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What ails the Ken-Betwa river link project?

The Steering Committee for the Ken-Betwa Link Project recently held its 3rd meeting in New Delhi. The Chairperson of the Committee (Secretary, Department of Water Resources) remarked that the Ken-Betwa Link Project is a 'flagship' project of the Government and 'it is critical for the water security and socio-economic development of Bundelkhand region'. The project was approved in December 2021 by the Union Government. The Ken-Betwa Link project is expected to cost INR 44,605 crore. While the project is expected to benefit local population, experts have questioned the utility of the project citing its environmental impact especially on the Panna Tiger Reserve and its tiger population. They recommend a more cautious approach before undertaking projects of such scale.

Ken-Betwa Link Project

- The Ken-Betwa Link Project (KBLP) is the first project under the National Perspective Plan for interlinking of rivers. Under this project, water from the Ken river will be transferred to the Betwa river. Both these rivers are tributaries of river Yamuna.
- The Ken-Betwa Link project was conceptualised in the 1980s. However, the water-sharing agreement could not be reached between the States of Madhya Pradesh and Uttar Pradesh. The work on the project was originally slated to begin in 2015 but got delayed. The project got a fresh push in 2020-21, with the Union Government making a revised deal with the two states (Madhya Pradesh and Uttar Pradesh).
- The Project has two phases. Under Phase-I, Daudhan Damcomplex (along with Low and High Level Tunnels) and Ken-Betwa Link Canal and Powerhouses will be completed. The Daudhan Dam will be built on the Ken river within the Panna Tiger Reserve. The dam will generate 103 MW of hydroelectric power. Under Phase-II, there are 3 components. Under this, Lower Orr dam, Bina Complex Project and Kotha Barrage will be constructed.
- This project will benefit people across the districts of MP and UP i.e. Tikamgarh, Panna and Chhatarpur districts in MP and Jhansi, Banda, Lalitpur and Mahoba districts in UP.
- A Special Purpose Vehicle (SPV) called Ken-Betwa Link Project Authority(KBLPA) will be set up to implement the project.

Benefits of Ken-Betwa Link Project

- Address Water Scarcity: Droughts are common in the Bundelkhand region, particularly during the non-monsoon season. Because of the hard rock and marginal alluvium terrain, the region is also deficient in groundwater. As a result, there is a need for a large-scale project to assist in harnessing flood water during the monsoon season and stabilising water availability in the region during the lean season, particularly during drought years.
- The project will also rejuvenate all the tanks in the route area of the link canal by feeding through the link canal, wherever possible and would help in groundwater recharge.
- The use of micro-irrigation is also planned in about 5 lakh hectares command of the project for better water-use efficiency.

- **Socio-Economic Development:** The project envisages to provide enormous benefits to the region covering an annual irrigation of 10.62 lakh hectares, drinking water supply to a population of about 62 lakh. It will also generate 103 MW of hydropower and 27 MW of solar power, utilising about 4,909 million cubic metres (MCM) of water.
- The project will definitely bring economic prosperity to this backward area due to increased agricultural activities and the arrest of migration of people from the region. It can help check distress migration from the region.
- Comprehensive Landscape Management Plan (LMP) is being prepared by the Wildlife Institute of India (WII) for the conservation of wildlife and biodiversity, not only in the Panna Tiger Reserve (PTR) area but also in the surrounding area to offset the impact of the Daudhan
- This project will establish a precedent for future river-linking initiatives and demonstrate India's innovative spirit and forward-thinking.

Challenges associated with the Ken-Betwa Link Project

- Environmental

(a) The project will partly submerge the Panna Tiger Reserve in Madhya Pradesh and affect the habitat of multiple species including tigers, jackals and vultures etc.;

(b) There will be destructive impact of the proposed dam on the flow of water into and outside of the Ken Gharial Sanctuary. The Supreme Court Central Empowered Committee (CEC) has mentioned in its report that "the Standing Committee of the National Board of Wildlife has not considered the impact of the project on the downstream gharial sanctuary";

(c) According to a report of the Forest Advisory Committee, an estimated 6 million trees will be cut down for the project which will adversely affect the rainfall in the already dry Bundelkhand region;

(d) The Environmental Impact Assessment of the project, based on which the project was given environmental clearance in 2017, has been tagged as inadequate with factual errors by a number of official agencies, including the Forest Advisory Committee within the Ministry of Environment;

(e) An expert body formed by the Standing Committee of the National Board for Wildlife (NBWL) suggested that "an independent hydrological study of river Ken is required" but the suggestion was ignored.

- Legal

(a) As far as the legal issues are concerned, mere approval by the Standing Committee of the National Board for Wildlife (NBWL) for the KBLP is not sufficient. According to the CEC, the project is not 'crucial' and hence required for enhanced and improved management of the wildlife, as conferred in Section 35(6) of the Wildlife Protection Act, 1972. According to the Sections 29 and 35(6) human activities within National Parks and Wildlife sanctuaries are restricted without prior approval. Diversion of, stopping or enhancement of the flow of water into or outside of them is not allowed unless doing so is deemed to be necessary to improve and better manage the wildlife within a sanctuary or a national park. And in the case of the Panna Tiger Reserve, the CEC has found such diversion to not be necessary to improve and better manage wildlife in the park;

(b) The CEC also observed that the wildlife approval conferred by the Standing Committee of the NBWL in August 2016 was ultra vires;

(c) The CEC had submitted its report to the Supreme Court in August 2019, and the matter remains sub judice. The project is also reportedly still to receive full forest clearance;

(d) A challenge to environment approval to the project is also pending before the National Green Tribunal, presumably because the tribunal believes the project must first secure forest clearance.

- Political

The water-sharing issue between UP and MP has not been resolved completely. The States have not been able to agree on water-sharing during non-monsoon months.

- Social

There will be a social cost associated with the reconstruction and rehabilitation that will be necessary as a result of the displaced people that the implementation of the project will cause. Experts are worried that the project could threaten Panna's access to clean water.

- Economic

The project is expected to cost upward of INR 45,000 crore. Experts contend that the benefits from the project may not be commensurate with the project cost.

Looking ahead

- First, all the concerns raised by the Supreme Court appointed CEC about the Ken-Betwa Link Project should be addressed.
- Second, the project should be built on verified and up-to-date data. Aside from that, a proper Environmental Impact Assessment should be performed.
- Third, The government should ensure that adequate compensation is provided for the resettlement of those who will be displaced as a result of the project.
- Fourth, the Government should ensure that the provisions of the Compensatory Afforestation Fund Act (CAMPA, 2016) are effectively implemented. There should be quality afforestation equivalent to the diverted forest land.
- Fifth, Experts have called for new detailed report and landscape management plan. The Government should address the concerns highlighted by various bodies and explore this option.
- Sixth, Experts have argued that restoring Bunderlkhand's former Chandel-period lakes and ponds, as well as replicating the successful field-pond schemes, will be more cost-effective, faster and environment-friendly. The Government should promote the use of traditional knowledge in water conservation to address the issue of water scarcity.

According to the Government, the Ken-Betwa project can address the issues related to water scarcity in the region. Irrigation and hydropower projects will contribute to prosperity of the region. However, there are legitimate environment concerns vis-a-vis benefits of the project. The Government should address these concerns and ensure that the adverse impacts on the local population and biodiversity are minimized. The Government is promoting traditional knowledge in water conservation through the rejuvenation of traditional water bodies under the Jal Shakti Abhiyan. Such sustainable initiatives should be scaled-up.

How PLI is creating a growth ecosystem in India?

- The recovery of the Indian economy after the Covid-19 pandemic has sent a message that the country is fast emerging as a key driver of global growth. The National Statistical Office's estimate released on January 6 says that the economy will grow at 7% this financial year. Given the current international economic scenario where **global value chains** (GVCs) are being reset, India has seen a strategic opportunity to become a prominent global manufacturing player. **A progressive policy approach** with respect to improving the ease of doing business, scrapping 1,500 irrelevant laws, introducing a competitive corporate tax regime, the availability of skilled labour, the presence of large consumer markets with considerable disposable incomes, the potential for enhanced exports of quality products, and a stable multi-party democracy make India a favourable manufacturing destination. This can reduce global dependency on a single-source country, which was witnessed during the last decade.
- To achieve this strategic vision, the government introduced the production-linked incentive (PLI) scheme in 14 key manufacturing sectors, with an outlay of ₹ 1.97 lakh crore in November 2020. This is a well-laid-out scheme with consideration for investment, production volumes, enhanced exports with domestic value addition, and employment generation. Incentive rates for the scheme have been designed in a tapering format to motivate and encourage industries to unlock their inherent potential and become drivers of an ecosystem that is self-sustaining and thrives well even after the conclusion of the incentive regime. While applicants are incentivised to perform on several indicators, the government ensures the necessary support for regulatory approvals along with the availability of facilities to applicant companies through Centre-state coordination. In addition, the encouragement to invest in research and development for quality product development enables our industries to align with emerging global trends.
- As one of the earliest ones, the ministry of electronics and information technology's PLI scheme for large-scale electronics manufacturing (LSEM) saw successful results, with 97% of mobile phones sold in India now being made in India. Furthermore, they are also being "Made in India for the World" as we witness a sharp growth in smartphone exports by 139% over the last three years. As of September 2022, the PLI scheme for LSEM attracted investments of ₹ 4,784 crore, with a total production of ₹ 2,03,952 crore, while also generating 41,000 additional jobs. In the medium-term, the scheme is expected to bring in additional production to the tune of ₹ 10.69 lakh crore and generate 700,000 jobs. Similar successes are replicated in the pharma sector PLI with 35 imported active pharmaceutical ingredients or key chemical inputs for drugs being developed in India. In addition, other sectors, such as food products, telecom and networking products, and drones are reporting successes with visible growth in investment, employment, and production. Over 600 foreign and domestic firms have been selected across 14 key sectors in two years, indicating enthusiastic industry participation.

The successes signal that the scheme is leading to the development of a potent ecosystem that is self-sustaining and thriving.

First, as the PLI scheme focuses on advanced technologies, it is likely to upgrade the skills of the existing labour force.

Second, it will replace technologically obsolete machinery and make the manufacturing sector globally competitive.

Third, the enhanced production volumes cater to increasing consumer demand. This can be seen for telecom and networking products, where timely intervention by the scheme will enable faster adoption of 4G and 5G products across India.

Fourth, with PLI in green technologies, India can pioneer green policy implementation with a reduced carbon footprint.

Fifth, better productivity will create a thrust in free trade agreements for better market access.

Sixth, increased sales will demand better logistical connectivity. The PM Gati Shakti plan provides multimodal connectivity to manufacturing zones across India, making logistics and operations efficient. Cluster parks with plug-and-play infrastructure have also been introduced to support manufacturing in different regions.

Lastly, an inclusive approach powered through close cooperation with the states is empowering industries and artisans in the hinterland of Bharat to be a part of the India growth story. The one-district-one-product initiative launched to support artisans and manufacturers at the district level and SFURTI, a cluster-based scheme to make traditional industries more productive, profitable, and capable of generating sustained employment, are cases in point. Thus, factors considered a competitive disadvantage are being holistically transformed into short-term and long-term competitive advantage for India and Indian industry.

The pandemic and its resultant global socioeconomic challenges have reaffirmed that the scheme's objectives for achieving strategic, sustainable, and inclusive economic growth for India are well considered. The scheme and its associated ecosystem have ensured that India is well-positioned to develop resilient GVCs, which will continue to provide national security in the evolving global scenario. Indian manufacturers now feel emboldened to move out of their comfort zone with a clear vision of becoming global champions even as India marches towards its emergence as *Viksit Bharat* (developed India).

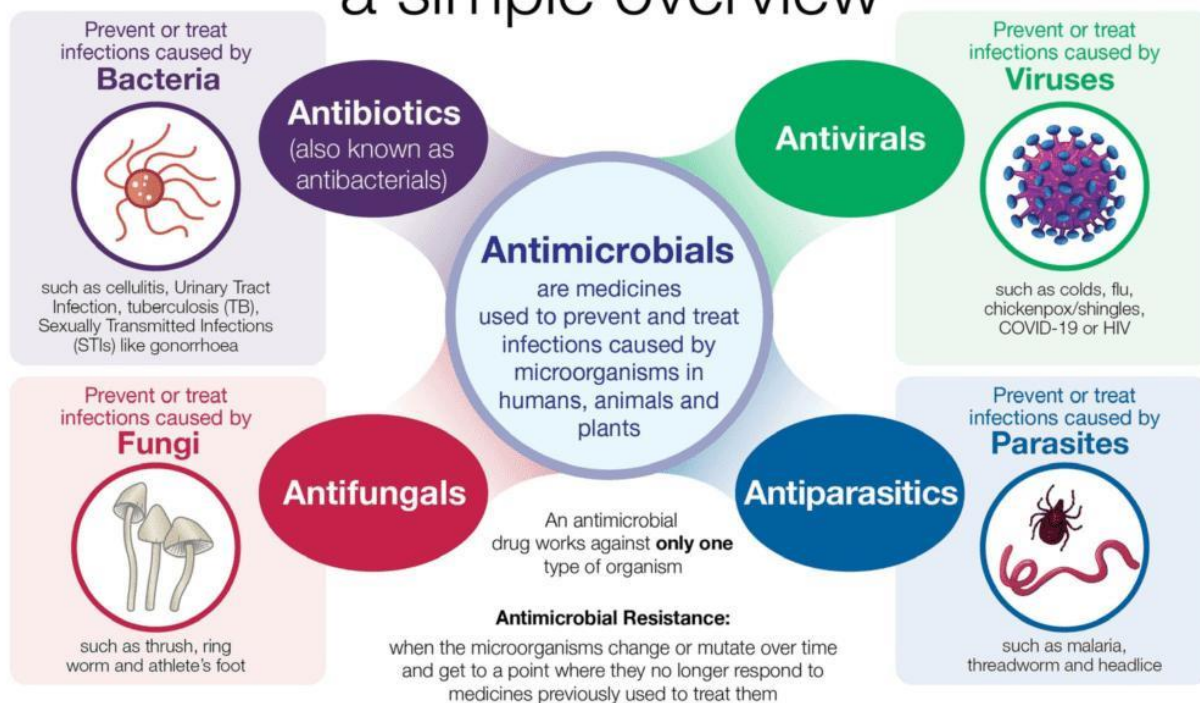
How do we solve antibiotic resistance?

- Since antibiotics were introduced to the world in the mid-20th century, deaths attributable to infections dropped from over 50% to 10-15%.
- Experts have been warning for decades that the threat of antibiotic resistance could take us back in time to when even simple infections were deadly.

What are antimicrobials?

- Antimicrobials – including antibiotics, antivirals, antifungals and antiparasitics – are medicines used to prevent and treat infections in humans, animals and plants.

**Antimicrobials:
a simple overview**



What is antimicrobial resistance?

- AMR happens when microorganisms (such as bacteria, fungi, viruses, and parasites) change and are still able to grow, even when they are exposed to antimicrobial medicines that are meant to kill or limit their growth (such as antibiotics, antifungals, antivirals, antimalarials, and anthelmintics).
- As a result, the medicines become ineffective and infections persist in the body, increasing the risk of spreading to others.

Impact of AMR:

- Treatment failure leading to chronic problems
- Increased morbidity (disability, poor outcomes) and mortality

- Adverse effects of alternative treatments (potentially less effective, possibly more toxic)
- Relapse of the infection after treatment
- Increased spread of antibiotic-resistant bacteria and their associated community- and healthcare-acquired infections
- Increased use of antibiotics
- Lack of availability of clinically effective antibiotics
- Longer and more complicated stays in hospital
- Excess healthcare costs
- Decreased societal productivity






Statistics:

- India is one of the largest consumers of antibiotics in the world.
- Antibiotic use in India has risen sharply, with about a 30% increase in their per capita use during the past decade, according to the State of the World's Antibiotics 2021 report.
- 5 lakh people die annually due to AMR worldwide.

Findings of the recent Global Research on Antimicrobial Resistance (GRAM) Report:


- 10-fold: Variation between countries in total antibiotic consumption rates, ranging from as low as 5 DDD to 45.9 DDD per 1000 population per day.
- 46% up: Between 2000 and 2018, global antibiotic consumption rates increased from 9.8 to 14.3 DDD per 1000 population per day).
- 76%: Increase observed between 2000 and 2018 in low- and middle-income countries (from 7.4 to 13.1 DDD per 1000 per day). In high-income countries, consumption rates remained stable.
- 116%: Increase in antibiotic consumption rates in South Asia. The second largest increase was in the North Africa and Middle East region (111%).

KNOWING THE THIN LINE BETWEEN USE AND ABUSE

<p>Some over-used antibiotics and the conditions they are taken for</p>	 Erythromycin: Fever	 Azithromycin: Common cold
 Ciprofloxacin: Diarrhoea	 Ofloxacin: Cough	 Amoxicillin: Sore Throat

Resistance to these antibiotics is highest in India

- ▶ **Fluoroquinolones:** Ciprofloxacin, Norfloxacin, Enoxacin, Ofloxacin, Levofloxacin
- ▶ **Carbapenem:** Meropenem, Imipenem
- ▶ **Colistin:** Used for treating ventilator-associated pneumonia and infections caused by other multi-drug resistant bacteria.



Factors leading to AMR:

- The main drivers of antimicrobial resistance include the
- Misuse and overuse of antimicrobials;
- Lack of access to clean water,

- Sanitation and hygiene (wash) for both humans and animals;
- Poor infection and disease prevention and control in health-care facilities and farms;
- Poor access to quality, Affordable medicines, Vaccines and diagnostics;
- Lack of awareness and knowledge; and Lack of enforcement of legislation.
- Lack of access to timely and appropriate treatments for infections,
- Self-medication, prescription sharing, over-the counter sale of antimicrobials,
- Non-compliance with the prescribed treatment.
- Genetic mutation of bacteria.
- By one species acquiring resistance from another.
- Antimicrobial Waste.

Antimicrobial Waste:

- Antimicrobials given to humans, animals and plants are entering the environment and water sources (including drinking water sources) via wastewater, waste, run-off and sewage and through this spreading drug-resistant organisms and antimicrobial resistance.
- This could fuel a rise in the emergence and spread of 'superbugs' that are resistant to several types of antimicrobial drugs. It could also harm organisms in the environment.

Measures to curb Antimicrobial waste:

- Develop and implement regulations and standards to better monitor and control the distribution and release of antimicrobials and drug-resistant organisms into the environment.
- In the manufacturing sector, developing national antimicrobial manufacturing pollution standards to better control and monitor antimicrobial pollution.
- In the human and animal health sector, enforcing laws and policies to reduce or eliminate antimicrobial use that is not under the guidance of a trained healthcare provider.
- In food systems, implementing standards to treat and manage discharge from food-animal farms, aquaculture farms and crop fields.

Inaction will have dire consequences for human, animal, plant and environmental health.

- Countries should develop guidance, implement and monitor release of antimicrobials from food systems, manufacturing facilities and human health systems into the environment.
- This should be done considering the prevention and management measures in national action plans on AMR, its aid.
- For the human health sector, countries should develop and implement antimicrobial stewardship policies. Antimicrobial stewardship ensures the sustainable use of antimicrobials and effective waste management approaches.
- Governments should enforce laws to reduce antimicrobial use that's not done under the guidance of a trained healthcare provider, ensuring equitable access to quality antimicrobials.

- International technical organisations working on food systems should develop tools and guidance to support the implementation of the Codex Code of practice to minimise and contain foodborne AMR.
- Strengthening One Health surveillance of use and discharge of antimicrobials and determinants from various sectors. Research and development in this area should be enhanced to gain a comprehensive understanding of the risks to human and animal health posed by antimicrobials in the environment.
- Cost-effective and greener waste management technologies should be explored, as this is critical for policymakers who want to support evidence-based policymaking.

Steps taken to curb AMR in India:

Red Line Campaign

- It urges people not to use medicines marked with a red vertical line, including antibiotics, without a doctor's prescription. These medicines are called as the 'Medicines with the Red Line'.

National Action Plan on Antimicrobial Resistance

- India has a National Action Plan on Antimicrobial Resistance in place

Delhi Declaration on Antimicrobial Resistance

- Delhi Declaration on Antimicrobial Resistance, was endorsed at the Inter-Ministerial Consultation on Antimicrobial Resistance in 2017.

AMR Surveillance Network

- ICMR has established AMR surveillance and research network (AMRSN) in 2013, to generate evidence and capture trends and patterns of drug resistant infections in the country.
- This network comprises of 30 tertiary care hospitals, both private and government.

AMR Research & International Collaboration

- ICMR has taken initiatives to develop new drugs / medicines through international collaborations in order to strengthen medical research in AMR:
1. ICMR along with Research Council of Norway (RCN) initiated a joint call for research in antimicrobial resistance in 2017.
 2. ICMR along with Federal Ministry of Education and Research (BMBF), Germany has a joint Indo-German collaboration for research on AMR.

Initiatives to control overuse or misuse of antibiotics

- ICMR has initiated an antibiotic stewardship program (AMSP) on a pilot project basis in 20 tertiary care hospitals across India to control misuse and overuse of antibiotics in hospital wards and ICUs.
- On the recommendations of ICMR, DCGI has banned 40 fixed dose combinations (FDCs) which were found inappropriate.
- ICMR worked in collaboration with Indian Council of Agriculture Research, Department of Animal Husbandry, Dairy and Fisheries and the DCGI to ban use of Colistin as growth promoter in animal feed in poultry.

Guidelines issued

- National Guidelines for Infection Prevention and Control in Healthcare Facilities have been released by MoHFW in Jan 2020.
- ICMR has developed evidence based treatment guidelines for treatment of ten syndromes of infections. It aims to rationalize the usage of antibiotics on Essential Medicines Formulary (EMF) and to establish consistency in the treatment of various infectious conditions.
- Further, ICMR has also issued the Treatment Guidelines for Antimicrobial Use in Common Syndromes” in 2019.

