pacific Ocean** in North America and Asia. They spend most of their time in the water but occasionally come ashore to sleep or rest. They have **webbed feet** and **water-repellent fur** to stay dry and warm, with nostrils and ears that close in the water. Sea otters typically consume about a quarter of their body weight daily, mainly **foraging in kelp forests** and **seagrass beds**.

They are a **keystone species**. Their presence helps sustain the biodiversity and overall health of marine ecosystems. Sea otters are classified as **Endangered** in the **IUCN Red List**.

45. Killer Whales or Orcas

They are the largest member of the **Delphinidae family**, or **dolphins**. They are found in all oceans. They are mostly found in cold places like Antarctica, Norway, and Alaska. However, they also live in warmer tropical and subtropical waters. Killer whales are **highly social**, and most live in **social groups called pods**. Pods are groups of **maternally related individuals** seen together more than half the time. Given their highly social and curious behaviour, **orcas often approach fishing vessels** to assess if there is any fish in the net, or just to observe people on the vessel.



They rely on **underwater sound to feed, communicate, and navigate**. They can measure up to 8 metres in length and weigh up to 6 tonnes as adults. They are considered **Data Deficient on the IUCN Red List**.

46. Walrus

They are **Pinniped** (fin-footed) **mammal**. They are related to seals and sea lions.

They are characterized by **large size and distinctive tusks**; skin covered with a thin layer of coarse hairs. They are **terrestrial and marine**. They can **swim in the ocean** and **walk on land and sea ice**.

They are primarily **mollusks** and also consume worms, snails, soft shell crabs, shrimp, and sea cucumbers. They are generally found in the **Arctic and sub-Arctic regions** near the North Pole, including the Pacific, Atlantic, and Arctic Oceans. They have been classified as **Vulnerable under the IUCN Red List**. They are primarily threatened by **climate change**. Earlier they were also hunted commercially. They are **keystone species in the Arctic marine ecosystems**.

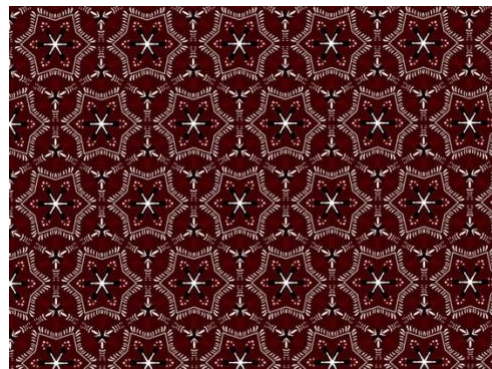


47. Golden Trevally Fish (Golden Kingfish)

The researchers of the ICAR-Central Marine Fisheries Research Institute (CMFRI) have succeeded in **captive breeding of golden trevally fish**. Golden Trevally (*Gnathanodon speciosus*) is a **high value marine fish**. It has yellowish belly, scattered black patches, yellow fins, and black tail. They are found in the reef areas. The golden trevally is primarily found in reef area fishing grounds in Tamil Nadu, Kerala, Puducherry, Karnataka and Gujarat. It is a promising **marine aquaculture species** due to its rapid growth rates, high meat quality, and high market demand for **consumption and ornamental purposes**. It is a **popular choice for aquariums** due to its attractive appearance.

48. GI Tag for Kutch Ajrakh

Kutch Ajrakh has been awarded GI Tag by the Controller General of Patents, Designs, and Trademarks (CGPDTM). This art form has originated from the culturally rich **Kutch region in Gujarat**. The name 'Ajrak' finds its roots in 'Azrak', which denotes **Indigo**. Indigo is widely used as a potent dye to produce a blue hue. The art form involves **hand-block printing of elaborate designs on treated cotton fabric**. **Natural vegetable and mineral colours** are used in this printing. There are predominantly 3 colours: **Blue** (Sky), **Red** (Earth and Fire), **White** (Stars).



The art work is mainly practised in the **Sindh, Barmer, and Kutch** region of Gujarat. **Ajrakhpur** is the epicenter of Ajrakh work in Gujarat. Nomadic pastoralist and agricultural communities like the Rabaris, Maldharis, and Ahir's are the prominent users of the products derived from these artform. They wear Ajrakh printed cloth as turbans, lungis, or stoles.

49. World Crafts Council

It is a Kuwait-based organisation working on the **recognition and preservation** of traditional crafts. It was founded by Ms. Aileen Osborn Vanderbilt Webb, Ms. Margaret M. Patch, and **Smt. Kamaladevi Chattopadhyay** at the 1st World Crafts Council General Assembly in New York in June 1964. Its objective

is to **strengthen the status of crafts in cultural and economic life**. It promotes fellowship among crafts-persons by offering them encouragement, help, and advice. Since its inception, it has been **affiliated with UNESCO** under Consultative Status.

50. World Craft City Programme

It was launched in 2014 by the World Crafts Council. Its objective is to recognize the pivotal role played by the local authorities, craftspeople, and communities in cultural, economic, and social development worldwide. Under this initiatives **Jaipur** (Rajasthan), **Mammalapuram** (Tamil Nadu) and **Mysore** have been added as craft cities from India.