Looking Forward

Option 1: Modify existing antibiotics

- Scientists have been working on the issue from many different angles. One approach is to modify old antibiotics so they overcome resistance.
- “Penicillin and cephalosporin antibiotics have undergone many rounds of modifications by medicinal chemists to improve their drug-like properties and overcome resistance. The ability to tinker with these structures is not infinite.

Option 2: Develop new antibiotics

- Another strategy is to make brand-new drugs, but this approach hasn't been very successful in recent decades.
- The reality is that the last genuinely new chemical structure that has resulted in a drug that is currently being used in humans was discovered in the mid-1980s.
- But there are some signs of progress. For one, scientists are now armed with much more sophisticated drug discovery technologies, not least artificial intelligence (AI).
- Examples of scientific innovations include computational machine learning approaches to screen drugs in silico, and methods to screen many different combinations of compounds for antibiotic effects. “In silico” refers to experiments performed via computer simulation.
- These new innovations are helping scientists overcome older challenges in drug discovery. The hope is that antibiotic-resistant drugs can be pushed through drug development pipelines quickly enough for them to make an impact in global health care.

Buying time with antibiotic regulation

- In the short term, some experts want more regulation of antibiotics so their use is limited to situations when they are strictly necessary. The hope is this will buy us some time to slow down antibiotic resistance while drug discovery catches up.
- Antibiotics are not well regulated in many parts of the world. For example, antibiotics were “flying off the shelves” during the COVID-19 pandemic in India, where people can buy them over the counter in pharmacies.
- Limiting the use of antibiotics in agriculture would also have a major impact, experts say.
- The EU and US have banned the use of antibiotics for livestock growth, and in 2022, the EU brought in legislation to prohibit all forms of routine antibiotic use in farming.

Constitutional Morality vs Majoritarian Morality

- Recently, the **Supreme Court Collegium** reaffirmed its recommendation to appoint Saurabh Kirpal, an openly gay lawyer as a judge of the Delhi High Court.
- The Government had earlier returned the proposal on the grounds that his partner was a Swiss national and that there was a possibility of the candidate being biased.
- Faizan Mustafa, an expert in Constitutional Law has discussed this standoff between the **Constitutional Morality of the Judiciary** and the **Majoritarian Morality of the Government** in the article titled **"Pride and Prejudice"** published in the Indian Express on Jan 21, 2023.

Appointment of a judge to the High Court

- According to Article 217 of the Constitution, the President appoints the Judge of a High Court after consulting with the Chief Justice of India (CJI) and the Governor of the State.
- The Chief Justice of the High Court is consulted on the appointment of other judges of the High Court.
- High Court judges are recommended by a Collegium made up of the CJI and the two senior-most judges while the proposal is forwarded by the Chief Justice of the concerned High Court and his two senior-most colleagues.

How has the Supreme Court responded to the Government's objections?

- The Supreme Court stated that Switzerland is a friendly country and **no precedent or rule exists that bars people with foreign spouses from being appointed to Constitutional posts**. Moreover, the R&AW report had not raised any concerns about national security.
- The Court pointed out that its judgement in the **Navtej Singh Johar case(2018), which decriminalized homosexuality**, held that every individual is entitled to maintain their dignity and individuality, based on their sexual orientation.
- The **Collegium** said that the candidate possessed the necessary competence, integrity and intellect, displayed good conduct and behaviour and would provide diversity and inclusivity in the judiciary.

Supreme Court's verdict in the Navtej Singh Johar Case

- In the **Navtej Singh Johar & Ors vs Union of India** case, the Supreme Court struck down **Section 377 of the IPC** as unconstitutional.
- The then CJI Dipak Misra, had said that an individual may desire solitude in the exercise of his choices but it may not be imposed on him.
- The CJI called for the evolution of a more **accepting and inclusive mindset** in the society.
- He opined that **Constitutional morality was not limited to the text of the Constitution but also included virtues like developing a pluralistic society**.

- **Freedom of choice** of any section of citizens could not be restrained on the grounds that it was opposed to the perception of the majority as the Constitution was not intended to protect just the majority.
- The Court expanded the ambit of **Art 15** to **include the prohibition of discrimination on the basis of sexual orientation** and questioned whether the government had a role in the personal relationships of citizens.

Reason behind the stalemate

- The author has said that the hesitance of the government to appoint a member of the **LGBTQ community** to a constitutional post is to indicate its commitment to the majoritarian morality of Indian society.
- He has also said that this could be a response by the collegium to the repeated criticism of the judicial appointments process by members of the **Executive**.

Constitutional Morality

- Constitutional morality implies that the democratic government should reinstate **fundamental democratic principles like liberty, equality, justice, and fraternity**, uphold the **rule of law** in its administration, and alter the preamble's ideals in order to create a more **dynamic social, economic, and political system based on democratic principles**.
- Constitutional morality is thought to be the highest form of respect for the constitution.
- Constitutional morality offers a **moral framework to the government** in the discharge of its duties.
- It outlines the standards that must be adhered to in order to continue functioning, as well as the conduct expected to uphold the Constitution in letter and spirit.
- It also demands accountability from the executive branch and its representatives.
- The various dimensions of Constitutional Morality include:
 - **Constitutionalism**
 - **Rule of Law**
 - **Basic Structure of the Constitution**
- It ensures the **establishment of the rule of law** in the country in line with the evolving goals and values of society.
- As a guiding principle, it highlights the significance of **maintaining public confidence in democratic institutions and encourages cooperation and coordination among citizens** in order to advance constitutional ambitions.
- Through rules and regulations, constitutional morality can affect and transform prevailing social morality.
- The Supreme Court's loose definition of constitutional morality's scope and extent leaves it open to the discretion of judges' interpretations.
- Critics contend that the idea of constitutional morality is merely one more step in the judiciary's campaign to undermine the authority of Parliament.

India's groundwater governance is in better shape

- India, with nearly **18%** of the **world's population**, occupies about **2.4%** of the total **geographical area** and consumes **4%** of total **water resources**.
 - Indian cities cater to about **48 %** of their water supply from **groundwater**.
- Over the last 50 years, the number of borewells has grown from **1 million to 20 million**, making **India the world's largest user of groundwater**.
- India's rapidly growing economy and population are straining its groundwater resources, which could lead to adverse economic and ecological impacts.

Importance of groundwater

- **Groundwater is the backbone of India's agriculture** and drinking water security in rural and urban areas.
 - Groundwater fulfils India's **80%** drinking water needs and **6 %** of irrigation needs.
- The theme of **UN World Water Day 2022** was '**Groundwater, Making the Invisible Visible**' is a reflection of the importance given to the resource across the globe.
- It is important to **ensure source sustainability** to provide safe drinking water to all rural households by 2024, **under the Jal Jeevan Mission**.

Government's effort for conservation of Groundwater

- Initiatives have been taken for the effective management and regulation of groundwater.
 - Examples are **Atal Bhujal Yojana (ABY)** and **National Project on Aquifer Management (NAQUIM)**:
 - With the goal of "**participatory groundwater management**", ABY looks to **inculcate behavioural change made possible by incentivization**.
 - NAQUIM aims to **help gather authentic data and enable informed decision-making**.
- A **Heli-borne-based survey** has been used along with traditional exploratory methods for rapid and accurate aquifer mapping.
- There are around **65,025 groundwater monitoring stations in India**, which include 7,885 automated stations.
 - The numbers are set to go beyond 84,000; in this, the number of automated stations will rise to over 35,000, with a special focus on **identifying high groundwater-extracting industrial and urban clusters and groundwater-stressed regions**.
- **Dynamic groundwater assessments** will be done *annually* now and a groundwater estimation committee formed to revise the assessment methodology.
- A software named '**India-Groundwater Resource Estimation System (IN-GRES)**' has been developed.

- The government launched the app **Jaldoot to capture data on groundwater tables.**
- As per Groundwater assessment in 2022:
 - A **time-bound and scientific approach is being adopted to monitor precious water resources.**
 - There has been a **3% reduction in the number of 'overexploited' groundwater units** and a **4% increase in the number of 'safe' category units as compared to 2017.**
 - There is reduction in annual extraction of 9.53 billion cubic meters.
 - There is also reduction in irrigation (208.49 BCM), industrial (3.64 BCM) and domestic water (27.05 BCM) use.
 - 9.37 BCM of additional groundwater potential was created through **artificial water conservation structures.**

Challenges

- **Unregulated extraction:** No limit on how much groundwater should extract
- **Excessive irrigation:** Groundwater levels are **hitting a low level at a rapid rate.**
- **Lack of a comprehensive and integrated land use planning framework.**
- **Poor knowledge of groundwater management systems**
- **Groundwater pollution:** Central Ground Water Board shows that groundwater across 21 states has **arsenic contamination.**
- **Accelerated population growth:** Increased demand for water because of a large population.
- **A large number of unaccounted and unregulated private water wells**
- Ineffective and insufficient legal and regulatory mandate

Looking ahead

- Need to focus on the **Integrated Water Resource Management framework.**
 - It promotes the coordinated development and management of water, land, and related resources.
- **Adopting water-sensitive urban design and planning** can help maintain the water cycle by managing groundwater, surface water, and rainwater for water demand and supply.
- **Provision for wastewater recycling and its reuse to promote the circular economy** of one water cycle.
 - It will help in source sustainability and groundwater pollution mitigation.
- **Interventions like rainwater harvesting, stormwater harvesting, rain garden, and bio-retention** ponds that intercept rainfall with vegetated land are low-maintenance alternatives to conventional systems.
 - These will **help in groundwater recharge.**
- **The strengthening of regulatory frameworks and stakeholder participation** needs to be formulated and imposed.
- **Aquifer characterization and robust monitoring of groundwater quality**, as well as quantity, are imperative.

- Data collection and formulation of effective regulatory legal policies, laws, and acts for better management will go a long way.

The groundwater resource assessment report 2022 shows a brighter future for groundwater situations in the country. However, with an increasing population necessary step must be taken to make India a water-surplus nation. With help of good policies and various initiatives on groundwater in India, the government will be able to achieve sustainable goals early.

Doing more trade within Asia makes economic sense

- Asia is increasingly becoming the center of the world economy.
- **By 2040**, the region could account for more than half of the global GDP and about 40 % of global consumption.
- Total merchandise trade between South Asia and East Asia **grew at 10% annually** between 1990 and 2018 to \$332 billion in 2018.
 - This could reach **\$500 billion looking ahead**.
- The handful of free trade agreements (FTAs) linking economies in South Asia with East Asia may **rise to 30 by 2030**.
 - South Asia-East Asia trade is linked to India's trade re-aligning towards East Asia through its 'Look East' and 'Act East' policies.

Importance of Enhanced Inter-Asian Trade

- After many crises like COVID-19 and the Ukraine-Russia war, more trade will help in **chasing recovery faster** than other world markets.
- With a business culture fuelled by technology and innovation, small companies and start-ups are **core to future growth in Asia**.
 - 40% of the world's "**unicorns**" are from Asia.
 - **Unicorns**: start-ups worth more than US\$1 billion
- It can tap **new growth opportunities** by exploring fresh possibilities closer to home.
- Asia could reach **50% of global GDP by 2040** and drive **40% of the world's consumption** by properly utilizing the Asian market.

Looking ahead

- Focus on **Regional Trade Integration** across Asia.
 - It will help in gradually reducing barriers to goods and services trade.
- Trade opening should be **calibrated with tax reforms**.
 - Because trade taxes account for much of government revenue.
- **Make adjustments in financing** to losing sectors to reallocate factors of production.
- **Re-training of workers** to promote gains from trade and mitigate income inequality.
- **Improve the performance of special economic zones (SEZs)** and invest in services SEZs to facilitate industrial clustering and exports.
 - South Asia has over 600 SEZs in operation
 - **Example**: in Kochi (India), Mirsarai (Bangladesh), and Hambantota (Sri Lanka).
 - **Ways to improve SEZs**
 - Ensuring macroeconomic and political stability
 - Adopting good practice regulatory policies toward investors
 - Providing reliable electricity and 5G broadband cellular technology
 - Upgrading worker skills.

- **Use Regional Comprehensive Economic Partnership (RCEP)** to provide for regional rules-based trade to insure against rising protectionism.
- Larger economies **should facilitate gains** from trade with smaller economies.
 - It will help to mitigate a backlash against regionalization
- **Improve tariff preference use** by better-preparing businesses in navigating the complex rules in FTAs
- **Reinvented trade-focused Bay of Bengal Initiative** for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)
 - It will help to facilitate stronger trade ties and support the interests of smaller members.

Asia is the world's largest regional economy and, as its economies integrate further, it has the potential to fuel and shape the next phase of globalization. Establishing good relations with other Asian countries and expanding India's trade relations can give an excellent boost to India's economy as well as it can help to tackle many more international problems.

Needed, a new approach to data protection for minors

- In India, **833 million active internet users** comprise 59.28% of the population.
 - **66 million** Internet users are children of 5 to 11 years which is 15 % of India's active Internet users.
- In order to ensure safeguarding of internet users, **Ministry of Electronics and Information Technology** recently proposed a draft Digital Personal Data Protection (DPDP) Bill, 2022.
 - This provides for mandatory parental consent for all data processing activities by children, defined as any person aged under 18 years.

Digital Personal Data Protection (DPDP) Bill

- The first draft of the law — the Personal Data Protection Bill, 2018, was **proposed by the Justice Srikrishna Committee**.
 - **Aim:** setting out a data protection law for India.
- The government made **revisions to this draft and introduced it as the Personal Data Protection Bill, 2019 (PDP Bill, 2019)** in the Lok Sabha in 2019.
 - The Lok Sabha passed a motion to refer the PDP Bill, 2019 to a joint committee of both the Houses of Parliament.
- Due to delays caused by the pandemic, the Joint Committee on the PDP Bill, 2019 (JPC) **submitted its report on the Bill after two years in December 2021**.
- The report was accompanied by a new draft bill, namely, the **Data Protection Bill, 2021 that incorporated the recommendations of the JPC**.
- However, in August 2022, citing the report of the JPC and the **“extensive changes” that the JPC had made to the 2019 Bill, the government withdrew the PDP Bill**.

Key features of Digital Personal Data Protection Bill, 2022

- It focused on **personal data, as compared to an earlier unwieldy draft**.
- It incorporates **hefty penalties for non-compliance**, but which are capped without any link to the turnover of the entity in question.
- It has **relaxed rules on cross-border data flows** that could bring relief to the big tech companies, alongside a provision for easier compliance requirements for start-ups.
- It covers the **processing of personal data** which is **collected by data fiduciaries** within the territory of India and which is processed to offer goods and services within India.
- It provides a **lower degree of protection** as the earlier drafts **only excluded data processed manually specifically by “small entities” and not generally**.
- It **reduces the information that a data fiduciary is required** to provide to the data principal.
- It seems to suppose that a **notice is only to be provided to take consent of the data principal**.
 - A notice is also **important for the data principal** to exercise data protection rights such as the **right to know** what personal data is being

processed by whom, whether that data needs correction or updation and also to request deletion of data that may not be relevant for the purpose of processing.

- It introduces the concept of “deemed consent”.
 - In effect, it bundles **purposes of processing** which were **either exempt from consent-based processing or were considered “reasonable purposes”** for which personal data processing could be undertaken under the ground of “deemed consent”.
- It recognises the **right to post-mortem privacy** which was missing from the PDP Bill, 2019.
 - It would allow the **data principal to nominate another individual in case of death or incapacity**.

Issues with bill

- **Relies on parents to grant consent** on behalf of the child in all cases.
 - **Low digital literacy**: In India parents often rely on their children for the digital content.
- **Does not factor in teenager's use of various Internet platforms** for self-expression and personal development.
 - Does not take into account the “**best interests of the child**”, a standard originating in the Convention on the Rights of the Child, 1989, to which India is a signatory.
 - India has upheld this standard in laws such as the Commissions for Protection of Child Rights Act, 2005, the Right of Children to Free and Compulsory Education Act, 2009, and the Protection of Children from Sexual Offences Act, 2012.
 - However, it **has not been applied** to the issue of data protection.
- Allow the government to **provide exemptions in the future** from strict parental consent requirements, profiling, tracking prohibitions.
 - For example, Instagram is regularly used as an educational and professional development tool by millions.
- Each platform will have to obtain ‘**verifiable parental consent**’ in the case of minors.
 - All platforms have to manage **more personal data** than before
 - Citizens will be at greater risk of harms such as data breaches, identity thefts, etc.

Looking ahead

- Platforms should be **mandated to undertake a risk assessment for minors** and design services with default settings that protect children from harm.
 - This will bring in co-regulation, by creating incentives for platforms to design better products for children.
- **Relax the age of mandatory parental consent** for the short term to minimize data collection.
- **Conduct surveys of both children and parents** to find out their online habits, digital literacy.
- **Make a policy** that balances the safety and the agency of children online.

In the digital era of India, data protection is very important for Indian internet users. A data breach can cause damage to the economy as well as the population of India. A good policy concerning data protection is necessary for the secure digitalization of India.

India's just energy transition

- **Just Energy Transition Partnership (JET-P)** is emerging as the key mechanism for multilateral financing by developed countries **to support energy transition** in developing countries.
 - India is considered the **next candidate for a JET-Partnership**.
- However, India must develop a **coherent domestic** JET strategy to negotiate a financing deal that addresses its unique set of **socio-economic challenges**.

Just energy transition

- While an **energy transition** to renewables typically focuses on requisite technology and finance, a **just energy transition** argues for **people-centric measures** that reduces negative impact of energy transitions on communities.
- It involves **maximizing the social and economic opportunities** of climate action while minimizing and carefully managing any challenges.

JETP

- **JETP is a new funding model** created to help South Africa, Indonesia, India, Vietnam, and Senegal transition away from fossil fuel energy and toward clean energy to addresses **social issues associated with their energy transitions**.
- It **ensures environmental sustainability** as well as decent work, social inclusion, and poverty eradication.
- It combines **technology, finance, and people** to help facilitate this transition.

Challenges in India

- The power system is **mainly driven by coal** and is in a **financial stress**.
- **Power distribution companies** (discoms) not managing properly to raise revenues to cover power purchase costs.
- **Carbon emissions are expected to peak** only two decades from now.
 - This necessitates the addition of both renewable energy and coal for its fast-growing electricity demand.
- **Existing JET-P deals** pay limited attention to intra-generational inequity.
 - This includes **job losses** resulting from a coal phase-down.
- More emphasis given by developed countries on coal phase-down, **without adequate attention** to the crucial difference in energy transition between industrialized and emerging economies.
- Difficulty in achieving **cost competitiveness**.
 - Indian components are 20% costlier than Chinese components.
- India's transition requires significant **simultaneous growth in energy demand**, nearing doubling of electricity demand by 2030.
- India cannot afford to put its **development on hold** while decarbonizing.

Looking ahead

- Need for **customized transition plan and finance** for the Indian power sector.
- Enhanced **investments in a power grid** to absorb an increasing share of renewable energy.
- **Acceleration in renewable energy (RE) deployment** rates.
 - Helps to match the pace of demand growth is critical to India's JET.

- **Adopt shifting energy demand patterns** in ways that **enable faster** RE capacity addition such as:
 - Solarisation of agricultural electricity demand
 - Electrification of diesel-powered Micro, Small, and Medium Enterprises (MSMEs)
 - Decentralized RE for residential cooking and heating
 - All these will help to address the rural-urban economic divide, create rural jobs, and address inter-generational and spatial inequities.
- **Domestic manufacturing of clean energy components** to sustain a JET, build energy self-sufficiency
- **Negotiate access to markets** outside India as part of a JET-Partnership, to reduce the cost gap through economies of scale.
- **Optimize the use of coal-fired power** plants closer to where coal is mined.
 - It will lead to emissions reduction and efficient power.

India's energy transition is already an inspiration for many emerging economies. With India holding the G-20 presidency, it has an opportunity at hand to negotiate the JETP deal for itself while also shaping international cooperation on just energy transitions. It will help India to achieve a clean energy transition as well India can achieve sustainable goals before the target years. But JETP countries should consider the scenario of the energy sector in India.

What is a living will, and the new Supreme Court order for simplifying passive euthanasia procedure?

The Supreme Court of India amended the guidelines governing passive euthanasia to make the process less complicated and time-consuming.

Guidelines Changes

- The Supreme Court modified the prior decision to eliminate the need for a judicial magistrate to testify or countersign a living will.
- The Supreme Court ruled that an attestation by a notary or a gazetted authority is necessary for a person to form a lawful living will.
- Instead of the living being in the custody of the relevant district court, the Supreme Court stated that the document would become a part of the National Health Digital Record, which may be viewed by hospitals and physicians anywhere in the nation.
- The patient's family may file a complaint with the appropriate high court, which will appoint a new board of medical specialists to help it make a final decision if the hospital's medical board has denied authorization to stop medical treatment.

Passive Euthanasia

- The act of withholding or withdrawing medical care, such as withholding or removing life support, to let a person die is known as passive euthanasia.
- Active euthanasia, in contrast, entails an active intervention to end a person's life with drugs or an outside force, such as giving a deadly injection.

India's practice of euthanasia includes:

- The Supreme Court of India legalized passive euthanasia in 2018 in a landmark decision, using the concept of a "living will."
- Under some situations, an adult may refuse medical care or freely opt not to receive medical treatment from embracing death naturally, according to the judgement.
- It also established criteria for "living wills" prepared by terminally ill individuals aware of their possibilities of entering a permanent vegetative state.
- "Dignity in the process of dying is as much an element of the right to life under Article 21," the court declared. Depriving a person of dignity at the end of life deprives the person of a meaningful existence."

Several nations that practice euthanasia:

- Euthanasia and assisted suicide are both legal in the Netherlands, Luxembourg, and Belgium for anybody experiencing "unbearable agony" with no possibility of relief.
- Switzerland forbids euthanasia, but permits assisted suicide when a doctor or medical professional is present.
- Euthanasia and assisted suicide will be legal in Canada for mentally ill people by March 2023, the decision has drawn heavy criticism, and the implementation date may be postponed.
- In the United States, each state has its own set of laws. Some states, including Washington, Oregon, and Montana, permit euthanasia.

Bard vs. Chatbot

Chatbot

- Chatbots, also called chatterbots, is a form of **Artificial Intelligence (AI)** used in messaging apps.
- This tool helps add convenience for customers—**they are automated programs that interact with customers like a human would** and cost little to nothing to engage with.
 - Key examples are **chatbots used by businesses in Facebook Messenger, or as virtual assistants**, such as Amazon's Alexa.
- Chatbots tend to operate in one of two ways—either via **machine learning or with set guidelines**.
- However, due to advancements in AI technology, chatbots using set guidelines are becoming a historical footnote.
- *Types*
 - **Chatbot with Set Guidelines:**
 - It can only respond to a **set number of requests and vocabulary and is only as intelligent** as its programming code.
 - An example of a **limited bot is an automated banking bot** that asks the caller some questions to understand what the caller wants to do.
 - **Machine Learning Chatbot:**
 - A chatbot that functions through machine learning have an **artificial neural network** inspired by the neural nodes of the human brain.
 - The bot is programmed to self-learn as it is introduced to new dialogues and words.
 - In effect, as a **chatbot receives new voice or textual dialogues**, the number of inquiries that it can reply to and the accuracy of each response it gives increases.
 - Meta (as Facebook's parent company is now known) has a machine learning chatbot that creates a platform for companies to interact with their consumers through the Messenger application.
 - *Advantages*
 - Chatbots are convenient for **providing customer service and support 24 hours a day, 7 days a week**.
 - They also free up phone lines and are far less expensive over the long run than hiring people to perform support.
 - Using AI and **natural language processing, chatbots are becoming better at understanding what customers want** and providing the help they need.
 - Companies also like chatbots because they can collect data about customer queries, response times, satisfaction, and so on.

- *Disadvantages*
 - Even with natural language processing, they may **not fully comprehend a customer's input and may provide incoherent answers.**
 - Many chatbots are also limited in the scope of queries that they are able to respond to.
 - Chatbots can be **expensive to implement and maintain**, especially if they must be customized and updated often.
 - The challenges of AI metamorphosing **into sentient are far in the future; however, unethical AI perpetuating historical bias** and echoing hate speech are the real dangers to watch for.

ChatGPT

- The ChatGPT can answer **“follow-up questions”**, and can also “admit its mistakes, challenge incorrect premises, and **reject inappropriate requests.**”
- It is based on the **company's GPT 3.5 series of language learning models (LLM)**.
 - GPT stands for Generative Pre-trained Transformer 3 and this is a kind of **computer language model that relies on deep learning techniques to produce human-like text** based on inputs.
- The model is trained to predict what will come next, and **that's why one can technically have a 'conversation' with ChatGPT.**
- The chatbot was also trained using **Reinforcement Learning from Human Feedback (RLHF)**.
- *Usage*
 - It can be used in **real-world applications** such as digital marketing, online content creation, answering customer service queries or as some users have found, even to help debug code.
 - The bot can respond to a large range of questions **while imitating human speaking styles.**
 - It is being seen as a replacement for the basic emails, party planning lists, CVs, and even college essays and homework.
 - It can also be used **to write code, as examples have shown.**
- *Limitations*
 - The chatbot **displayed clear racial and sexist biases**, which remains a problem with almost all AI models.
 - The chatbot gives answers which are grammatically correct and read well— though some have pointed out that **these lack context and substance**, which is largely true.
 - ChatGPT occasionally produces inaccurate information and that **its knowledge is restricted to global events** that occurred before 2021.

Bard

- Bard is based on the Language **Model for Dialogue Application (LaMDA)**, Google's own conversational AI chatbot.

- It will give in-depth, conversational and essay-style answers just like ChatGPT does right now.
- However, the model is currently a “lightweight” version of LaMDA, and the one being “requires significantly less computing power, enabling it to scale to **more users**.”
- *Features*
 - It is built on Transformer technology, which is **also the backbone of ChatGPT** and other AI bots.
 - Transformer technology was pioneered by Google and made **open source in 2017**.
 - Transformer technology is a **Neural Network Architecture**, which is **capable of making predictions based on inputs** and is primarily used in natural language processing and computer vision technology.
 - The architecture determines how the network processes information and influences its accuracy and efficiency in solving a particular problem. Common architectures include feedforward networks, recurrent networks, and convolutional neural networks.

How is ChatGPT different from Bard?

- ChatGPT has impressed with its ability to respond to complex queries — though with varying degrees of accuracy — but its **biggest shortcoming perhaps is that it cannot access real-time information** from the Internet.
 - But Microsoft just unveiled a **new version of Bing that's powered by ChatGPT** which is a significant improvement of the version of ChatGPT.
- ChatGPT’s language model was trained on a **vast dataset to generate text based on the input**, and the dataset, at the moment, **only includes information until 2021**.
- Whereas, for questions where there might not be a clear-cut answer, **Bard will synthesise a response that reflects differing opinions**.
 - For example, the question, “Is it easier to learn the piano or the guitar?” would be met with “Some say the piano is easier to learn, as the finger and hand movements are more natural. Others say that it’s easier to learn chords on the guitar.”

Concerns of AI-Based Generative Chatbots

- The text generation software from Google and OpenAI, while fascinating and eloquent, can be extremely prone to inaccuracies, experts have pointed out.
- The ability to search the Internet in real-time, including content such as hate speech and racial and gender biases and stereotyping, **could lead to problems, and take the sheen off these new products**.
- Even with natural language processing, they may not fully comprehend a customer's **input and may provide incoherent answers**.
- Many chatbots are also limited in the scope of queries that they are able to respond to.

Gender gap in financial inclusion

- **Business Correspondents (BCs)** are the vital cog for the financial inclusion strategy of every bank.
 - **BC:** retail agents engaged by banks for providing banking services at locations other than a bank branch/ATM.
- Around **95 percent** of banking outlets in **rural regions** are operated by BCs.
- Despite the proliferation of BCs, the representation of female BCs is dismally low (**Less than 10 %** of the total BC network).

Female BC is needed, because

- BCs have been able to conduct banking transactions, from nearby their homes, **cutting down transportation cost, time, and hesitancy barriers.**
- Female BCs are **better positioned to serve** and engage under-banked women.
 - Male staff often **deal without discussion** with female customers, which hinders women's agency and in turn decreases their engagement with formal financial institutions.
- Lower levels of financial as well as digital literacy make handholding support provided by female BCs **relevant** for women customers.
- Female BCs show **higher profitability, wider cross-selling** of financial products, and **lower attrition rates.**
- Female BCs have been particularly important **in nudging the excluded underbanked women** and addressing the **last-mile disconnect.**

Initiative on female BCs by the government

One Gram Panchayat One BC Sakhi

- **Launched by** the Ministry of Rural Development.
- **Aims to** increase these numbers and deploy at least one BC Sakhi in every Gram Panchayat by the end of 2023-24.
- **Effect:** During lockdown, BC Sakhis (female banker friend) created awareness and enabled access to Pradhan Mantri Garib Kalyan Yojana cash transfers and other Direct Benefit Transfers at doorsteps and reduced beneficiaries rush at bank branches.

Challenges with Female BCs

- **Lack of funds** to invest in hardware required to operate as a BC.
 - Only a handful of banks extend equipment support to BCs.
- **Higher minimum qualification** for female BCs by some banks.
 - **According to the RBI mandate,** the 10th pass is the minimum qualification to appear for the examination still, many banks keep their minimum qualification as the 12th pass.
- **Limited additional financial support** provided by banks to female BCs such as mobility, and safety.
- **Solely reliability on BC** work as a source of revenue.
 - BCs ecosystem has a **low commission** structure.
- Female BCs **lack the training to serve the needs** of women enterprises.

Looking ahead

- Need for a policy to create a **more inclusive and supportive ecosystem** for female BCs.
- **Additional financial support** such as reimbursement of the cost incurred in commutation, internet connectivity
- Female BCs **training camps** to provide a broader range of services.
 - It will increase their revenue streams and improve financial inclusion for women enterprises.
- **Improvement** in the Percentage of female BCs.
- Banks have to keep the **10th pass as the minimum qualification.**
- Banks should provide the necessary types of equipment such as laptops, and smartphones to Female BCs.

BC in India is currently a male-dominated profession but good policy can bring gender parity across India in this sector. By addressing challenges in Business Correspondents, it is possible to increase the representation of female BCs. It will ultimately help us to achieve sustainable goals such as gender equality.

Trouble in Joshimath raises questions about hydroelectric projects in fragile mountain ecosystems

- The Himalaya are a major water source for much of **South Asia**.
- Most countries in the region, including India, China, Nepal, Bhutan, and Pakistan, have built or are planning to build hydropower projects in the Himalaya.
 - For example:
 - **Nepal:** Arun III Hydroelectric Project and the West Seti Hydroelectric Project
 - **Bhutan:** Chukha Hydropower Project and the Tala Hydropower Project.
- However, in recent times the region witnessed **catastrophic events like earthquakes, landslides, flood etc.**

Hydropower Project

- The source of hydro power is **water**. Hydro power plants are usually located **on or near a water source**.
- This is achieved by converting the gravitational potential or kinetic energy of a water source to produce power.
- The volume of the water flow and the change in elevation **or 'fall'**, and often referred to as **'head'**—from one point to another determine the amount of available energy in moving water.
 - The **greater the water flow** and the higher the head, the **more electricity** a hydropower plant can produce.
- It is an **attractive alternative to fossil fuels** as it does not directly produce **carbon dioxide or other atmospheric pollutants**.

Indian Hydropower projects on the Himalaya

- **Sawra-Kuddu Hydro Power Project:**
 - **State:** Himachal Pradesh
 - **Capacity:** 386 million units of electricity per annum
 - **River:** Pabbar in Shimla
 - First such dam in Asia in the **shape of a piano**.
- **Luhri Stage- I HEP project:**
 - **State:** Himachal Pradesh
 - **Capacity:** 210 MW
 - **River:** Satluj
- **Dhaultasidh Hydro Power Project:**
 - **State:** Himachal Pradesh
 - **Capacity:** 66 MW
 - **River:** Beas
- **Renukaji Dam project:**
 - **State:** Himachal Pradesh
 - **Capacity:** 40MW

- **River:** Giri
- **Subansiri Lower Hydroelectric Project**
 - **State:** Arunachal Pradesh
 - **Capacity:** 2000 MW (8x250 MW)
- **Teesta Low Dam Hydroelectric Project**
 - **State:** Sikkim
 - **Capacity:** 160 MW (4x40 MW)

Impact of hydropower projects in Himalaya

- **Geological impacts:** Triggering of landslides/slope failures leading to damage of roads, farms houses.
 - 97.42% of the total geographical area of Himachal Pradesh is prone to landslides.
 - Four hydropower projects in the Himalayan region are at risk from landslides triggered by earthquakes and tremors.
- **Hydrogeological impacts:** Drying of springs and underground water sources
- **Muck Dumping:** Along rivers leading to increasing siltation, in forests and pastures
- **Safety negligence** leading to accidents
- **Impact on local environment:** Can disrupt the flow of rivers, leading to changes in water temperature and chemistry.
- **Impact on marine fauna:** Disrupt migration patterns of fish and impact local wildlife, particularly if the dam's construction leads to habitat loss.
- **Impact on community:** Can displace local communities, affecting their livelihoods and cultural heritage.

Micro hydro system: An alternative to hydropower

- It is a **small-scale hydroelectric power generation system** that typically generates up to **100 kilowatts (kW) of electricity**.
- It uses the **energy of falling water to turn a turbine**, which, in turn, generates electricity.
- This system can be used for various applications, **including powering homes, businesses, and small communities**.
- Typically, **less expensive to build** and maintain than large hydroelectric dams and have a smaller environmental footprint.
- Located even in **inaccessible areas** where it is **difficult to transmit electricity** from larger power stations.
- They can provide a **reliable source of energy** to communities that are **not connected to the grid**.

Conventional facilities

1. **Run-of-river system:**
 - It uses the **natural flow of water** in a stream or river to generate electricity.
 - **Components:**
 - **Water conveyance:** channel, pipeline, or pressurized pipeline (penstock) that delivers the water

- **Turbine, pump, or waterwheel:** Transforms the energy of flowing water into rotational energy
 - **Alternator or generator:** Transforms the rotational energy into electricity
 - **Regulator:** Controls the generator
 - **Wiring:** Delivers the electricity
2. **Pumped Storage systems**
- It is a system where water accumulates in reservoirs created by dams on **streams and rivers** and is **released through hydro turbines** as needed to generate electricity.

The need of the hour is a pause on hydropower in the Himalayas in order to stop further devastation. There needs to be a complete stop to subsidies to the hydropower sector based on the 'green' tagging.

A Nordic-India connect to power a green transition

- India has been at the forefront of developing new **green technologies** and solutions such as hydrogen, batteries, and carbon capture to succeed in the green transition.
- Over the last decades, Nordic countries have been **pioneering green technologies**.
- However, the Nordic countries alone cannot deliver the green transition the world requires.
- Together, the Nordics and India can deliver key technologies and **solutions to stop climate change** and boost green growth.

Nordic countries

- The Nordic countries are a geographical and cultural region in **Northern Europe and the North Atlantic**.
- "Nordic" is a term derived from the **local Scandinavian-language** word "Norden" which means "**the northern islands**"
- The Nordic countries are **top performers in numerous metrics of national performance**.
- They are the least corrupt in the world and have a low crime rate.



Significance of Nordic-India Connection

- India gets to **expand its strengths** by collaborating with these countries:
 - Nordic countries are pioneers in innovation, clean energy, green technologies, education, health care, human rights, rule of law.
 - They represent the **most advanced economies** of Europe.
- **India presents an ideal opportunity** to these countries because of its large market.
 - The Nordic countries can take an active part in the flagship programs launched by India.
- India and Nordic countries **enjoy robust business partnerships** though the economics of these five countries individually is much smaller than those of the G20 countries.

- The total bilateral trade and services between India and the Nordic countries are US\$13 billion.
- At the **Nordic-India Summit** held in **Copenhagen** in 2022, the five Nordic Prime Ministers and India's Prime Minister agreed to intensify cooperation on digitalization, renewable energy, maritime industries, and the circular economy.
- Nordic businesses are **operating in India** and have made substantial investments.
 - Their business community in India is growing.
- India is the **only country** with which the Nordic countries have summit-level meetings, apart from the U.S.
- Trade between Norway and India has **doubled in the last three years**.
- The Norwegian government has recently established a new **Climate Investment Fund for investments in renewables abroad**, and India has been defined as a focus country.
 - Almost ₹ 1,500 crores have been invested in India.
- Nordic countries are often used as **role models** for good governance in equality, education, sustainability, and economic policy.
 - India can emulate the best practices.

Future Benefits for India

- In India's current developing phase towards a green, digital, and innovative future, Nordic countries can be formed as a big helping hand in India's green transition.
- Nordic countries have **world-leading technologies** and **expertise to offer**.
- Nordics have business delegations and companies that are **leaders within sectors** such as clean energy, circular economy, digitalization, tourism, and the maritime sector.
- Trade in services is an area of significant potential, especially with tourism, education, IT, energy, maritime and financial services.
- The **Norwegian Sovereign Wealth Fund** is likely to become one of India's largest single foreign investors (around \$17.6 billion).
- Strong partnership with Nordic countries will boost **innovation, economic growth, sustainable solutions, and mutually beneficial trade** and investment.

There is still significant untapped potential for trade and further collaboration with Nordic countries. Together, the Nordics and India can be the powerhouse of the green transition globally. Good ties with Nordic countries and a little more effort can speed up the process of India's transition toward a developed nation.

Comptroller and Auditor General of India

- The Constitution of India (Article 148) provides for an independent office of the Comptroller and Auditor General of India (CAG).
- He is the head of the Indian Audit and Accounts Department and is one of the bulwarks of the democratic system of government in India
- He is the guardian of the public purse and controls the entire financial system of the country at both the levels—the Centre and the state.
- His duty is to uphold the Constitution of India and laws of Parliament in the field of financial administration.

Constitutional Provisions for Office of CAG

- **Article 148** broadly deals with the CAG appointment, oath and conditions of service.
- **Article 149** deals with Duties and Powers of the Comptroller and Auditor-General of India.
- **Article 150** says that the accounts of the Union and of the States shall be kept in such form as the President may, on the advice of the CAG, prescribe.
- **Article 151** says that the reports of the Comptroller and Auditor-General of India relating to the accounts of the Union shall be submitted to the president, who shall cause them to be laid before each House of Parliament.
- **Article 279**—Calculation of “net proceeds” is ascertained and certified by the Comptroller and Auditor-General of India, whose certificate is final

Appointment, Term & Removal

- The **CAG is appointed by the President of India** by a warrant under his hand and seal.
- The CAG holds office for a period of six years or up to the age of 65 years, whichever is earlier.
- He can resign any time from his office by addressing the resignation letter to the president.
- He can also be **removed by the president** on same grounds and in the same manner as a **judge of the Supreme Court**. In other words, he can be removed by the president on the basis of a resolution passed to that effect by both the Houses of Parliament with special majority, either on the ground of proved misbehaviour or incapacity.

Independence.

The Constitution has made the following provisions to safeguard and ensure the independence of CAG:

- He is provided with the security of tenure and can be removed by the president only in accordance with the procedure mentioned in the Constitution. Thus, he does not

hold his office till the pleasure of the president, though he is appointed by him.

- He is **not eligible for further office**, either under the Government of India or of any state, after he ceases to hold his office.
- His salary and other service conditions are determined by the Parliament. His salary is equal to that of a judge of the Supreme Court.

- Neither his salary nor his rights in respect of leave of absence, pension or age of retirement can be altered to his disadvantage after his appointment.
- The administrative expenses of the office of the CAG, including all salaries, allowances and pensions of persons serving in that office are charged upon the Consolidated Fund of India and are not subject to the vote of Parliament.
- No minister can represent the CAG in Parliament (both Houses) and no minister can be called upon to take any responsibility for any actions done by him.

Duties of CAG

- CAG audits the accounts related to all expenditure from the Consolidated Fund of India, Consolidated Fund of each state and UT having a legislative assembly.
- CAG audits all expenditure from the Contingency Fund of India and the Public Account of India as well as the Contingency Fund and Public Account of each state.
- CAG audits all trading, manufacturing, profit and loss accounts, balance sheets and other subsidiary accounts kept by any department of the Central Government and the state governments.
- CAG audits the receipts and expenditure of all bodies and authorities substantially financed from the Central or State revenues; government companies; other corporations and bodies, when so required by related laws.
- He **ascertains and certifies the net proceeds of any tax or duty and his certificate is final on the matter.**

Reports:

- **He submits his audit reports relating to the accounts of the Centre and State to the President and Governor**, who shall, in turn, place them before both the houses of Parliament and the state legislature respectively.
- **He submits 3 audit reports to the President:** audit report on appropriation accounts, audit report on finance accounts and audit report on public undertakings.

CAG and PAC:

- He acts as a **guide, friend and philosopher of the Public Accounts Committee of the Parliament.**
- Three CAG reports i.e. audit report on appropriation accounts, audit report on finance accounts and audit report on public sector undertakings are examined by PAC.
- CAG also assists the committee in its deliberations by preparing a list of the most urgent matters which deserve the attention of the PAC.
- He also helps in making the actions of the committee clear to the witnesses and in making the action of the government clear to the committee.
- CAG position is sometimes one of interpreter and translator, explaining the officials' views to the politicians and vice-versa.
- The responsibility of the CAG does not end here. He has to watch whether the corrective action suggested by him has been taken or not. In cases where it has not been taken, he reports the matter to the PAC which will take up the matter.

Issues in office of CAG:

No laid down criteria:

- Independence can be ensured if there is a well laid out criteria for this. Such criteria would include required qualifications which an individual should possess to be appointed as CAG and also a procedure through which selection should be made. The procedure must be transparent.

Appointment Issue:

- The current practice adopted for the appointment of the CAG is that the Cabinet Secretary prepares a shortlist for the finance minister who then submits it before the prime minister
- The prime minister recommends one name from that list to the president. If the president approves the same, the appointment of the CAG is made by warrant under the hand and seal of the president
- Such a procedure is faulty as there are chances for **conflict of interest**

Dilution of Accountability:

- The CAG is an auditor to the government of India, which is headed by the prime minister
- If the head of the auditee is to select an individual for auditing his organisation, there is a danger of some 'pliable' person becoming the CAG and it may dilute the **accountability**

Delays and Reduction in CAG Reports:

- There has been delays and pendency of Comptroller and Auditor General (CAG) reports with critics terming it as **"CAGed"**.
- The total number of CAG reports relating to central government ministries and departments **came down from 55 in 2015 to just 14 in 2020, a fall of nearly 75 per cent**, as per a recent reply to a Right To Information (RTI) application.

Know this

- CAG of India only performed the role of an Auditor General and not of a Comptroller but in Britain it has the power of both Comptroller as well as Auditor General.
- In India the CAG audits the accounts after the expenditure is committed i.e. ex post facto. In UK no money can be drawn from the public exchequer without the approval of the CAG.
- In India, CAG is not a member of the parliament while in Britain; CAG is a member of house of the Commons.

Reforms Needed.

Ensuring Independence:

- Internationally, most countries have enacted laws putting in **certain qualifications** and also the process of appointment of the head of their Supreme Audit Institution, so that he works **independently** and is **not under the influence of the Executive**, whose performance he is required to evaluate and provide audit opinion on achievement of the objectives.
- **The Exchequer and Audit Act of the United Kingdom**, as amended in 1983 provides that the CAG will be jointly selected by the Prime Minister and Chairman of the Committee of Public Accounts and thereafter ratified by the House of Commons

Transparency in Appointment:

- In India, to bring about **transparency and objectivity** in the selection process of the CAG, an institutional mechanism needs to be put in place
- A list may be prepared of persons possessing such qualifications. Thereafter, a **high-level committee** may examine the personalities and recommend to the president a panel of three names out of which one can be appointed

Curbing Delays:

- Just like the citizen's right to get the information within a month under RTI Act 2005, auditors should be provided access to records on priority basis within seven days, failing which, heads of departments should be required to explain the circumstances that caused the delay.