51. Volatility Index

The Volatility Index (VIX or Fear Index) measures the expected volatility in the market in the near future. Volatility refers to **the rate and extent of price changes in the market**, which is often associated with **financial risk**. The VIX rises during periods of higher volatility and falls if volatility decreases. The VIX is calculated based on the **expected annualized volatility**, expressed in percentage terms, derived from the order book of options on a specific underlying index.

The India VIX shows the expected level of volatility in the stock market over the next 30 days. It uses the prices of **options on the NIFTY 50 Index** to calculate expected future volatility.

52. Standalone Primary Dealers (SPDs)

The Reserve Bank of India (RBI) has allowed standalone primary dealers (SPDs) to **borrow in foreign currency** from their parent companies and entities authorized by it.

A primary dealer is an RBI-registered entity that is **authorized to buy and sell government securities**. There are 2 types: Standalone primary dealers and Bank primary dealers.

SPDs are either **subsidiaries of scheduled commercial banks** or entities **incorporated abroad or under the Companies Act**. SPDs are registered as **non-banking financial companies**. As of March 2023, there were 7 SPDs registered as NBFCs with the RBI. SPDs are **regulated by the RBI**. Borrowings by SPDs must adhere to prescribed limits for foreign currency.

53. India International Bullion Exchange (IIBX)

It is situated in GIFT City (Gujarat International Finance Tech City), Gandhinagar, Gujarat. IIBX serves as **India's 1st international bullion exchange**, facilitating the import of bullion and offering a comprehensive ecosystem for **bullion trading and investment**. IIBX ensures clear pricing mechanisms. It maintains high **standards of quality and uniformity in bullion trading**. It is governed by the **International Financial Services Centers Authority (IFSCA)**, which oversees financial products, services, and institutions within IFSCs.

Bullion is high-purity gold and silver, typically stored as bars, ingots, or coins. It can occasionally **serve as legal tender** and is **commonly held as reserves by central banks or by institutional investors**.

54. Coal Linkage

The Ministry of Power has clarified that **coal-based thermal plants** can utilize **linkage coal** to offer surplus power in the power market. This clarification aims to ensure **optimum utilization of generating stations**. Coal linkage means **buying coal from mines which are closer to the power plant**. Earlier it was compulsory to buy coal from the allocated coal block. But now power plants can buy coal from mines which are closer to the power station. It helps in **saving money on transportation/logistics**.

55. Project ISHAN

The Government has initiated Project ISHAN (Indian Single Sky Harmonized Air Traffic Management) at Nagpur with the idea of **One Nation, One Airspace**. It aims to enhance the capacity of the aviation industry to handle the increasing domestic traffic, which has been predicted to double by 2030.

It will merge India's **4 Flight Information Regions (FIRs)** in Delhi, Mumbai, Kolkata, and Chennai into one airspace around Nagpur. In aviation, a flight information region (FIR) is a specified region of airspace in which a flight information service and an alerting service (ALRS) are provided. The aim behind the initiative is to **reduce carbon footprint, enhance safety, and reduce usage of aircraft fuel**.

56. Methods of Household Consumption Measurement (Monthly Per Capita Expenditure, MPCE)

Uniform Reference Period MPCE (or $MPCE_{URP}$): This is the measure of MPCE obtained when household consumer expenditure on each item is recorded for a reference period of **"last 30 days"** (preceding the date of survey).

Mixed Reference Period MPCE (or $MPCE_{MRP}$): This is the measure of MPCE obtained when household consumer expenditure on items of **clothing and bedding, footwear, education, institutional medical care, and durable goods** is recorded for a reference period of **"last 365 days"**, and expenditure on **all other items** is recorded with a reference period of **"last 30 days"**.

Modified Mixed Reference Period MPCE (or $MPCE_{MMRP}$): This is the measure of MPCE obtained when household consumer expenditure on **edible oil, egg, fish and meat, vegetables, fruits, spices, beverages, refreshments, processed food, pan, tobacco and intoxicants** is recorded for a reference period of **"last 7 days"**, and for **all other items**, the reference periods used are the **same as in case of Mixed Reference Period MPCE** ($MPCE_{MRP}$).

57. Changes in Process of Approval for Drug Exports

The Union Government has decided that **Central Drugs Standard Control Organization (CDSCO)** will be the **sole licensing authority** to **issue NOC for drug export**. Earlier, State Drug Controllers had the jurisdiction to issue NOC certificates. This move comes amidst heightened global scrutiny of Indian-made drugs. This centralization of authority aims to **enhance regulatory oversight** and **streamline the export process** for pharmaceutical companies.

NOTE: With effect from 1st February 2022, the monthly ForumIAS Epic Magazine, for the month will provide wholistic coverage for the said month up to 20th of the month. This ensures that issues / stories that occur after 21st of the month are allowed to fully develop and are covered wholistically in the next month.