Reforms suggested by Vinod Rai (former CAG)

- Bring all private-public partnerships (PPPs), Panchayati Raj Institutions and government-funded societies, within the ambit of the CAG.
- CAG Act of 1971 should be amended to keep pace with the changes in governance.
- A collegium type mechanism to choose a new CAG on the lines of selecting a Chief Vigilance Commissioner (CVC).

Steps improving efficiency of CAG:

- In the wake of the Big Data revolution, CAG came out with a **Big Data management policy in 2016** and also established a Centre for Data Management and Analytics in Delhi which is a welcome step.
- In 2017, CAG of India hosted the Commonwealth Auditors General Conference. Leveraging technology in public audit and environment audit were the two themes of the conference. Conference helped in fostering partnerships amongst Commonwealth countries for capacity development in public audit.
- CAG successfully audited the UN headquarters which involves multifarious and complex operations; it shows the credibility of Indian CAG.

Conclusion

- CAG helps the parliament/state legislatures hold their respective governments accountable and hence reforms in office of CAG is of utmost importance.
- He is one of the **bulwarks** of the democratic system of government in India and truly the **most important office in Constitution of India as conveyed by B.R Ambedkar.**

“I am of the opinion that this dignitary or officer is probably the most important officer in the Constitution of India. He is the one man who is going to see that the expenses voted by Parliament are not exceeded, or varied from what has been laid down by Parliament in the Appropriation Act.” —Dr. B.R Ambedkar.

All about Directorate of Enforcement (ED)

- The **Directorate of Enforcement (ED)** is a multi-disciplinary organization mandated with investigation of offences of **money laundering** and violations of **foreign exchange laws**.
 - It functions under the **Department of Revenue of the Ministry of Finance**.
- As a **premier financial investigation agency of the Government of India**, the Enforcement Directorate functions in strict compliance with the Constitution and Laws of India.

Genesis of ED

- The origin of this Directorate goes back to 1st May, 1956, when an **'Enforcement Unit'** was **formed in the Department of Economic Affairs** for handling Exchange Control Laws violations under **Foreign Exchange Regulation Act (FERA), 1947**.
 - It was headquartered in Delhi, headed by a **Legal Service Officer as the Director of Enforcement**.
 - It had two branches – at Bombay and Calcutta.
- In the year 1957, this Unit was **renamed as 'Enforcement Directorate'**, and another branch was opened at Madras (now Chennai).
- In 1960, the **administrative control of the Directorate was transferred** from the Department of Economic Affairs **to the Department of Revenue**.
- With the passage of time, FERA 1947 was repealed and replaced by FERA, 1973.
 - With the onset of the process of economic liberalisation, FERA, 1973, which was a regulatory law, was repealed and in its place, a new law viz. the **Foreign Exchange Management Act, 1999 (FEMA)** came into operation w.e.f. 1st June 2000.
- Further, in tune with the **International Anti Money Laundering regime**, the **Prevention of Money Laundering Act, 2002 (PMLA)** was enacted and ED was entrusted with its enforcement w.e.f. 1st July 2005.

Structure of ED

- **Hierarchy:** The Directorate of Enforcement, with its headquarters at New Delhi, is **headed by the Director of Enforcement**.
 - There are **five regional offices at Mumbai, Chennai, Chandigarh, Kolkata and Delhi** headed by Special Directors of Enforcement.
 - The Directorate has **10 Zonal offices** each of which is **headed by a Deputy Director** and **11 sub Zonal Offices** each of which is headed by an **Assistant Director**.
- **Recruitment: Recruitment of the officers is done directly** and by drawing officers from other investigation agencies.
 - It comprises officers of **IRS** (Indian Revenue Services), **IPS** (Indian Police Services) and **IAS** (Indian Administrative Services) such as **Income Tax officer, Excise officer, Customs officer, and police**.

- **Tenure:**In November 2021, the President of India promulgated two ordinances allowing the **Centre to extend the tenures of the directors** of the **Central Bureau of Investigation (CBI)** and the Enforcement Directorate **from two years to up to five years.**
 - The **Delhi Special Police Establishment (DSPE) Act, 1946** (for ED) and the **Central Vigilance Commission (CVC) Act, 2003** (for CV Commissioners) have been amended to give the government the power to keep the two chiefs in their posts for **one year after they have completed their two-year terms.**
 - The chiefs of the Central agencies **currently have a fixed two-year tenure, but can now be given three annual extensions.**
 - However, no further extension can be granted after the completion of a period of five years in total including the period mentioned in the initial appointment.

Statutory Functions of ED

The statutory functions of the Directorate include **enforcement of following Acts:**

- **COFEPOSA:**Under the Conservation of Foreign Exchange and Prevention of Smuggling Activities Act, 1974 (COFEPOSA), this Directorate is **empowered to sponsor cases of preventive detention** with regard to contraventions of FEMA.
- **Foreign Exchange Management Act, 1999 (FEMA):**It is a civil law enacted to consolidate and amend the laws relating to facilitate external trade and payments and to promote the orderly development and maintenance of foreign exchange market in India.
 - **ED has been given the responsibility to conduct investigation** into suspected contraventions of foreign exchange laws and regulations, to **adjudicate and impose penalties** on those adjudged to have contravened the law.
- **Prevention of Money Laundering Act, 2002 (PMLA):**Following the recommendations of the **Financial Action Task Force (FATF)** India enacted PMLA.
 - The ED has been entrusted with the responsibility of **executing the provisions of PMLA by conducting investigation** to trace the assets derived from proceeds of crime, to provisionally attach the property and to **ensure prosecution of the offenders and confiscation of the property** by the Special court.
- **Fugitive Economic Offenders Act, 2018 (FEOA):**Lately, with the increase in the number of cases relating to **economic offenders taking shelter in foreign countries**, the Government of India introduced the **Fugitive Economic Offenders Act, 2018 (FEOA)** and **ED is entrusted with its enforcement.**
 - This law was enacted to **deter economic offenders from evading the process of Indian law** by remaining outside the jurisdiction of Indian courts.
 - Under this law, the ED is mandated to **attach the properties of the fugitive economic offenders** who have escaped from India warranting

arrest and provide for the **confiscation of their properties** to the Central Government.

ED Functions under PMLA

- The ED carries out **search (property) and seizure (money/documents)** after it has decided that the money has been laundered, under **Section 16** (power of survey) and **Section 17** (search and seizure) of the PMLA.
 - On the basis of that, the authorities decide if arrest is needed as per **Section 19 (power of arrest)**.
- Under **Section 50** of the PMLA, the **ED can also directly carry out search and seizure** without calling the person for questioning.
 - It is **not necessary to summon the person first** and then start with the search and seizure.
- If the person is arrested, the **ED gets 60 days to file the prosecution complaint** (chargesheet) as the punishment under PMLA doesn't go beyond seven years.
 - If no one is arrested and only the property is attached, then the prosecution complaint along with attachment order is to be **submitted before the adjudicating authority within 60 days**.

ED's Jurisdiction

- Both **FEMA or PMLA apply to the whole of India**. So, the ED can take action against any person on which this act applies.
 - Cases under FEMA may lie in **civil courts** where PMLA cases will lie in **criminal courts**.
- The agency **has jurisdiction over a person or any other legal entity** who commits a crime.
 - **All the public servants** come under the jurisdiction of the agency if they are involved in any offence related to money laundering.
- **ED can not take an action suo motu**. One has to complain to any other agency or Police first and then ED will investigate the matter and will identify the accused.
 - The ED will investigate the matter and may attach the property of an accused person and also make an arrest and start proceeding with the violation of the provisions of FEMA and PMLA act.
 - The matter will be resolved by way of **adjudication by courts or PMLA courts**.

Criticisms

- The **Supreme Court (SC)** is examining allegations of **rampant misuse of PMLA by the government and the Enforcement Directorate (ED)**. Major Allegations include:
 - **Being Used for Ordinary Crimes:**
 - **PMLA is pulled into the investigation of even "ordinary" crimes** and assets of genuine victims have been attached.
 - PMLA was a comprehensive penal statute to counter the threat of money laundering, specifically stemming from trade in narcotics.

- Currently, the **offences in the schedule of the Act are extremely overbroad**, and in several cases, have absolutely no relation to either narcotics or organised crime.
- **Lack of Transparency and Clarity:**
 - The **Enforcement Case Information Report (ECIR)**- an equivalent of the FIR - is considered an “internal document” and not given to the accused.
 - The ED **treats itself as an exception to the principles and practises** [of criminal procedure law] and chooses to register an ECIR on its own whims and fancies on its own file.
 - There is also a lack of clarity about **ED's selection of cases to investigate.**
 - The initiation of an investigation by the ED has consequences which have the potential of curtailing the liberty of an individual.

Recent Controversies

- The PMLA formulated in 2002 has undergone various critical changes from time to time in order to give itself more strength to deal with the offence of money laundering.
 - However, on account of these amendments, several petitions have been filed across the country that question the **almost blanket powers assigned to the ED under PMLA** for searching, seizing, investigating, and attaching assets considered to be proceeds of crimes.
- Moreover, in a recent hearing, the **SC upheld the constitutional validity of the PMLA and ED's power to hold inquiries, arrest people and attach property** (under Section 5 of the Act).
 - The Court stated that Section 5 provides for a balancing arrangement to secure the interests of the person and also ensures that the proceeds of crime remain available to be dealt with in the manner provided by the 2002 Act.
 - It **rejected the argument that ED authorities are police officers** and, hence, a statement recorded by them (Section 50 of the Act) would be hit by **Article 20(3) of the Indian Constitution** which says no person accused of an offence shall be compelled to be a witness against himself (**self incrimination**).
- Additionally, the **conviction rate of the ED under PMLA is very low**, despite thousands of cases registered and people arrested.
 - According to the data quoted by the government in Parliament of India, there were **zero convictions between 2005 and 2013-14**.
 - By 2014-15 to 2021-22, **out of 888 cases under ED, only 23 cases were under conviction.**

Reforms - ED

- It is true that law has given stringent powers to the ED in dealing with the accused that can increase the possibility of political misuse.

- But **there must be a consensus between the adjudicating authority and the officers of ED** to abide by the constitutionality of provision under PMLA, making the investigation more lucid.
- The **process itself should not become a punishment**. ED's expanded powers should be welcomed with a **greater commitment to expeditiously resolve the cases**, so both the judiciary and enforcement agencies can move forward with speedy trials and convictions.
- There must be a **constant scrutiny over the operations of the Enforcement Directorate** and current disposition whether this clarification will improve the conviction rate (which is right now less than half a percent).
- And if there will be any lacunas in the operative part, change is the law of nature, these gaps can be filled either through suitable legislation, executive action or revised order of the apex court.

Other Investigation Agencies are there in India

Investigation Agency	Features
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Enforcement Directorate:	<p>§ The Directorate of Enforcement (ED) is a multi-disciplinary organization mandated with investigation of offences of money laundering and violations of foreign exchange laws.</p> <ul style="list-style-type: none"> ○ It functions under the Department of Revenue of the Ministry of Finance. ○ It is the a premier financial investigation agency of the Government of India. ○ The statutory functions of the Directorate include enforcement of following Acts: <ul style="list-style-type: none"> · Conservation of Foreign Exchange and Prevention of Smuggling Activities Act, 1974 (COFEPOSA) · Foreign Exchange Management Act, 1999 (FEMA) · Prevention of Money Laundering Act, 2002 (PMLA) · Fugitive Economic Offenders Act, 2018 (FEOA)
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National Investigation Agency (NIA):

- § It is the **Central Counter-Terrorism Law Enforcement Agency of India** mandated to **investigate all the offences affecting the sovereignty, security and integrity of India.**
- o It includes offences:
 - that affect friendly relations with foreign states.
 - are against atomic and nuclear facilities.
 - that involve smuggling of arms, drugs and fake Indian currency and infiltration from across the borders.
 - committed under the statutory laws enacted to implement international treaties, agreements, conventions and resolutions of the United Nations, its agencies and other international organisations.
 - o It was constituted under the **National Investigation Agency (NIA) Act, 2008.**

Central Bureau of Investigation (CBI):

- § It is the **premier investigating police agency** in India.
- o It provides assistance to the **Central Vigilance Commission** and **Lokpal.**
 - o It is also the **nodal police agency in India** which **coordinates investigations on behalf of Interpol Member countries.**
 - o Its conviction rate is as high as 65 to 70% and it is comparable to the best investigation agencies in the world.

Narcotics Control Bureau (NCB):

- § It was constituted by the Government of India in 1986 under the **Narcotic Drugs and Psychotropic Substances Act, 1985.**
- o The NCB is the **nodal agency on the matter of drug law enforcement** in India.
 - o It is the **apex coordinating agency** under the Ministry of Home Affairs.

Serious Fraud Investigation Office (SFIO):

- § It is a **multi-disciplinary organization under the Ministry of Corporate Affairs**, consisting of experts in the field of accountancy, forensic auditing, law, information technology, investigation, company law, capital market and taxation **for detecting and prosecuting or recommending for prosecution white-collar crimes/frauds.**
- o Section 211 of the **Companies Act, 2013**, has accorded statutory status to the Serious Fraud Investigation Office (SFIO).
 - SFIO also has **powers to arrest people for the violation of the Company law.**
 - o A White-collar crime is a **nonviolent crime committed for financial gain.** It is characterized by deceit, concealment, or violation of trust.

Adani - the symbol of Indian crony capitalism

Parliament witnessed sharp exchanges over the **Adani-Hindenburg issue** and the opposition is accusing it of **crony capitalism** and raising demands for a probe by a **Joint Parliamentary Committee** or a **Chief Justice of India (CJI)-designated committee**.

Crony Capitalism

- **Crony capitalism** is a term used to describe a **capitalist economic system** in which **individuals or businesses with close ties to political leaders and government officials** use their **political connections to gain an unfair advantage** in the marketplace.
- In the **Crony Capitalism Index 2021** published by **The Economist**; India was ranked at **7th position where crony sector wealth accounted for 8% of Gross Domestic Product (GDP)** of the country.

Issues Associated with Crony Capitalism

- **Unfair Advantage in Marketplace:** Crony capitalism can lead to corruption as **businesses use their political connections to gain an unfair advantage** in the marketplace, often by bribing government officials.
 - This can **undermine the rule of law and erode public trust** in government institutions.
- **Distorted Market Competition:** When some businesses are given an unfair advantage through their political connections, it **distorts market competition** and makes it difficult for smaller businesses and entrepreneurs to succeed.
 - This can lead to a **concentration of wealth and power in the hands of a few individuals or corporations**.
- **Reduced Innovation:** The dominant position of large businesses often erodes competition and **discourages them to further innovate** or improvise their products/services.
 - This can **stifle innovation in the overall economy** and lead to a **decline in competitiveness**.
- **Public Distrust of Government and the Economy:** Widespread crony capitalism can lead to a **loss of public trust in government institutions** and the economic system.
 - This can make it difficult for policymakers to implement reforms and for businesses to operate effectively.

Looking forward

- **Improving Transparency and Accountability:** India can improve transparency and accountability in its **political and economic systems** by implementing measures such as **open data initiatives, increasing the independence of regulatory agencies, and improving the transparency of government contracts** and subsidies.
- **Encouraging Competition:** India can encourage competition by **reducing barriers to entry for smaller businesses and entrepreneurs**, such as **reducing red tape and streamlining regulations**.

- This can make it easier for new entrants to compete with established businesses and **reduce the concentration of wealth** and power in the hands of a few individuals or corporations.
- **Towards Corporate Ethical Responsibility:** India can promote responsible business practices by implementing measures to ensure that **businesses act ethically and sustainably**, in lines of **corporate social responsibility** and sustainability initiatives.
 - This can **increase public trust in the economic system** and encourage businesses to act in the best interests of society as a whole.
- **Encouraging Responsible Political Behaviour:** India can encourage responsible political behaviour by **increasing the transparency of political donations and lobbying activities**.
 - This can reduce the potential for corruption and ensure that elected officials are held accountable for their actions.

Making millet cultivation profitable

- The Food and Agriculture Organization of the United Nations (FAO) has declared **2023 as the International Year of Millets**.
 - India declared **2018 as the National Year of Millets**.
- Millets are growing in popularity across the globe because of their **high nutritional values**.

Millets

- Millets are some of the **earliest cultivated grains**, dating back to the prehistoric age.
- Millets are mentioned in some of the oldest Indian texts.
 - In **Yajur Veda**, they are identified as '**priyangava**' or foxtail millet, '**aanava**' or barnyard millet, and '**shyaamaka**' or black finger millet.
- Millets have **special nutritive properties** and **special agronomic characteristics** (drought-resistant and suitable for semi-arid regions).
- Every millet's variety **contains nutrients**, including calcium, carbohydrates, iron, magnesium, potassium, and phosphorus.
- They **contain vitamins** such as folic acid, vitamin B6, β - Carotene, and niacin in abundance.
 - Often referred to as '**nutri-grains**'.
- **Millets** currently being cultivated in India that are categorised into two categories:
 - **Major Millets:** '**Bajra**'/Pearl millet, '**Ragi**'/Finger millet, Sorghum millet
 - **Minor Millets:** '**Ramdana**'/Amaranth, '**Kuttu**'/Buckwheat millet, '**Sanwa**'/Barnyard millet, '**Kangni**'/Foxtail millet, and '**Kodon**'/Kodo millet.

India in millet production

- 60 years ago, millets comprised up to **40% of the cultivated grain in India**, more than rice and wheat.
- India is the **largest producer** of millet in the world.
 - (sub-point) India produces **15 million MT** of millet annually.
 - **Rajasthan** has the highest area under millets cultivation (31.3%)
- India is the **second-largest exporter** of millet.
- In last 25 years, there is decline in the area under cultivation of **minor millets and finger millet** at the block level.
 - However, it has **increased gradually after 2014-15**, although the acreage is still one-third of acreage in the early 2000s.
 - This increase is due to improved seeds, agronomic practices and intercropping.

Need of millets

- 71% of the Indian population **cannot afford a nutritious diet**.
 - Millets can be the perfect solution for a nutritious diet
- Millets can grow on **less fertile soil with minimal inputs**.

- Millets have hard nature and the **ability to grow in rain-fed lands**,
- As against the requirement of 5,000 liters of water to grow one kilogram of rice, millets need hardly 250-300 liters.
- They can be **mix-cultivated** along with pulses and vegetables.

Challenges of millet production in India

- **Low productivity of millets**
 - In 2016-17, the area under millets stood at 14.72 million hectares, down from 37 million ha in 1965-66, before the pre-Green Revolution era.
- **Decline in the area** under millet cultivation.
 - Due to low yield, area under nutri-cereals **declined since the mid-1980s**: from 41 million hectares in the 1980s to 24 million hectares in 2017-18.
- Processing of millets is a **time-consuming and laborious task**, mainly undertaken by women.
- Millets selling prices are **very low in the APMC** (Agricultural Produce Market Committee) **mandis**
- **Unavailability** of good-quality millet seeds
- **Lack of appropriate processing technologies** that yield stable shelf products
 - Millet value-added products have low shelf-life
- **Different processing facilities** are needed for different millets
 - Farmers do not have different facilities.
- **Absence of proper grades** and standards
- **Social stigma on millets** that they are Poor Man's Food
- Millet-based products are not **covered under standard foods**
- **Absence of market intelligence** on millets to analyze the export competitiveness of millets, and price volatility of domestic and international markets
- Procured in only a **few States**, and stocks in the **central pool are small**.
 - In 2022, central stocks had 33 million tonnes of rice and 31 million tonnes of wheat, but only four lakh tonnes of Nutri cereals.
- **Due to less production in millets**, the inclusion of millets in the PDS (Public Distribution System) is difficult.
 - It would be feasible only if more than **50% of total millet production** were procured for PDS, which is nearly impossible.
 - The production of sorghum (4.8 million tonnes), pearl millet (10.4 million tonnes), and finger millet along with other millets (3.7 million tonnes) put together was 18.9 million tonnes.

Looking ahead

- **Promote the production** of more millets by **providing price support** to farmers
- Put efforts to bring millets cultivation under **irrigated condition**
 - Expected demand for millets around **40-50 Billion tonnes in 2050**.
- **Building up seed hubs** for increasing the quality of seed capacity and production.

- The usage of good quality seed can **increase production at least by 20 %**.
- **Incentivizing millet cultivation** to increase the area under millets
 - **Karnataka Model** can be replicated where under the “**The Food of the Future**” initiative farmers were given ₹ 10000/ ha incentive to for cultivation of millets
- Millets should be **incorporated into the public distribution program** at a nominal price.
- **The provision of MSP** (Minimum support price) for minor millets should be considered
 - Currently, MSP covers only major millets (Sorghum, Bajra, Ragi)
- **Biofortified millets** can be made available for the consumption of resource-poor farm households
- **Introducing the nutrition benefits** of millets in the course curriculum of school education
- Organize **awareness creation programs** such as advertising in print media, electronic media (TV Channels, Radio), social media
- **Incentivizing the processing and export** of millet products for encouraging the big private companies
- Introduce **customised post-harvest machinery** to replace the hand-pounding of millet that takes too much time.
- Increasing the production of millets and reversing the decline in millet area require multiple interventions including **scientific inputs, institutional mechanisms, financial incentives and in-kind support**.
- Government of India and State governments (such Karnataka and Odisha), have initiated Millet Missions.
 - However, the **issue of the economics of millet cultivation** should be incorporated into these missions.

Millets have the potential to assume significance not only for food security but also for nutritional security in India. Historically, millet has been marginalized both in policy and priorities of agriculture and nutrition in India. With the millet's revolution in India, they could be the potential new tools for the government to fight socio-economic issues such as malnutrition and rural poverty while addressing sustainability concerns.

MicroLEDs

OLED (Organic Light Emitting Diodes)

OLED (Organic Light Emitting Diodes) is a flat light emitting technology, made by placing a series of organic thin films between two conductors. When electrical current is applied, a bright light is emitted. OLED display offer improved image quality– better contrast, higher brightness, fuller viewing angle, a wider colour range and much faster refresh rates and lower power consumption over an LED display.

1. Organic Light Emitting Diode (OLED) is a newer display technology for mobiles and monitors. It consists of an organic layer sandwiched between two conducting sheets (an Anode and a cathode) with a glass plate the top and bottom.
2. The carbon-based organic material emits electro-luminescent light when electricity is applied across the two conducting sheets.
3. The panel is much thinner as it does not require backlight and filters. OLEDs are superior in their exceptional colour reproduction, fast response times, higher brightness and extremely light weight designs.

OLED

LED

OLEDs are made of organic materials.

LEDs are made from inorganic compounds.

The pixels of an OLED are self illuminating.

The LEDs used to light an LED display.

OLED are expensive, though OLED prices are dropping significantly.

LED are currently less expensive than OLED displays.

OLED feature a wider viewing angle than do LED.

LED feature a limited viewing angle.

With OLED panels, the colours do not get washed out when viewers watch from extreme angles.

In LED panels, the colours sometimes get washed out when viewers watch from extreme angles.

OLED technology offers the ability to develop lighter and thinner display.

LED are heavier and thicker display.

OLED are more energy efficient. OLEDs have better Power efficiency.

LED consume more energy efficient when compared to their OLED counterparts.

Response Time of OLEDs is faster than that of LED.

Response Time of LED is slower than that of OLED.

Uses of an OLED

1. **Lighting Applications:** OLED lighting has the illumination of higher quality, varied panel shapes, and better-diffused light sources. This is used for lightning purposes.
2. **Mobile Phones:** OLED are used in mobile phones. In mobile phone AMOLED technology is used in screens which has better colours and contrast.
3. **Television Sets:** Major giants in the industry pushing the use of OLED in television sets. OLEDs have advantages such as they include thin, low cost displays with a low driving voltage, wide viewing angle and high contrast and colour gamut.
4. **Fashion Industry:** OLED technology is also used in the fashion industry, the automotive sector, production of cameras, and video games.

Drawbacks of OLEDs

1. OLED displays don't last as long: degradation of the organic molecules meant that early versions of OLEDs tended to wear out around four times faster than conventional LCDs or LED displays.
2. Some OLEDs are moisture sensitive.
3. Higher power consumption (when viewing brighter colors)
4. Prolonged exposure to UV light can damage OLED.

OLED has come a long way and is expected to be the mainstream display technology, usurping LEDs and LCDs in the future. However, research is still required to address some of the drawbacks of the technology.

MicroLEDs

- **MicroLEDs are self-illuminating diodes** that have brighter and better colour reproduction than **Organic Light Emitting Diode (OLED) display technology**.
 - MicroLED technology is based on the **use of sapphires**, which are known for their ability to shine on their own indefinitely.
 - The technology involves the **use of tiny light-emitting diodes (LEDs) that are packed tightly together** to create a bright and high-quality display.
 - Unlike OLED displays, **microLED displays use inorganic materials** such as gallium nitride.
 - A microLED is as **small as cutting a centimetre of hair into 200 smaller pieces**. Each of these microLEDs are semiconductors that receive electric signals.
 - Once these microLEDs are gathered, **they form a module**. Several modules are then combined to form screens.

How is microLED better than OLED?

- Brightness is not only important to determine how good a picture is, but it's also crucial for HDR effectiveness of content. MicroLED has a contrast ratio of 1,000,000:1 and can illuminate far brighter than OLED displays (which is up to 30 times brighter). However, OLED panels are improving, yet the peak brightness levels in these panels are limited compared to other LED panels like -- Samsung's QLED panels. This is possible due to the inorganic material (gallium nitride) that is used in microLED displays.

- This material enables the individual RGB LED sources to go brighter for a longer period. The organic material in OLED panels diminishes if the screen is too bright for too long. On the contrary, inorganic materials have a longer overall lifespan.

Benefits

- Brighter screens with **better colour reproduction** and viewing angles.
- **Limitless scalability**, as microLED displays are **resolution-free, bezel-free, ratio-free, and even size-free**.
- The ability to **freely resize the screen in any form for practical usage**.
- **Self-emissive microLEDs** that individually produce **red, green, and blue colours** without needing backlighting or colour filters.

Challenges

- **Manufacturing Complexity:** The process of manufacturing microLEDs is **highly complex**, and it **requires precise control** over many variables to produce high-quality displays.
- **Cost:** The **cost of manufacturing microLED displays is currently very high**, and it may take some time for the technology to become affordable enough for widespread adoption.
- **Power Consumption:** MicroLEDs require a lot of **power** to operate, which can make them **less energy-efficient** than other display technologies.

Black soldier fly larvae can be a cheap, nutritious alternative to cereal-based poultry feed

India is among the **top five chicken and egg producers in the world**, but there are challenges to the business for small poultry farmers because of the quality, quantity and cost of feed.

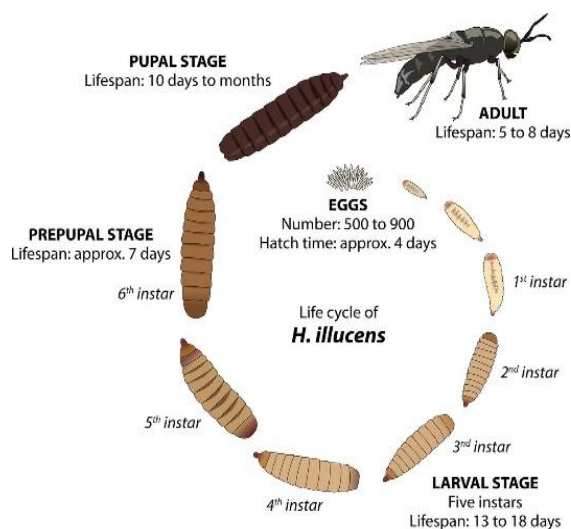
- **Black soldier fly**, since it has a high nutritional value can be one of the substitutes to address these challenges.

Challenges Related to Poultry Feed

- Feeds account for up to **70% of the entire cost of poultry production**. Besides, the conventional feed supplied to the poultry, majorly cereals and soya, competes with the **food demands of a growing human population**.
- In addition to rising cost, the **feed resource availability is a major determinant** of the sustainability of the poultry sector.
- One such alternative is **brewers dried grains**, a byproduct of the brewing industry.
 - Though rich in protein and amino acid, **its limitations include high moisture and fibre content**.
- **Rice bran is another economically viable alternative** to wheat in certain parts of the country. It has a comparable apparent metabolisable energy as wheat.
 - However, studies show that the laying performance of the **chicks declined on incorporation** of rice bran to the feed.
- The larvae of **black soldier fly (Hermetia illucens)**, for instance, have a **high nutritional value** and are easy to raise.

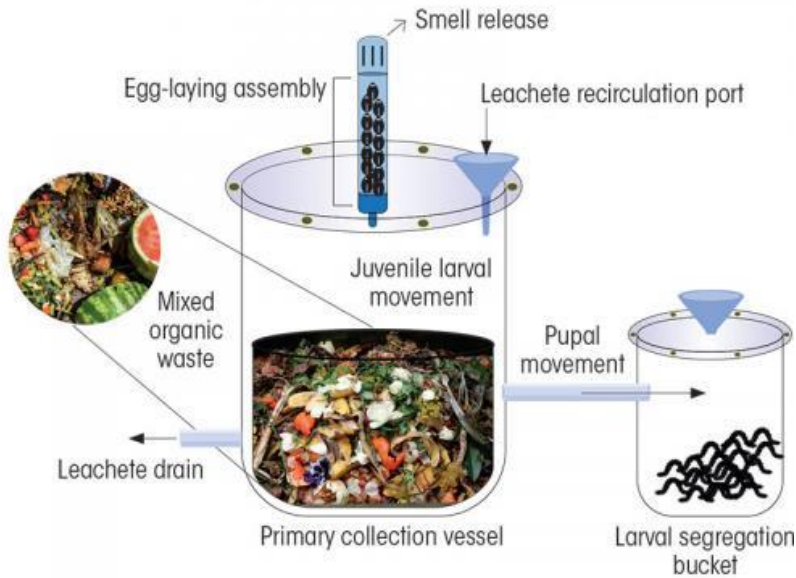
Black Soldier Fly

- The black soldier fly is a fly (Diptera) of the **Stratiomyidae** family that is commonly found in many parts of the world.
- They are a dull, whitish color. They **feed on a variety of organic matter**, from rejected food waste to manure.
- They also have high **waste-to-biomass conversion**
- This means, unlike hot-blooded mammals and birds, which use a lot of energy to keep themselves warm, **insects are efficient converters of food into body mass**.



WIN-WIN STRATEGY

The novel trapping mechanism uses organic food waste and some eggs of black soldier fly to churn out larvae to be used as feed



- **Utility:**

- They can be a **low-cost, low footprint, eco-friendly** as well as natural feed companion to poultry farmers.
- The larvae are **capable of converting the organic waste into a wide range of useful vitamins and minerals.**
 - They are thus rich **in calcium, phosphorus, magnesium, sodium, potassium, iron, zinc**, copper, manganese and so on, which makes them a promising candidate for livestock feed.

Chargesheets are not public documents

The **Supreme Court** on 20 January 2023 held that **chargesheets are not 'public documents'** and **enabling their free public access** violates the provisions of the **Criminal Code of Procedure** as it compromises the rights of the accused, victim, and the **investigation agencies**. Before dismissing the **PIL seeking directions** to the police or investigating agencies like the **ED or the CBI**, a two-judge bench of Justice MR Shah and Justice CT Ravikumar also cautioned against **the possibility of 'misuse'**.

What is a chargesheet?

- A **chargesheet**, as defined under **Section 173 CrPC**, is the final report prepared by a police officer or **investigative agencies** after completing their investigation of a case.
- After preparing **the chargesheet**, the **officer-in-charge of the police station forwards it to a Magistrate**, who is empowered to take notice of the offences mentioned in it.
- The **chargesheet should contain details of names, the nature of the information, and offences**. Whether the accused is under arrest, in custody, or has been released, whether any action was taken against him, are all important questions that the chargesheet answers.
- Further, **when the chargesheet relates to offences for which there is sufficient evidence** against the accused, the officer forwards it to the Magistrate, complete with all documents. This forms the basis for the **prosecution's case** and the charges to be framed.
- "The **charge-sheet is nothing but a final report of the police officer** under s. 173(2) of the CrPC," the apex court held in its 1991 ruling in **K Veeraswami vs UOI & Ors**.
- A **chargesheet must be filed against the accused** within a **prescribed period of 60-90 days**, otherwise the arrest is illegal and the accused is entitled to bail.
- **How is a chargesheet different from an FIR?**
- The term '**chargesheet**' has been expressly defined under **Section 173 of the CrPC** but '**First Information Report**' or **FIR**, has **not been defined in either the Indian Penal Code (IPC) or the CrPC**. Instead, it finds a place under the **police regulations/ rules under Section 154 of CrPC**, which deals with '**Information in Cognizable Cases**'.
- While **the chargesheet is the final report** filed towards the **end of an investigation**, an FIR is filed at the '**first instance**' that the police is informed of a **cognizable offense or offence for which one can be arrested without a warrant**; such as rape, murder, kidnapping.
- Further, an **FIR does not decide a person's guilt** but a **chargesheet is complete with evidence** and is often used during the trial to prove the offenses the accused is charged with.
- After **filing an FIR**, the **investigation takes place**. Only if the **police have sufficient evidence can the case be forwarded to the Magistrate**, otherwise, the accused is released from custody under **Section 169 of the CrPC**. The law laid down by the **Supreme Court in 1967 in Abhinandan Jha & Ors vs Dinesh Mishra** reiterates this.

- Finally, the **FIR should be filed at the first instance** of receiving knowledge of the **occurrence of a cognizable offense**. According to **Section 154 (3) of the CrPC**, if any person is aggrieved by the refusal of authorities to file FIR, they can send the complaint to the **Superintendent of Police**, who will either investigate himself or direct it to their subordinate.
- **A chargesheet is filed by the police or law-enforcement/ investigative agency** only after they have gathered **sufficient evidence against the accused** in respect of the offenses mentioned in the FIR, otherwise, a **'cancellation report'** or **'untraced report'** can be filed when due to lack of evidence.

CHARGESHEET	FIR
Expressly Defined under Section 173 of CrpC	Not been defined in wither IPC or CrPC but defined in Police Regulations/Rules under Section 154 of CrPC that deals with Information in Cognizable offences
Final report filed towards the end of an investigation	FIR is filled in first instance that the police is informed of a cognizable offence (arrest for which one can be arrested without a warrant.
Chargesheet is complete with evidence and is often used during the trial to prove the offences the accused is charged with	FIR does not decide a person's guilt.
A chargesheet is filed by the police or law-enforcement/investigative agency only after they have gathered sufficient evidence against the accused in respect of the offenses mentioned in the FIR, otherwise, a 'cancellation report' or 'untraced report' can be filed when due to lack of evidence..	According to Section 154 (3) of the CrPC, if any person is aggrieved by the refusal of authorities to file FIR, they can send the complaint to the Superintendent of Police, who will either investigate himself or direct it to their subordinate
Complaint is defined under Section 2 of CrpC, any allegation made orally or in writing to a magistrate, with a view to his taking action under the code, that some person whether known or unknown has committed an offence.	Not been defined in wither IPC or CrpC but defined in Police Regulations/Rules under Section 154 of CrPC that deals with Information in Cognizable offences
Complaint can be filed by any person subject to certain exceptions.	Can be lodged by person such as the aggrieved party or an eye witness or police themselves.
Complaint is made to a magistrate	First information report is made to the competent police officer
A complaint may relate to a cognizable or non-cognizable offence.	First Information Report must relate to a cognizable offence on the face of it
When complaint is filed no investigation is done by the police officer until directed by the competent authority.	When a FIR is lodged, a policer officer starts with investigating the matter.
No prescribed format is given for filing a complaint. But some essential ingredients are to be satisfied.	There is prescribed format by law for FIR

Why is a chargesheet not a 'public document'?

- Dismissing the plea, the Court held that a **chargesheet cannot be made publicly** available as **it's not a 'public document' under Sections 74 and 76 of the Evidence Act**, as argued by the petitioners'.

- **Section 74 of the Evidence Act** defines ‘public documents’ as those which form the acts or records of **sovereign authority**, official bodies, tribunals, and of public offices either legislative, judicial or executive in any part of India, Commonwealth or a foreign country. It also includes public records “**kept in any State of private documents**”.
- Meanwhile, **Section 76 of the Evidence Act** mandates every public officer having custody over such documents to provide its copy pursuant to a demand and payment of legal fee, accompanied by a **certificate of attestation** along with the date, seal, name and designation of the officer.
- While dictating its order, the Court said that **reliance on Sections 74 and 76** was ‘**misconceived**’ and added, “**Documents mentioned in Section 74 of the Evidence Act** can only be said to be public documents, certified copies of which are to be given by the concerned public authority having the custody of such a public document. **Copy of chargesheets along with necessary public documents** cannot be said to be ‘public documents’ under Section 74 of the Evidence Act.”
- The Court also clarified that **as per Section 75 of the Evidence Act**, all documents other than those listed under Section 74’ are private documents.
- The Court rejected the **petitioner’s reliance on a 2016 ruling of the Supreme Court in ‘Youth Bar Association of India vs UOI’**, where it directed **all police stations in the country** to publish copies of FIRs online **within 24 hours of registration**, except in cases where offenses were of sensitive nature. The Court rejected the **reliance on its judgment** by saying that the directions given by it in the **2016 ruling only applied to FIRs** and could not extend to chargesheets.
- This was done so that **if the innocent accused are harassed**, they are able to get relief from the competent court and are not taken by surprise, the Court said in reference **to its 2016 judgment**. The direction was issued in favor of the accused in that case and **could not be stretched to the public at large**, the Bench added.

Court’s refrain on the misuse of documents

- **One of the concerns** expressed by **Justice MR Shah** during the proceedings was the possibility of misuse by NGOs and ‘busybodies’ “**Chargesheets cannot be given to everybody**,” Justice MR Shah had said on 9 January 2023, according to a report by LiveLaw.
- Meanwhile, Justice CT Ravikumar cited the 2022 ruling in ‘**Vijay Madanlal Choudhary vs UOI**’, where the Court held that ECIR is not equivalent to FIR and thus, the accused cannot be allowed a copy of the same.
- “**Suffice it to observe that ECIR cannot be equated with an FIR** which is mandatorily required **to be recorded** and supplied to the accused as per the provisions of the **1973 Code**, the Apex Court said in its 2022 judgment.
- Applying the same principles to the present case, the Bench said that investigating agencies like **ED could not be made to provide their chargesheets to the public**.

India's urban planning needs a multi-generational process.

- Feroze Varun Gandhi a Member of Parliament from Uttar Pradesh and the author of the new book, 'The Indian Metropolis: Deconstructing India's Urban Spaces' has written an article titled 'Hill Or City, Urban Planning Cannot Be An Afterthought' published in the Hindu on 14th February.
- In this article, he said that India's urban planning should not be limited to an election cycle and there is a need for a multi-generational process.
- A tunnel boring equipment struck an aquifer on December 24, 2009, in Joshimath, Uttarakhand, around three kilometres from the village of Selang.
- As a result, around 800 litres of water were lost every second (enough to sustain the needs of nearly 30 lakh people per day).
- The water flow decreased but never ceased after that, and soon groundwater sources started to run dry.
- Joshimath lacks a wastewater management system. Instead, widespread application of the soak-pit technique might make the problem of land sinking worse.
- The Tapovan Vishnugad dam and the Helang-Marwari bypass road are two ongoing infrastructure projects that could make things worse.

Causes of increasing land subsidence incidents in hilly urban India

- An estimated 12.6% of India's land area is vulnerable to landslides, especially in Sikkim, West Bengal and Uttarakhand.
- According to the National Institute of Disaster Management (and highlighted in the National Landslide Risk Management Strategy, September 2019) urban policy is making this worse.
- The increasing incidents of land subsidence in hilly urban India are due to ill-conceived land use planning, driven by building bye-laws that ignore local geological and environmental factors, and construction that weakens rock formations.

Climate change

- The Intergovernmental Panel on Climate Change report of March 2022 has highlighted the risk Kolkata faces due to a rise in sea levels.
 - The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.
- The combination of poor urban planning and climate change will mean that many of India's cities could face devastating flooding.

Suggestions

- Local Data: Credible data on landslide risk needs to be mapped at a granular level, with additional detail and localisation.
- High-risk areas should not be allowed to expand large infrastructure, and there must be a push to reduce human interventions and adhere to carrying capacity.
- Assessment: Site development in hazardous zones needs to be assessed by a geologist, with corrective measures implemented, and steps taken to prohibit construction in hazardous areas.

- Early warning: Early warning systems and landslide action plans can also be helpful.
- Flood-Proof: Urban planners must prioritize enhancing sewerage and stormwater drain networks, desilting rivers, and building coastal walls in areas at risk of sea-level rise.
- There should be a greater focus on flood-resilient architecture, including river embankments, flood shelters, and warning systems.
- Protecting "blue infra" areas is also essential, as they act as natural sponges that absorb surface runoff and recharge groundwater.
 - 'Sponge cities' are urban areas with abundant natural areas such as trees, lakes and parks – or other good designs intended to absorb rain and prevent flooding.
- Urban authorities should invest in simulation capacity to determine flooding hotspots and flood risk maps as rainfall patterns and intensity change.
- It is vital to take a comprehensive approach to flood-proofing India's cities and address the impacts of climate change and poor urban planning to prevent devastating flooding.

Case studies: Urban planning

- Aizawl, Mizoram is located in Seismic Zone V and has a steep terrain, making it vulnerable to landslides during earthquakes with magnitude greater than 7 on the Richter scale.
- The city has developed a landslide action plan, updated regulations, and a cross-disciplinary landslide policy committee to guide construction activities in hazardous zones and continually update risk zones.
- On the other hand, Gangtok, Sikkim has a real-time landslide monitoring and early warning system established with the help of Amrita Vishwa Vidyapeetham, which uses sensors to assess rainfall infiltration, water movement, and slope instability.
 - The seismic Zonation map of the country (state-wise) given by the Bureau of Indian Standards (BIS) has been categorized into several seismic zones (Zone II to Zone V).
 - Zone V is seismically the most active region, while zone II is the least.

Looking forward

- The development of urban areas in India should prioritize incorporating environmental planning, enhancing natural open spaces, and considering the impact of climate change and extreme weather.
- Disaster risk and preparedness planning should be assessed and updated, with early warning systems and a disaster management framework in place.
- Cities should have large arterial roads that allow for the movement of people and goods. This process should be viewed as a long-term, multi-generational plan, rather than limited to an election cycle.

Risk-proofing climate finance in India

- The assessment and disclosure of **climate risk** is a window of opportunity for financial institutions to innovate financial solutions to support the **green transition**.
- It is now widely accepted that financial stress produced by climate risk affects the survival and health of **individual lending institutions** or even a country's **financial systemic** stability.
- Recently released report by RBI titled '**Report of the Survey on Climate Risk and Sustainable Finance**', is indicative of the steps being taken by various institutions to respond to this evolving reality.
- However, RBI's initial efforts need to be supported by many more steps.

Climate finance

- It refers to local, national, or transnational financing—drawn from public, private and alternative sources of financing
- It seeks to **support mitigation** and **adaptation actions** that will address **climate change**.
- it is needed for **mitigation** because large-scale investments are required to significantly reduce emissions.
- It is equally important for **adaptation**, as significant **financial resources** are needed to adapt to the adverse effects and reduce the impacts of a changing climate.
- It recognizes that the **contribution of countries** to climate change and their capacity to prevent it and cope with its consequences vary enormously.
 - So the **developed countries** should also continue to take the lead in **mobilizing climate finance** through a variety of actions like including supporting country-driven strategies and taking into account the needs and priorities of developing country Parties.
- **Financial mechanisms for climate finance under United Nations Framework Convention on Climate Change (UNFCCC):** Green Climate Fund (GCF), Special Climate Change Fund (SCCF), Least Developed Countries Fund (LDCF), and Adaptation Fund

Target for climate finance

- **UNFCCC COP15 (2009):** Developed country parties, to achieve meaningful mitigation actions and transparency on implementation, jointly set a target of **USD 100 billion a year** by **2020** to address the needs of **developing countries**.
- The climate finance goal was then formally recognized by the **UNFCCC Conference** of the Parties at COP16.
- At COP21 in Paris, Parties extended the **\$100 billion** goals through 2025.
- After COP26 there was a consensus that developed nations will **double** their **collective provision** of adaptation finance from 2019 levels by 2025.

Areas to be covered by RBI

End-use guidance for sustainable finance for regulated entities (REs):

- Provide more guidance on end use of sustainable finance by regulated entities, especially regarding which end uses would qualify for **sustainable financing** as well as an approach to monitoring end use.
- **Securities and Exchange Board (SEBI)** of India's green debt securities framework's list of end uses is one step in this direction.
 - This is a starting point for the RBI to develop its own **regulation** keeping in mind the instrument level nuances between bonds and banking products.
- it also limits the possibilities of **window-dressing** or **greenwashing**.
- Greenwashing is the practice in which firms and governments **mark all kinds of activities as climate-friendly**, as something that would lead to emissions reduction, or avoidance of emissions.

Separate the Definition of climate risk as a separate risk class

- To create a separate **formal definition** of **climate risk** for the **finance sector** — the sources of climate risks could be physical, transition, liability, etc.
- **Stipulate** basic common disclosures related to this **risk class** in the organization's annual **reports/periodic filings**.
- Encouraging REs to adopt the Task Force on Climate-Related Financial Disclosures (TCFD) guidelines for improving REs acceptability and access to foreign funds/markets where TCFD is almost universally accepted as a disclosure norm.

Capacity building

- Preparing adequate number of well-trained **professionals** for RBI's REs in the rapidly evolving areas of climate risk and **sustainable finance**.
- **Indian Institute of Banking and Finance (IIBF)** needs to prepare and provide regular trainings and technical skills upgradation courses for REs staff who will be part of the departments responsible for climate risk assessment and/or involved in sustainable finance initiatives.

Joint steering of RBI & SEBI for looking on climate risk

- A **joint steering** committee from the RBI, SEBI and the Insurance Regulatory and Development Authority (IRDA) for looking at climate risk issues together.
- A **joint policy** response for climate **risk measurement** and mitigation given the interdependent nature of financial institutions and markets.

A centralized public database

- A centralized public database pertaining to **climate vulnerabilities** such as inundation in flood-prone areas, heat stress, etc.

Business Responsibility and Sustainability Report (BRSR)

- BRSR is a reporting requirement by SEBI for **ESG (Environment, Social and Governance)** parameters for the **top 1,000 listed** Indian companies by market capitalization as well as ESG ratings.
- it covers measurable parameters of **climate impact** such as emissions, generation of pollutants, etc.
- By using this information, the REs should be conducting climate **risk stress** testing and simulations on their **loan books** at a total **portfolio level**.

Special Empowered Task Force

- The **RBI** could create Special Empowered Task Force to study the various sustainable **finance instruments** issued.
- By using this task force, it can create **a half-yearly or annual reports/compendium** detailing observations, trends of impact assessment, etc.
- It could provide valuable guidance to financial institutions, both **domestic** and **global**.

India has announced a net zero target for 2070 but the roadmaps and concrete action plans for achieving the targets are missing. RBI should think about the assessment and disclosure of climate risk to innovate financial solutions and provide support the green transition of industry and society by creating a centralized public database pertaining to climate vulnerabilities. It will help the government to improve its policy towards climate finance.

Silent pandemic of Antimicrobial Resistance

- While the world is emerging from the acute phase of the COVID-19 pandemic, the very harmful but **invisible pandemic** of **Antimicrobial Resistance (AMR)** is unfortunately here to stay.
- Similar to the efforts done against COVID-19, **rapidly rising AMR rates** also need an accelerated, multi-sectoral, global and national response.

Antimicrobials and Anti-microbial resistance

- **Antimicrobials:** It includes antibiotics, antivirals, antifungals and antiparasitics medicines used to prevent and treat infections in **humans, animals and plants**.
- **Antimicrobial Resistance (AMR):** It is the resistance acquired by any **microorganism** (bacteria, viruses, fungi, parasite, etc.) against **antimicrobial drugs** that are used to **treat infections**.
 - It occurs when a microorganism changes over time and **no longer responds to medicines** making infections harder to treat and increasing the risk of disease spread, severe illness and death.
 - The **WHO** has identified AMR as one of the **top ten threats** to global health.
 - **Microorganisms** that develop antimicrobial resistance are sometimes referred to as “**superbugs**”.

Reasons for the Spread of AMR

- **Antibiotic consumption in humans:**
 - Unnecessary and injudicious use of antibiotic fixed dose combinations could lead to emergence of bacterial strains resistant to multiple antibiotics.
- **Social factors:**
 - Self-medication.
 - Access to antibiotics without prescription.
 - Lack of knowledge about when to use antibiotics.
- **Culture activities:**
 - Mass bathing in rivers as part of religious mass gathering occasions.
- **Antibiotic Consumption in Food Animals:**
 - Antibiotics which are critical to human health are commonly used for growth promotion in poultry.
- **Pharmaceutical Industry Pollution:**
 - The wastewater effluents from the antibiotic manufacturing units contain a substantial amount of antibiotics, leading to contamination of rivers and lakes.
- **Environmental Sanitation:**
 - Untreated disposal of sewage water bodies - leading to contamination of rivers with antibiotic residues and antibiotic-resistant organisms.
- **Infection Control Practices in Healthcare Settings:**

- A report on hand-washing practices of nurses and doctors found that only 31.8% of them washed hands after contact with patients.

Concerns related with the AMR

- **Global public health** response has been threatened due to **rising misuse and overuse of antibiotics** in humans and animals.
- Microbial resistance to antibiotics has made it **harder to treat** infections such as **pneumonia, tuberculosis (TB), blood-poisoning (septicaemia)** and several food-borne diseases.
- AMR also imposes a **huge health cost on the patient** in the form of longer hospitalisation, health complications and delayed recovery.
- It puts patients undergoing major surgeries and treatments, such as **chemotherapy**, at a greater risk.
- Many times, patients recover from advanced medical procedures but succumb to untreatable infections.
- It adds to the burden of communicable diseases and strains the **health systems** of a country.
- Recently conducted a study by **Indian Council of Medical Research (ICMR)** showed that the resistance level increases from **5% to 10% every year** for **broad-spectrum antimicrobials**.
- In 2019, AMR was associated with an **estimated 4.95 million human deaths**.

India and the Muscat Conference

- Over 30 countries adopted **Muscat Ministerial Manifesto on AMR** at recently held 3rd Global High-Level Ministerial Conference on AMR in Muscat, Oman.
- It also recognised the **need to address** the impact of AMR not only on **humans** but also on animals, and in areas of environmental health, food security and economic growth and development.
- **The conference focused on three health targets:**
 - Reduce the total amount of antimicrobials used in the **agri-food system** at least by **30-50% by 2030**.
 - Eliminate use in **animals and food production** of antimicrobials that are medically important for human health.
 - To ensure that by **2030** at **least 60% of overall antibiotic consumption** in humans is from the WHO "Access" group of antibiotics.
- **Targets by Muscat Manifesto:**
- It encourages countries to prioritize their **national action plans** for AMR keeping **the One Health approach**.
 - The **One Health approach** requires all stakeholders to work together towards an integrated programme
 - **It linking challenges** of humans, terrestrial and aquatic animals, plant health, food and feed production and the environment.
 - This approach will enable the world to effectively prevent, predict and detect **the health crisis** induced by AMR.
- Tackling AMR requires constant monitoring of **antibiotic consumption**, identifying the types and quantities of antibiotics being used.

- There is an urgent need to **reduce** the usage of antimicrobials in the agri-food system.

Government Initiatives for AMR

- **National Action Plan on Antimicrobial Resistance (2017-21)** emphasized the effectiveness of the government's initiatives for hand hygiene and sanitation programs such as Swachh Bharat Abhiyan, Kayakalp, and Swachh Swasth Sarvatra.
 - The government has also attempted to raise **community awareness** about healthier and better food production practices, particularly in the animal food industry.
- **National Health Policy, 2017:** It included **specific guidelines for the use of antibiotics**, such as limiting the use of antibiotics as over-the-counter medications and prohibiting or restricting the use of antibiotics for livestock growth promotion.
- **Red Line campaign** in India requires prescription-only antibiotics to be marked with a red line to discourage the over-the-counter sale of antibiotics.
- **Food Safety and Standards Authority of India (FSSAI)** has established guidelines for limiting antibiotics in food products such as fish and honey.

Global Initiatives for AMR

- **Global Action Plan on Antimicrobial Resistance (GAP):**
 - During the 2015 World Health Assembly, countries committed to the framework outlined in the Global Action Plan 1 (GAP) on AMR, as well as the development and implementation of multisectoral national action plans.
- **Tripartite Joint Secretariat on Antimicrobial Resistance:**
 - A tripartite joint secretariat (FAO, OIE, and WHO) has been established and is hosted by WHO to drive multi-stakeholder engagement in AMR.
 - **World Antimicrobial Awareness Week (WAAW):**
 - It was previously called the World Antibiotic Awareness Week. From 2020, it will be known as World Antimicrobial Awareness Week. It is a global campaign aimed at raising global awareness of antimicrobial resistance.
 - **Global Antimicrobial Resistance and Use Surveillance System (GLASS):**
 - WHO launched it in 2015 to continue filling knowledge gaps and informing strategies at all levels.
 - GLASS was designed to gradually incorporate data from surveillance of AMR in humans, surveillance of the use of antimicrobial medicines, AMR in the food chain, and AMR in the environment.
 - **Global Antibiotic Research and Development Partnership (GARDP):**
 - It a joint initiative of WHO and the Drugs for Neglected Diseases Initiative (DNDi), promotes

research and development through public-private partnerships.

- By 2025, the partnership hopes to have developed and delivered five new treatments that target drug-resistant bacteria identified by WHO as the greatest threat.

- **Global Research and Development Priority Setting for AMR:**

- WHO developed the priority pathogens list in 2017 to guide research and development of new antimicrobials, diagnostics, and vaccines.
- WHO reviews the pre-clinical and clinical antibacterial pipelines on an annual basis to see how the pipeline is progressing in relation to the WHO priority pathogens list.

Looking ahead

- The rapidly rising AMR rates need an accelerated, **multi-sectoral, global and national response**.
- **G-20 health summits** offers an opportunity for India to ensure that all aspects of AMR are addressed and countries commit to progress.
- Some key areas for action are:
 - Surveillance of **priority pathogens** and **sharing of data**, including through WHO's GLASS platform.
 - **Regulatory and policy action** to stop use of antibiotics that are important for human health in animals.
 - **No use of antibiotics** for growth promotion in animals.
 - More government investment in **research and innovation** for new antibiotics.
 - Explore **use of vaccines** to prevent certain infections due to AMR organisms in humans and animals.
 - Special focus on **combating TB and drug-resistant TB**.
- Tackling AMR requires constant monitoring of **antibiotic consumption**, identifying the types and quantities of antibiotics being used.
- There is an urgent need to **reduce** the usage of antimicrobials in the agri-food system.
 - Scientific evidence suggests that the less antimicrobials are used, it is less likely that there will be an emergence of drug resistance.
 - Countries such as the **Netherlands and Thailand** have decreased their usage by almost **50%**.
 - In China, the consumption of antibiotics in the agricultural sector has fallen substantially.

AMR is a serious global health threat and could not be overshadowed by other competing public health priorities. India needs to increasing surveillance and funding research on new antibiotics. It also intends to increase private sector participation and data reporting to the WHO Global Antimicrobial Resistance and Use Surveillance System (GLASS) and other standardized systems. The various G-20 health summits scheduled through 2023 provide an opportunity for India to ensure that all aspects of AMR are addressed and countries commit to progress.

INS Vagir A "Lethal Platform"

- The **Indian Navy** commissioned the **fifth diesel-electric Kalvari-class submarine Vagir**. It is among the **six submarines** being built by the **Mazagon Dock Shipbuilders Limited (MDL)**, Mumbai, in collaboration with the **French M/s Naval Group** under **Project 75**. Four of these submarines have already been commissioned into the Navy and a **sixth will be commissioned next year**.
- The **induction of Vagir** is another step towards the Indian Navy consolidating its position as a builder's Navy, as it also **reflects MDL's capabilities** as a premier ship and **submarine building yard**", the government said in a press release.

Specifications of Vagir

- The latest submarine gets its name from the **erstwhile Vagir**, a submarine which **served the Navy between 1973 and 2001** and undertook numerous operational missions. The **construction of the new Vagir began in 2009** and it took its maiden sea sortie in February last year. Also known as **Sand Shark**, the submarine was delivered to the Indian Navy in December 2022.
- According to a government press release, **Vagir represents stealth and fearlessness**, as it comes with features like an **advanced acoustic absorption technique**.
- **Vagir will boost the Indian Navy's capability** to further **India's maritime interests** and is capable of **undertaking diverse missions** including **anti-surface warfare, anti-submarine warfare, intelligence gathering, mine laying and surveillance missions**, the government release said.

5TH OF INDIA'S 6 DEADLIEST SUBS DELIVERED
VAGIR TO BE 18TH OF NAVY'S IN-SERVICE FLEET

The fifth of six Scorpene-class submarines, Vagir, was delivered to the Navy by Mazagon Dock Shipbuilders Limited (MDL) on Tuesday and will soon be commissioned. The sixth sub is under sea trials and is expected to be delivered within a year. With advanced stealth features, this class of subs is a major boost to India's naval might. But how strong is the Navy's submarine fleet and how does it compare with regional rivals? **V Navagan reports**

SUBS AT NAVY'S SERVICE

The class features silent propulsion and additional air-independent propulsion. Built under Project 75*

Sub	Commissioning
Kalvari	Dec 2017
Khanjar	Sept 2019
Karanj	Dec 2020
Vela	Dec 2021
Vagir	Dec 2022
Vishakh	2023**

*The name of the Navy's 200th warship will be Vagir. **Expected

INDIA'S SUBMARINES

In service: **17**
Commissioning soon: **1**
Undergoing sea trials: **1**
Decommissioned: **6**

HOW FLEETS COMPARE
Comparison of naval submarine fleets in India's neighbourhood:

China: 60	India: 17	Pak: 8
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The numbers shown remain in question. Countries keep a lot of data on submarines secret, including information on the exact number of submarines they have.

Kalvari Class (Scorpene French Design)

4 subs in service
1 about to be commissioned
1 undergoing sea trials

Stealth factor | Scorpene-class submarines have advanced acoustic silencing techniques, low-radiated noise levels, hydro-dynamically optimised shape. They can launch attacks using precision-guided weapons including torpedoes and missiles.

Type | Attack submarine
Armaments | Torpedoes (air missile), anti-ship missiles

Length | **67.5 metres**

Sindhughosh Class (Russian Design)

7 subs in service, 3 decommissioned

• All class diesel-electric submarines. Were built under a contract between the erstwhile USSR's Rosvooruzhenie and the Ministry of Defence (India)

Type | Attack submarine

Armaments | Club-X missile, torpedoes, anti-submarine missiles, active-passive homing torpedoes

Length | **72.6m**

Shishumar Class (German Design) 4 subs in service

• These are diesel-electric submarines, developed by the German yard Howaldtswerke-Deutsche Werft (HDW). The first two were built by HDW at Kiel, Germany, and the rest at MDL Mumbai. The ships were commissioned between 1996 and 2004

Type | All-leaf submarine
Armaments | Torpedoes, so-called strap-on mines, Harpoon Block II missiles

Length | **64.4m**

Arhanth class (German Design) 2 In service

• The nuclear subs INS Arhanth and Arighat are a class of Indian nuclear-powered ballistic missile submarine, classified as "strategic strike nuclear submarine". Arhanth (launched in 2009, and after extensive sea trials, commissioned in 2015) was the first ballistic missile sub to have been built by a country other than one of the five permanent members of the UN Security Council

Type | Nuclear-powered ballistic missile submarine

Armaments | Torpedoes, cruise missiles, and mines

Length | **111m**

Kalvari-class background

- **Vagir** is a **Kalvari-class submarine**, which includes **other vessels**, such as the **INS Kalvari**, **INS Khanderi**, **INS Karanj**, **INS Vela** and **INS Vagsheer**. Of these, **Kalvari and Khanderi** were **commissioned in 2017 and 2019**, and **Vela and Karanj** were **inducted in 2021**. **Vagir** has now been commissioned and **Vagsheer was launched in 2022** and is expected to be inducted next year.
- The submarines in the **current Kalvari-class** take their names from erstwhile decommissioned classes of submarines named **Kalvari**, which included **Kalvari**, **Khanderi**, **Karanj** and **Vela** classes — comprising **Vela**, **Vagir**, **Vagshir**. The now-decommissioned **Kalvari and Vela classes were one of the earliest submarines** in the post-independence Indian Navy, which belonged to Soviet origin Foxtrot class of vessels.
- **In maritime parlance**, a **class of ships is a group of vessels** which have the same make, purpose and displacement. In the Navy and Coast Guard in India, the ships belonging to a **particular class are named in a specific manner**. Many times the names have the **same first letters, prefixes, and similar meanings** or the names belong to a particular type of word, for example, **names of cities, persons, mythological concepts, animals, rivers, mountains, weapons**, etc. The class is generally named after the first vessel in the category. In some cases, **a particular class of vessels** takes their names from an earlier class of vessels which are now decommissioned.
- Like **Kalvari** – which means **Tiger Shark**, **Vagir has been named after a Sand Fish**, a predatory marine species. **Khanderi has been named after an Island Fort** built by Chhatrapati Shivaji, which played a key role in his Navy. **Karanj has also been named after an Island** located South of Mumbai.

Technical details of INS Vagir

- The **design of the Kalvari-class of submarines** is based on the **Scorpene class of submarines** designed and developed by **French defence major Naval Group formerly DCNS** and the Spanish state-owned entity **Navantia**. This class of submarines has **Diesel Electric transmission systems** and these are primarily attack submarines or **'hunter-killer' types** which mean they are designed to target and sink adversary naval vessels.
- The **Kalavari class of submarines** has an estimated **endurance of approximately 50 days**. They also have the **capability of operating in a wide range of Naval combat** including **anti-warship** and **anti-submarine operations**, intelligence gathering and surveillance and naval mine laying. These submarines are around **220 feet long** and have a height of 40 feet. It can reach the **highest speeds of 11 knots (20 km/h)** when surfaced and **20 knots (37 km/h)** when submerged.
- The modern variants of the **Scorpene class of submarines** have what is called **Air Independent Propulsion (AIP)** which enables **non-nuclear submarines to operate for a long time without access to surface oxygen**. It also needs to be noted that the Defence Research and Development Organisation (DRDO) has an ongoing programme to build a **fuel cell-based AIP system** for Indian Naval Submarines.

- The **Kalvari classes of submarines** are capable of launching various types of **torpedoes and missiles** and are equipped with a range of surveillance and **intelligence-gathering mechanisms**.

Strategic importance

- India currently operates **one submarine in the nuclear-powered class of Chakra** and **two other nuclear-powered vessels in Arihant** in addition to submarines belonging to **three classes of Diesel Electric category — Kalvari, Shishumar and Sindhughosh**, some of which are ageing.
- The **nuclear-powered and diesel-electric submarines** have their designated roles in the **Carrier Battle Groups**, which are formations of ships and submarines with Aircraft Carriers in the lead role. As per the basic principles of submarine deployment and minimum requirement for India to create a strategic deterrence, there is a specific number of submarines of both types that India needs to have in active service.
- Currently, **India has less number of submarines** than what is required with some more of those from both types being at various stages of construction. Currently, **India has a less-than-ideal number of submarines**, with many new ones being at various stages of construction.
- In the **late 1990s**, around the time of the **Kargil war**, a three-decade plan took shape for **indigenous construction of submarines** which is known to have **two separate series of submarine building lines – codenamed Project 75 and Project 75I** — in collaboration with foreign entities. The Ministry of Defence is also known to have put in place a roadmap for indigenous design and subsequent construction of submarines which will further add numbers to the **Navy's arsenal**.

**Budget 2023-24: An infrastructure push for the people says CEO NITI Aayog
Param Iyer**

- Infrastructure is universally acknowledged as a **key driver of growth**.
- Since 2014, India's development story has been closely linked with a strong focus on physical, social and digital infrastructure.
- Budget 2023 gives a powerful thrust to these **three dimensions of infrastructure** development which, put together, accelerate inclusive growth.
 - Physical, social and digital infrastructure.
- Rs. 10 lakh crore (3.3 per cent of the GDP), an increase of **three times from 2019**, was allocated for infrastructure which indicates the government's focus on inclusive growth.

Outlay

- The Government of India's **capital expenditure as a percentage of GDP increased** from 1.7 per cent in 2014 to nearly 2.9 per cent in 2022-23.
- In Budget 2023-24, Rs 10 lakh crore (3.3 per cent of the GDP), an increase of three times from 2019, was allocated for infrastructure.
 - The **Ministry of Railways** received its **highest-ever allocation** of Rs 2.4 lakh crore, approximately nine times the allocation in 2013-14.
 - The **Ministry of Road Transport and Highways** saw a **36 per cent increase** in its budget to about Rs 2.7 lakh crore.
- The **direct capital investment** by the Centre has been further **supplemented** by a one-year **extension of the 50-year interest-free loan to state governments**.
 - It aims to encourage infrastructure investment and incentivise complementary policy actions, with a significantly increased outlay of Rs 1.3 lakh crore.

Significance of Investments in Physical Infrastructure

- The targeted infrastructure investments to various Ministries will help create **vital physical infrastructure, jobs** and spur **private investments**.
- It will improve **connectivity** that will accelerate the movement of passengers and freight and will also provide a **cushion** against global headwinds and prevailing **global slowdown**.
- The extension of interest-free loans to state governments will lead to **decentralized infrastructure development** in urban and peri-urban areas across regions.
 - For example, a 66 per cent increase in allocation to the **PM Awas Yojana** will not only provide housing but also create jobs in rural areas.
- Investment on infrastructure development is critical as **every rupee** spent on capital expenditure gives **95 as a multiplier**.
 - In contrast, the money given through revenue expenditure gets less than a rupee for every rupee spent.
- In the last eight years, one can witness the blurring of the digital divide that existed between urban and rural areas. The world has acknowledged India's phenomenal success in building **population-scale platforms** at startup speed.

Digital Infrastructure Development in India

- Digital transformation of India has been happening in two phases as follows:
- **First phase:** It started in 2015 led by the **JAM trinity**- Jan Dhan, Aadhaar and mobile linkages, and the Digital India programme. Few successful milestones in this phase of public digital infrastructure creation are as follows:
 - Low-cost accessibility (Aadhaar), the success of citizen-centric services such as the Unified Payments Interface (UPI), large-scale adoption and reach (**DigiLocker, MyGov**), and the vaccine journey (**CoWin**) etc.
 - This had benefited India's populace through increasing penetration of government schemes and **efficient financial inclusion**.
- **Second phase:** It is now being led by the development, application, and large-scale expansion of cutting-edge technologies such as 5G, Internet of Things (IoT), artificial intelligence (AI), quantum computing, mechatronics, robotics, and more.
 - For example, the **Digital India Bhashini portal** is a public digital platform hosting 260 open-source API-based AI models for machine translation, and text-to-speech conversion in 11 Indian languages and English.
 - AI thus has enormous potential as a tool for **breaking down language barriers** in a country like India, with its unparalleled **linguistic and cultural diversity**, providing internet access in native languages.
 - It also provides the benefits of **Natural Language Processing (NLP)** to MSMEs and individual innovators in the hinterlands. NLP is the ability of a computer program to understand human language as it is spoken and written.
- **New announcements:** The **Agriculture Accelerator Fund** was announced recently in the budget 2023-24.
 - It will enable the Indian agricultural ecosystem (startups, businesses, and farmers) to work collaboratively and find knowledge-based and farmer-centric solutions.
 - It will enormously benefit agricultural sector that employs nearly half the workforce of the Indian economy.

Investment in Social Infrastructure

- It includes education and skilling, public health and nutrition, drinking water, sanitation and other social services.
- **Budgetary announcements:** The total expenditure of the central government in social infrastructure has increased by 134 per cent from Rs 9.1 lakh crore in 2016 to 21.3 lakh crore in 2023 (BE).
 - The budget also announced mission to **eliminate sickle cell anaemia** by raising awareness about the near-fatal disease and screening 7 crore people in age group of 0 and 40 yrs, immensely benefiting the affected tribal areas.
 - It will also lead to a **more productive and proficient workforce**, reduced mortality, wasting and stunting, increased social mobility and a higher quality of life.

- All these factors contribute to a stronger and more inclusive economy and holistic development.
- **Earlier efforts to boost social infrastructure:** The **Aspirational Districts Programme** spearheaded by NITI Aayog also gave attention to backward districts through data-driven governance, resulting in **consistent macro improvements in key socioeconomic indicators.**
- The emphasis on digital land records under the **SVAMITVA Scheme** of the Ministry of Panchayati Raj, a structural reform in rural land management has also led to individual economic empowerment.
- The **PM National Dialysis Programme** recorded a 232 per cent expansion in the Non-Communicable Diseases clinics and 320 per cent expansion in the districts under the programme between 2014 and 2022.

Conclusion

- The concerted thrust on **creation, maintenance and expansion** of physical, digital and social infrastructure has emerged as a systemic focus of India's unique development model.
- This **infrastructure triad** will be the **enabler of growth and leveller of opportunities** in the dream of a **"Viksit Bharat" by 2047** and people must be kept at the focal point of this infrastructure growth story.

Drone Technology the New Tractor?

- Transformative technological solutions are increasing in the agricultural sector, leading to the rise of over 1,300 start-ups aimed at addressing the untapped potential of the agri-tech. Up until 2021, India received investments of over \$1.6 billion in agri-tech, being the third highest globally.
- The use of drones in the agriculture sector has risen significantly, with several novel applications in aerial seeding, pesticide spraying and remote data collection for research. Future possibilities are limitless, where drones may even replace tractors one day!
- India's Drone Rules — regulations that authorise civilian use of the technology were only introduced in August 2021 and broadly categorise unmanned aircraft systems (UAS) based on a two-fold classification. Despite recognising autonomous UAS as a separate category, the Drone Rules do not provide any specifications or guidelines for such aircraft systems.
- India's agri-tech sector is increasingly leveraging this technology. In 2020, the Haryana government engaged pesticide-spraying drones to tackle locust attacks on crops. For this, an authorisation from the Ministry of Civil Aviation (MoCA) was sought by the Ministry of Agriculture and Farmers Welfare.
- Some other prominent applications are aerial seeding, chemical and pesticide spraying (which not only avoids human contact but also the multispectral sensors identify optimum locations for application, enabling a greater degree of precision), aerial imagery and data collection on aspects such as crop health assessment, monitoring of water resources, soil analysis, damage analysis, livestock tracking, among others.

Regulatory points

- Drone technology is a rapidly developing space and unsurprisingly, the regulatory environment is continuing to evolve and yet to take a concrete shape.
- Registration requirements are fairly strict. Unless specifically exempted, each drone is required to be mandatorily registered with a unique identification number on a Digital Sky Platform (DSP). Any subsequent transfer of ownership of a drone, or a change to the flight control module or remote pilot station is required to be updated on the DSP.
- Additionally, drone operators (other than small to medium-sized drones up to 2kg for non-commercial use) are required to hold a valid remote pilot certificate – which is non-transferable (even to employees of the same company with which such pilot is employed).
- Privacy is a major concern that looms over the trajectory of this sector since aerial vehicles come equipped with sophisticated sensors and cameras.
- Currently, the Drone Rules do not adequately address privacy concerns although, the Unmanned Aircraft Systems Rules 2021, which were in force briefly (until superseded by Drone Rules), imposed obligations on the drone operator to address privacy concerns.
- The import of drones in completely-built-up, semi-knocked-down and completely-knocked-down forms (with limited exceptions for government-use,

R&D and military purposes) has been banned by the government. That said, no such restrictions apply to import of drone components.

- Drone technology is being viewed as a green alternative to certain conventional agriculture resources.
- Businesses exploring drone technology could potentially attract investment from ESG-focused funds.

ESG Funds

- They are used synonymously with **sustainable and socially responsible investing**.
- While selecting a stock for investment, an ESG fund shortlists companies that **score high on environment, social responsibility, and corporate governance**, and then looks at financial factors.
- With the **overall increase in awareness, and with regulations moving in this direction**, investors are re-evaluating traditional approaches and considering the impact of their decisions on the planet.
- The key difference between the ESG funds and other funds is "**conscience**" i.e. the ESG fund focuses on companies with environment-friendly practices, ethical business practices and an employee-friendly record.
- The fund is regulated by **Securities and Exchange Board of India (SEBI)**.

Significance

- The companies will be forced to **improve governance and ethical practices**, and act with greater social and environmental responsibility.
- As the policy framework changes, companies that do not alter business models or become **more environmentally sustainable**, could have their revenue and profits impacted in the long term.
- Globally, many pension funds and sovereign wealth **funds do not invest in companies** that are seen as polluting or socially not responsible.

Reasons Behind ESG growth

- The **greater policy focus on aspects such as cleanliness, skill development, expanded healthcare coverage**, and education indicates potential public investment in these social development and environmentally sensitive sectors of the economy.
- There is **increasing awareness and understanding among younger investors** about the impact of business on social development and environment.
- The companies that are part of the ESG or NSE Prime will not only be on the right side of regulations and benefit from it in the long term, but will also have a better reputation and potentially command a premium on valuation in the long run.

Areas of concern

- Alongside the greater attention on **issues such as climate risk, emissions, supply chains, labour rights, anti-corruption**, etc., certain concerns have been flagged as well.
- **Greenwashing** is one of the top concerns among global institutional investors.

- **Greenwashing** is considered an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly.
- Investment experts have also pointed to the tendency of fund managers to overweigh certain stocks and companies in a situation where most large investment-friendly companies have fallen short of the qualitative and quantitative parameters used for ESG investing.

Slow progress to creating a safe workplace for women

- Sexual harassment is unwelcome **sexual behaviour** that's offensive, humiliating or intimidating.
 - It can be written, verbal or physical, and can happen in person or online.
- The recent case of **allegations of sexual harassment** that some of **India's sportswomen** (wrestling) are said to have faced have shocked the India.
- This shows that **any internal complaints** committee does not function or, **the wrestlers were not aware** about it.
- In view of the issue, **the Union Sports Minister** constituted an '**oversight committee**' headed by a lady Olympic medal holder to investigate the charges levelled against the president of the **Wrestling Federation of India**.

Challenges to creating safe working place for women

- Indirect women violence at workplace remains poorly addressed because it is **embedded deep in India's social and economic structures**.
 - With more men at the workplace, they feel empowered to take undue advantage of the historical fact that the society is still patriarchal and women are not only in a minority but also occupy a few of the higher positions.
- According to the **Periodic Labour Force Survey (PLFS) annual report** of 2020-21
 - it shows that though the **participation of women** in the total labour force grew.
 - i.e., **Labour Force Participation Rate (LFPR)** has **gradually increased** from **17.5% in 2017-18 to 25.1% in 2020-21**.
 - The Worker Population Ratio (WPR) from **16.5% in 2017-18 to 24.2% in 2020-21**
 - it is still much less when compared to **men**.

Suggestions for creating safe working place for women

To creating safe working place for women below **measures** can be used:

- **Stringent legislations:**
 - There should be **stricter enforcement of laws** and **regulations** related to women's safety in organizations.
 - Every company and factory that employs women should implement a **zero-tolerance policy** towards sexual harassment.
 - Even the laws that are implemented nationwide should be **executed without any discrimination**.
- **Greater awareness:**
 - **Increased awareness** among **male employers** and employees so that they are able to support their female co-workers instead of threatening them for sexual favours.
 - Women should also be made conscious of their **rights regarding sexual harassment** at the workplace.

- HR should ensure that the employees in the company are **well aware** of their **rights** and **duties**.
- **Self-defence training:**
 - Women should be imparted self-defence training so that they are **able to protect themselves** from **rape** and **harassment**.
 - **Self-defence programs** should be organized by various institutions, and more and more women should be a part of these programs.
- **A safe and healthy job climate:**
 - The **job environment** should be made **safe** and **healthy** for all the employees.
 - This will increase employee participation and productivity and reduce **employee absenteeism** and **turnover**.
 - Women will also be able to give their **careers a smooth ride** and will **not be forced** to leave their jobs.
- **Platform to express concerns:**
 - Every woman should be provided with a **platform to raise their concerns**.
 - Setting up an **Internal Complaints Committee (ICC)** to resolve sexual harassment issues in the organizations and implement policies relating to women's safety at the workplace.
 - ICC is a **mandatory committee** that every employer is required to constitute within his organization.
 - **Responsibilities of ICC:** Every company should have a safe and harassment-free workplace.
 - In the case of the complaint against POSH, the ICC is solely **responsible to investigate without being bias**.
 - **Social media** is emerging as a trusted platform where women can **voice their opinion** and share their stories and experiences.
 - But not every woman has **access to social media**, neither their workplace has an established committee for redressal.
- **Encourage vocational training among women:**
 - Every woman should be provided **vocational training**, and an entrepreneurial skill must be imbibed in them so that they become independent, and it will **reduce gender discrimination**.
- **Provide equipment for the safety of women:**
 - The company or organization should have a provision to come up with equipment such as **pepper spray** that will ensure safety for women employees.
 - In addition, all-time active **redressal committee** should be mandated in every organization to ensure safety for women.

Measures taken for to create safe working place for women by government

Protection of Women against Sexual Harassment at Workplace Act, 2013 (POSH Act)

- **Aims:** to address workplace sexual harassment of women

- This law has enabled Indian women to stand up for their **rights** and **assert** their autonomy in the **workplace**.
- It was passed by the Indian government **to protect against** sexual harassment and abuse of women in the workplace.
- This Act was created to ensure that workplaces remain free from **sexual harassment** and to provide a **safe and secure environment for women**.

Vishaka guidelines

- They were provided **by the Supreme Court** in Vishaka and others Vs State of Rajasthan judgement in 1997.
- The guidelines has three key obligations on institutions — **prohibition, prevention, redress**.

Sexual Harassment of Women at Workplace Act, 2013

- Vishaka Guidelines were superseded in 2013 by the Sexual Harassment of Women at Workplace Act.
- **Aims:** to provide protection against sexual harassment of women at **workplace** and for the **prevention** and **redressal** of complaints of sexual harassment and for matters connected therewith or incidental thereto.
- **Applicability:** for all sectors including **organised** and **unorganised** sectors.

National Commission for Women

- It is the **statutory body** of the Government of India and established under the **1990 National Commission for Women Act**.
- It has all the powers of a Civil Court
- **Aims:** Indian Woman should be **secure in her home** and outside with fully **empowerment** to access all her rights and entitlements and opportunity to contribute equally in all walks of life
- It is advising for government on all **policy matters affecting women**. It reviews **Constitutional** and **Legal safeguards** for women and recommend remedial legislative measures to Government.

MeToo movement

- It is a **social movement** against sexual abuse, sexual harassment, and rape culture, in which people publicize their experiences of **sexual abuse or sexual harassment**.
- **Purpose:** to **empower sexually assaulted people** through empathy, solidarity, and strength in numbers, by visibly demonstrating how many have experienced sexual assault and harassment, especially in the workplace.

Conclusion

In developing countries, both men and women are working in the same surroundings, at the same time, and coordinating well with each other. Women's safety at the workplace has become a matter of serious concern in the country. Most of the victims are found in informal sectors, who don't have any means to exercise their rights. Women from formal sectors are mostly educated and can raise their voices against men who tend to sexually assault them through social media and redressal laws. But women who are not educated normalize the daily torture from their male co-workers. India has a long way to go to protect every woman in the country from harassment at the workplace.

Let's rebuild India-US trade ties

- Recently, the US Air force shot down a balloon claiming it to be a **Chinese spying device**.
 - This incident has complicated an already strained **US-China relationship**.
- Several factors have tested their trade relationship in recent years, and these include **disagreements over trade imbalances, intellectual property theft, and technology transfer**.
- In this context, India should seize this opportunity to build better relations with US supply chain and logistics management.

Concerning points between US and China

- In 2018, the US **imposed tariffs** on Chinese imports **to reduce its trade deficit** with China and address concerns over intellectual property theft.
 - China responded with tariffs of its own, leading to the ongoing **trade dispute**.
- To reshape the **existing global supply** chains the **US has passed two crucial legislations**:
 - **The Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act** and **the Inflation Reduction Act**, with a budget outlay of **\$280 billion** and **\$370 billion**, respectively.
 - **The CHIPS Act aims**: “To build a domestic **semiconductor industry** and push forward America’s scientific supremacy over **China**”
 - **The Inflation Reduction Act aims**: “ To reducing **healthcare costs** and **encouraging clean and green energy transmission** in a big way”
- Currently, India is also following this path through schemes like **Production Linked Incentives (PLI)**.

Current India-US Bilateral trade relations

- *Even though India-US trade relations have strengthened post, many issues have stopped them from having a **full-fledged trade agreement**.*
- The US is the largest **import partner** of **India**.
- According to the data of **the commerce ministry**, in **2021-22**, the bilateral trade between the US and India stood at **USD 119.42 billion** as against **USD 80.51 billion** in 2020-21.
- Exports to the US increased to **USD 76.11 billion in 2021-22** from USD 51.62 billion in previous fiscal year, while imports rose to USD 43.31 billion as compared to about USD 29 billion in 2020-21.
- America is one of the few countries with which India has a **trade surplus**.
 - In 2021-22, India had a **trade surplus of USD 32.8 billion** with the US.
- While both nations are cautious about their current over-reliance on **Chinese imports**
 - They have divergent views on **agriculture, labour standards, climate, and human rights issues**.

- These are reflected in the current **Indo-Pacific Economic Framework for Prosperity (IPEF)**, which tries to build regional cooperation on trade, supply chains, clean energy, tax and anti-corruption.

Suggestions to improve India-US trade relations

As a first step, **both nations could work on the following:**

1. Reinstatement of India in the Generalised System of Preferences (GSP) The GSP was established by the US to provide preferential treatment to certain imports from **developing countries**.

- Under this programme, eligible products from developing countries, including India, were exempt from **tariffs when imported into the US**.
- This made Indian exports to the US more **competitive** and **helped increase trade between** the two countries
- India was the **largest beneficiary** of the GSP system.
- In 2018, **\$6.8 billion worth of exports from India** — nearly **10%** of the country's exports, that is benefited from **GSP rules**.
- In 2019, the US removed India from the **GSP programme**, citing concerns over trade practices and failure to provide equitable and reasonable market access to US companies.
- **Reinstating India** into the GSP programme will be a good way to **enhance bi-lateral ties**.

2. Start negotiating on services trade outside the framework of comprehensive free trade negotiations

- The US has been seeking greater access to the **Indian education and insurance markets**, while India has been pushing for **more labour access** in some US services.
 - More than the merchandise segment, there are **more complementarities** between India and US in the **services segment**.
- To negotiate services trade agreements within a comprehensive **free trade agreement (FTA)** framework, considering the complementarity that services trade provides for both nations, a standalone services agreement could provide **a quick opportunity** for both countries to seal a deal.
- There are several low-hanging fruits, such as **US investments in the state-of-the-art GIFT City** and taking forward India's fintech innovations like **UPI, RuPay, etc.**, to the US, which can all be win-win measures, with least conflict.

3. Start intellectual-level exchange of ideas on labour and environmental standards.

- **Labour and environmental standards** have been a significant point of contention.
 - While the US feels harmonising both the standards is essential for **protecting global welfare**, India's practical **inability restricts** it from starting a discussion on this topic.
 - India needs to understand that the **developed world** and **some developing countries** are moving in this direction.
 - A striking example is the **EU-Vietnam FTA** that has shown a lot of benefits accruing to both trade partners.

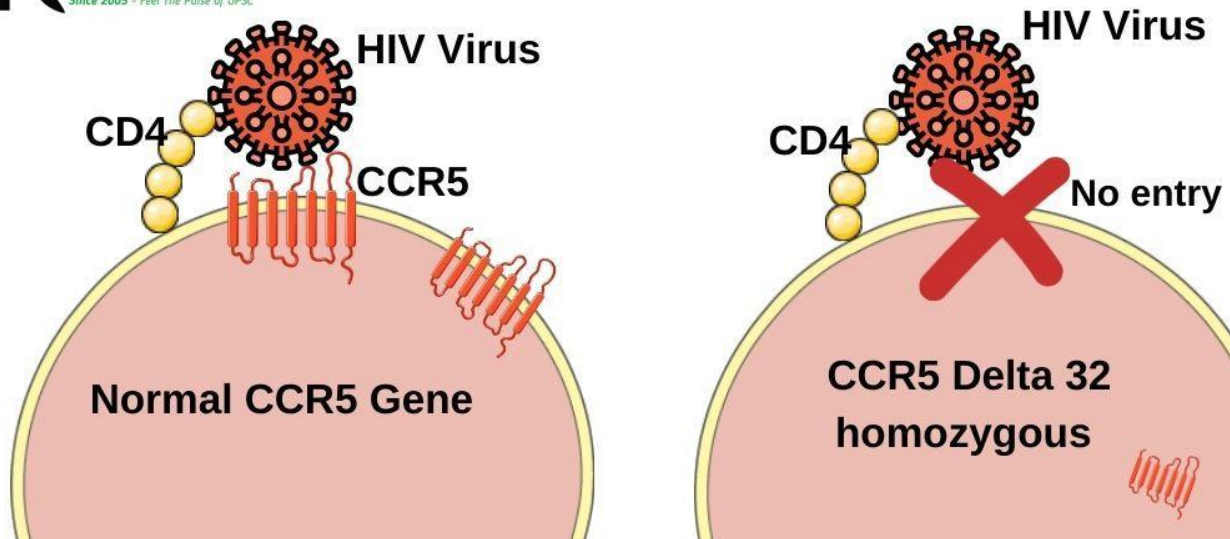
- In the context of **India's ongoing negotiations engaged** with the EU, the UK, Canada and Australia, standards are an important issue.
- The future of global trade will be divided among blocs, largely led by the **US and China**.
 - There is likely to be **free trade** within a bloc and limited trade across blocs.

The United States and India have a strong strategic partnership founded on shared values, commitment to a free and open Indo-Pacific region. Attempts by the US to re-establish supply chains with friendlier nations. India needs to reinstatement in the Generalised System of Preferences, start negotiating on services trade outside the framework of comprehensive free trade negotiations with US. India needs to understand that Labour and environmental standards have been a significant point of contention. India needs to start engaging experts and the research and academic community to brainstorm these standards with cross-country comparisons. Hence, showcasing quick results in negotiations becomes vital for both the US and India.

Climate change - a powerful force multiplier of geopolitical risk.

- Global warming impacting geo-politics is very much evident in the radically transformed Arctic region, which is warming four times faster than other parts of Earth. Arctic's ice meltdown and its geographical location is likely to transform global maritime commerce and also opens up possibilities of extraction of huge potential oil and gas and other mineral resources, and expanded fishing and tourism in the Arctic.
- The **big three—the United States, China and Russia**, and NATO, are jockeying for position and influence in the Arctic region, raising geopolitical stakes. In January 2018, China released a white paper on the Arctic, in which it called itself as a 'near-Arctic state'. China is also the only country apart from Russia that is building a nuclear ice-breaker. That same year, Russia and NATO conducted Exercise Vostok and Trident Juncture respectively, their largest since the Cold War. While the former witnessed participation by China, the latter comprised all 29 NATO members (at that time) plus Sweden and Finland and included the first deployment of a US Navy aircraft carrier above the Arctic Circle since 1991. Russia has substantially beefed up its military presence in the Arctic. On January 1, 2021, Russia's Murmansk-based Northern Fleet was upgraded to the status of a Military District. In the same year, its Umka exercise saw three of its SSBNs surfacing through Arctic ice for the first time. In 2021, Russia also released a strategy for the Arctic for the period up to 2035, stating its intentions to develop the region's abundant hydrocarbon and mineral resources, and establish the Northern Sea Route (NSR) as the preferred international shipping route.
- In October 2022, the US released the second edition of its Arctic Strategy which highlighted the vying for resources by countries due to increased accessibility caused by climate change-induced Arctic ice-melt. US maintains six military bases in the Arctic. In 2022, the US Army established the 11th Airborne Division in the Arctic, placing about 12,000 soldiers under a single command for Arctic military operations.
- The Russia-Ukraine conflict has seen the Arctic become an unintended victim of global geopolitics. In protest against Russia's actions, on March 3, 2022, seven (A7) of eight members of the Arctic Council, announced a historic suspension of participation in all activities of the Council. The suspension of dialogue and scientific engagement in the Arctic is a serious setback to global efforts to mitigate climate change risks since the Arctic is a bellwether of climate change.
- Global geopolitics, has, therefore, spilled over to the Arctic region which has become a new arena of strategic contestation and there is an increased risk of conflict due to unintended consequences of confrontation.

CCR5 Delta 32 mutation



Recently, the man referred to as the "Dusseldorf patient" became at least the third person to have been "cured of HIV" after a bone marrow transplant carrying a specific HIV-resistant mutation.

CCR5 Delta 32

- Cysteine-cysteine chemokine receptor 5 (CCR5) is a **protein** on the surface of **white blood cells** that are involved in the immune system as it acts as a receptor for chemokines.
- CCR5 is found in the **cell membranes of many types of mammalian cells**, including nerve cells and white blood cells.
- In humans, the CCR5 gene that encodes the CCR5 protein is located on the short (p) arm at position 21 on chromosome 3.
- **Role of CCR5:** The role of CCR5 is **to allow entry of chemokines** into the cell—chemokines are involved in signalling the body's inflammation response to injuries.

How does the mutation work in HIV patients?

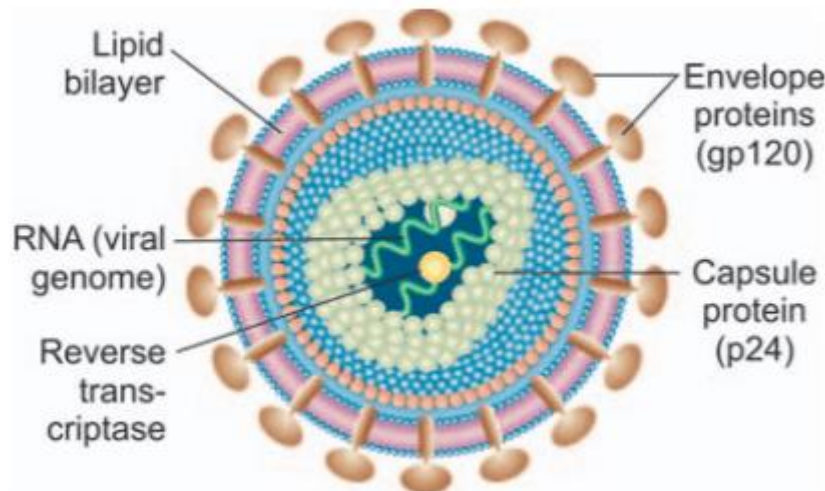
- Various mutations of the CCR5 gene are known that result in damage to the expressed receptor.
- One of the mutant forms of the gene is CCR5-delta 32, which results from the deletion of a particular sequence of 32 base pairs.
- HIV (Human Immunodeficiency Virus) mainly attacks the **CD4 immune cells** in the human body, thereby reducing a person's ability to fight off secondary infections.
- The CCR5 receptors on the surface of the CD4 immune cells act as a doorway for HIV. However, the CCR5-delta 32 mutation prevents these receptors used by the HIV from forming on the surface, effectively removing the doorway.

Challenges in transplanting these receptors in HIV Patients

- **Heavy load of HIV Patients** - Mutation exist in very few people and nearly 38.4 million people living with HIV across the world.
- It is very difficult to find a matching donor.
- **Restricted donor pool** - The mutation occurs mainly among Caucasians, and restricted the donor pool further.
- **High risk** - Bone marrow Transplant involves high risks, especially that of the person rejecting the donated marrow.
- There is also the likelihood of the virus mutating to enter the cells through other mechanisms in such persons.

Human Immunodeficiency Virus (HIV)

- **Type** - HIV is a lentivirus, which is a sub-classification of the retrovirus.
- **AIDS** - It causes the HIV infection which over time leads to Acquired Immunodeficiency Syndrome (AIDS).
- AIDS is a deadly condition in which the affected person's immune system fails, leading to the spread of life-threatening infections and cancers in his body.
- HIV demolishes a particular type of WBC (White Blood Cells) and the T-helper cells.
- **Transmission** - HIV infection can occur by the transference of blood, breast milk, vaginal fluid, semen, or pre-ejaculate.



-
- The cylindrical nucleoid in the mature virion is the special morphologic characteristic of HIV. In electron micrographs, the diagnostic bar-shaped nucleoid can be observed. It shows the hallmark exotic flower appearance under the electron microscope.
- In 1984, Dr. Rober C. Gallo discovered HIV.
- Human immunodeficiency virus (HIV) is a complex RNA virus of the genus Lentivirus within the Retroviridae family.
- The shape is of the virus is spherical.
- The virus is composed of a capsid core which contains the genetic material that has been surrounded by a protein envelope.

- The protein envelope has many spikes of the glycoprotein. The outer part of glycoprotein called gp120 is attached to the gp41 which is the inner part of the glycoprotein.
- The envelope of HIV also contains other proteins including some HLA antigens (Human Leucocyte Antigen).
- The genome of HIV contains two helices of RNA molecules in folded form. The enzymes reverse transcriptase is present which is responsible for the conversion of the RNA to form the DNA.
- There is another enzyme called as integrase which helps the viral genome to incorporate in the host cell.

Current treatments for HIV

- Although there are no cures for the infection at present, the disease can be managed using antiretroviral therapy.
- **Anti-Retroviral Therapy** - These medicines suppress the replication of the virus within the body, allowing the number of CD4 immune cells to bounce back.
- The drugs have to be taken for life because the virus continues to persist in reservoirs across the body.
- If the drugs are stopped, the virus can again start replicating and spreading.
- When the viral levels are low, the likelihood of a person transmitting the infection is also low.
- **PrEP (pre-exposure prophylaxis)**- Although there is no vaccine for HIV, there are *Pre-exposure prophylaxis* (or PrEP) medicines that can be taken by people at high risk of contracting the infection. PrEP reduces the risk of getting HIV from sex by about 99%.

NLSIU's domicile reservation policy

- The **National Law School of India University (NLSIU)**, Bengaluru has recently **come under fire from the Karnataka government**, advocate association members and Pro Kannada outfits for its controversial "**domicile reservation policy**."
- In **2021**, NLSIU had voluntarily adopted the "**Inclusion and Expansion Plan 2021-2025**." In it, the institution planned to **increase the total student intake** for both undergraduate and postgraduate law programmes every year and **also reserve 25 per cent seats horizontally (compartmentalized)** for Karnataka students. This came after the **Karnataka High Court struck down the National Law School Amendment Act** that aimed to horizontally reserve 25 per cent seats for students of Karnataka, in 2020.
- However, on 29 December 2022, the **law minister of Karnataka, JC Madhuswamy** wrote a letter to the university's vice chancellor alleging that the institution clubbed the Karnataka students who otherwise **were eligible for admissions through All India Rank based on general merit** with the **domicile category**. According to the minister, this disadvantaged those Karnataka students who did not make it to the General Merit List.

What is horizontal and vertical reservation and how does NLSIU apply it?

- **Reservation for Scheduled Castes, Scheduled Tribes, and Other Backward Classes** is referred to as **vertical reservation**. **Horizontal reservation** refers to **opportunity provided to other categories of beneficiaries** such as **women, veterans, the transgender community, domicile and individuals with disabilities**, cutting through the vertical categories.
- NLSIU claims that **'Karnataka Students'** are admitted to **25 per cent of seats** in every vertical category, including **General/ SC/ ST/ OBC/ EWS** and as a result, constitute at least 25 per cent of the overall student body. The institution also claims that **the consortium of National Law Universities (NLUs)** administers State horizontal reservations in 21 NLUs based on the merit rank list and that NLSIU follows an identical procedure.

Why was domicile reservation introduced?

- In **2020**, the **Karnataka government notified the National Law School of India Amendment Act**. This mandates that NLSIU shall **horizontally reserve 25 per cent seats for Karnataka domicile students** – any student who has studied in any one of the recognized educational institutions in the state for a period of **not less than 10 years** preceding the qualifying examination. The amendment was made to encourage more graduates from NLSIU to join the Bar in Karnataka.
- However, in **2020**, the **Karnataka High Court struck down this amendment act** stating that the **state legislature has no power or authority under the Act to direct the Law School** to provide reservations for students. The court also held that the **law school is an autonomous entity** and any form of reservation for students to be admitted to it shall be provided by the **Executive Council of the Law School** bearing in mind the fact that it is an institution of national importance.

- However, **despite the Act being struck down**, NLSIU voluntarily adopted the **'Inclusion and Expansion Plan 2021-25.'** This aimed to increase annual student intake, include **multidisciplinary approaches** in curricula, introduce new reservation categories including the **25 per cent domicile reservation** for Karnataka students.

Why is the state government and advocates' association of Bengaluru opposing NLSIU's domicile reservation implementation?

- Karnataka Law Minister JC Madhuswamy and the Advocates' Association of Bengaluru argue that the **"institution has deceptively merged students who qualify under the All India Quota"** and those who gain admission under the domicile reservation category, thus restricting the percentage of students from Karnataka who may gain admission into NLSIU to a maximum of 25 per cent.
- For instance, **the provisional list for CLAT 2023** released showed that a **total of 60 students from Karnataka gained admission through horizontal** (compartmentalized) reservation cutting across vertical categories. However, out of the 60 candidates, 19 candidates were also eligible for admission through the All India Rank category. However, they were given seats reserved for domicile candidates instead.
- To this, the Advocates' Association expressed its opposition, claiming **"this means that 19 students from Karnataka who deserved admission lost out** due to the candidates who were otherwise eligible on general merit basis."
- **What is the Advocates' Association demanding?**
- **Advocates' association** and **certain pro Kannada outfits** are demanding that any student who is otherwise eligible **to claim domicile reservation** but qualifies for admission through the All India Rank, should be admitted under the **latter category**. The Karnataka domicile seats should only be for those who do not obtain a seat through their All India Rank.
- They have also appealed to the **Chief Justice of India DY Chandrachud** to intervene in his capacity of the **'Chairman of the Executive Council of NLSIU'** to ensure that the domicile reservation policy followed by NLSIU is in sync with policies in other NLUs and to ensure that the **proportion of Karnataka students being admitted to NLSIU** is not **artificially restricted to 25 per cent**.

What next?

- While NLSIU has already initiated the admission process for 2023-24 academic year, **the state government has approached the Supreme Court of India** and has applied a **special leave petition**, challenging the High Court's decision that struck down the Amendment Act.
- Meanwhile NLSIU has projected that the number of Karnataka students admitted to law programmes at NLSIU **will increase to 135 in academic year 2024-25** and **500 in 2026-27**, with increases to overall student intake.

India's Research and Development (R&D) estimates are an incomplete picture

- India's **R&D expenditure-GDP ratio of 0.7%** is very low when compared to **major economies** and is much below the **world average of 1.8%**.
- The **main reason** is the low investment in R&D by the **corporate sector**.
 - While the corporate sector accounts for about **two-thirds of Gross Domestic Expenditure (GERD)** on R&D in leading economies, its share in India is **just 37%**.
 - There is evidence suggesting that India's **GERD data are an underestimate**.
- A 2022 info of the **National Science Foundation** of US on Foreign R&D by U.S.-based **multinational corporations** shows a spend of **\$9.5 billion (₹ 649.7 billion)** on R&D in India in 2018, which increased to **\$9.8 billion (₹ 690.2 billion)** in the following year.
- There are **MNCs from other leading countries** also spending on **R&D in India**.
 - **Department of Science and Technology** has published R&D Statistics in 2020 which provided an estimate of **₹ 60.9 billion R&D spending in 2017-18** by foreign MNCs, which is only about **10% of what U.S. firms** have reported to have spent in **India on R&D**.

Issues with the current system

- The **National Science and Technology Management Information System (NSTMIS)** of the DST is the agency that compiles GERD statistics in India.
- It is easier to gather the information on R&D by the **government sector, the higher education sector and public sector enterprises**.
- The **challenge** lies in **collecting data** from the **private corporate sector**.
- There are two key factors that make the **official R&D estimates grossly inadequate**.
 - The method used for identification of R&D performing firms does not **capture all the R&D performing firms**.
 - For this purpose, The **NSTIMS** relies on the **Department of Scientific and Industrial Research (DSIR)** list of recognised R&D units and the Prowess database of the **Centre for Monitoring Indian Economy Pvt. Ltd.**
- The DSIR list may not have many of the **actual R&D performers** for two **reasons**:
 - Firms which consider **government incentives as not attractive enough** or that are **sensitive about sharing critical information** with the DSIR **may not be inclined to register** themselves with the DSIR.
 - It may be difficult for R&D firms in services such as software and R&D **services** to **meet the requirement** of having **separate infrastructure for R&D** to distinguish it from their **usual business**.
 - Many of the R&D performing enterprises in new technology areas may come under the **services category**.

- The **Institute for Studies in Industrial Development** has performed a study that looked at **298 firms receiving foreign investment (2004-16)** for R&D purposes, found that only **11% had been registered with DSIR**.
- The **Prowess database covers only 3.5%** of the currently active registered enterprises in India.
- A quick search in both the DSIR directory of recognised R&D units (2021) and Prowess shows that some of the leading **Indian enterprises in new technology areas** and **foreign R&D centres are not covered**.
 - For example, **SigTuple Technologies**, which is a leading start-up in India focusing on artificial intelligence-based HealthTech and **has filed 19 patents** as in 2021, is **unlisted in both databases**.
- Recently, **two survey conducted** by the NSTMIS is the **key source of R&D statistics of India**.
 - For those firms which do not respond to the survey, the data is collected from **secondary sources** such as **annual reports and Prowess**.
 - This method will work only **if firms disclose their R&D spending**.
 - A review of the documents submitted to the **Ministry of Corporate Affairs (MCA)** by some R&D-oriented firms shows that there are firms **which do not report any spending on R&D** in spite of their declarations that suggest that **they are engaged in activities of technology development, adoption and adaptation**.
 - Some of the firms which do not report spending on R&D do have **patents granted in India**, or their personnel are mentioned as **innovators in patents granted by the U.S. Patent and Trademark Office**.
 - They may not feel the compulsion of **disclosing accurate data** to the **Indian regulatory authorities**.

Suggestion to improve in current system

- Transforming India's R&D statistics to truly reflect the **R&D ecosystem calls for short-term and medium-term measures**.
 - In the **short term**, the **NSTMIS** should use **the patents granted data**, both in **India and the U.S.**, in addition to its **current method** to identify R&D performing enterprises.
- While surveys can collect much more information related to **innovation activities**, R&D statistics should **not be confined** to the responses to the surveys.
 - Instead, **annual R&D estimates** can be prepared from **mandatory disclosures** that the enterprises are required to make to the **MCA**.
- In order to **ensure compliance and proper reporting**, technologies can be used like in the case of **revamped income-tax return** forms where **various sections are interlinked**.
- **Proper disclosure** of information to **regulatory agencies**, including **R&D spending data**, should be made an **essential component** of the environmental, **social and governance (ESG)** ranking of enterprises.

R&D is a critical component in strengthening the productivity and economic growth of a nation. The Centre needs to cover the current deficit in R&D and cater to the present and future needs by committing to raise the spending on R&D to 1 per cent of the GDP.

To increase India's R&D statistics the NSTMIS should use the patents granted data. To create proper report and ensure compliance of R&D technologies can be used in which information is interlinked. Government should encourage people and investors to invest in R&D because it will help government and private sector in retaining this talent in the country.

Cyberattacks are rising, but there is an ideal patch

- **Cyberattack** is a malicious and deliberate attempt by an **individual** or **organization** to breach the information system of another individual or organization.
- The recent hacking events have exposed **India's weak cyber security infrastructure**.
- The first was the ransomware attack on the servers of India's premium institute, the **All India Institute of Medical Sciences (AIIMS)**.
 - Nearly **40 million health records** were compromised.
 - it took over **two weeks** for the systems to be brought online.
- Soon afterwards a ransomware gang name "**Blackcat**" has breached the parent company of **Solar Industries Limited, one of the Ministry of Defence's ammunition and explosives manufacturers**.
 - It has extracted over **2 Terabyte of data**.

Issues in current digital network which increasing Growing vulnerability

- **Ransomwares** have emerged as the most predominant of **malicious cyberattacks**.
- The perpetrators demand **hefty payments** for the release of **withheld data**.
- Data show that over **75% of Indian organisations have faced such attacks**, with each breach costing an average of **₹ 35 crore of damage**.
- There are **many other malwares** that could infect all kinds of **computer systems**.
- With the lines between the **physical and digital realms blurring rapidly**, every critical infrastructure, from transportation, power and banking systems, would become extremely vulnerable to the assaults from hostile state and non-state actors.
- **Cyber capabilities** are also playing a **pivotal role**.
 - As seen in the ongoing conflict in **Ukraine**, where electronic systems in warheads, radars and communication devices have reportedly been rendered ineffective using **hacking and GPS jamming**.
- With the introduction of **5G** and the arrival of **quantum computing**, the potency of malicious software, and avenues for **digital security breaches** would only **increase**.
 - **India's cybersecurity strategy** would do well not to overlook these actualities and trends.
- Most of the organisations are in the **private sector**, and their participation remains **limited in India's cybersecurity structures**.

Steps taken by Government for Cyberattacks

- In 2022, the **Indian Computer Emergency Response Team (CERT-In)**, which is India's cybersecurity agency, **introduced a set of guidelines** for organisations to comply with when connected to the **digital realm**.
 - This included the **mandatory obligation to report cyberattack incidents** within hours of **identifying them**, and designating a points person with domain knowledge to interact with CERT-In.

- **India's draft Digital Personal Protection Bill 2022** proposes a penalty of up to **₹ 500 crores** for data breaches.
- India's armed forces created a **Defence Cyber Agency (DCA)**, capable of **offensive** and **defensive** manoeuvres.
- All Indian States have their **own cyber command** and **control centres**.

Global efforts to fight against cyberattacks

- **India** has already **signed cybersecurity treaties**, where the countries include the United States, Russia, the United Kingdom, South Korea and the European Union.
- Even in **multinational frameworks** such as the **Quad** and the **I2U2 Group** there are efforts to enhance cooperation in **cyber incident** responses, technology collaboration, capacity building, and in the improvement of cyber resilience.
 - Yet, there is no truly **global framework**, with many operating in silos.
- Previous years have seen the **United Nations General Assembly** establish two processes on the issues of security in the **information and communication technologies (ICT)** environment.
 - **Open-ended Working Group (OEWG)**, comprising the **entire UN membership**, established through a resolution by **Russia**.
 - U.S., on the continuation of the **Group of Governmental Experts (GGE)**, comprising **25 countries** from all the major regions.

Global challenges to fight against cybercrimes

- With most cyberattacks originating from beyond borders, **international cooperation** would be critical to keep **digital space secure**.
- In 2023, cybercrimes are expected to cause damage worth an estimated **\$8 trillion worldwide**.
- There is absence of truly **global framework to fight against global cybercrimes**, with many operating in silos.
- The two **antagonistic** permanent members of the **UN Security Council**, counted among India's most important **strategic partners**, differ vastly on many aspects of the Internet, including openness, restrictions on data flow, and digital sovereignty.
- Based on adoption, member-states have found the two resolutions to be **complementary**, and **not mutually exclusive**.
 - Amidst the turbulent current world events, these **UN groups would** struggle to have effective dialogues.

Suggestions to fight against global cybercrimes

- The G-20 summit this year in India, which will see participation by all the **stakeholders driving the global levers of power**, is a rare opportunity to bring together domestic and international engagement groups across the spectrum, and steer the direction of these consultations.
- India could make an effort to conceptualise a **global framework of common minimum acceptance for cybersecurity**.
 - This would be one of the most **significant contributions** made by any nation towards collective security in **modern times**.

- Private companies in India should look at the **Digital Geneva Convention**, where over **30 global companies** have signed a declaration to **protect users** and customers from **cyber breaches**, and collaborate with like-minded **intergovernmental and state frameworks**.

By G-20 president ship, India has opportunities to create global cyber security framework and comprehensive domestic for cybersecurity. India needs to secure its computing environment and IoT with current tools, patches, updates and best known methods in a timely manner. Indian government should defend cyberattack by develop by core skills in cyber security, data integrity and data security fields while also setting stringent cyber security standards to protect banks and financial institutions.

India's lithium discovery significance and risks.

- The **Geological Survey of India's discovery of "5.9 million tonnes inferred lithium resources" in the Salal-Haimana area of Reasi district, Jammu & Kashmir**, has been hailed as a game-changer in India's impending transition to a green economy.
- According to the Mines and Minerals (Development and Exploration) Act 1957, the term "inferred" refers to the "preliminary exploration stage," the second of four steps in the process.
- The discovery has significant strategic implications, but if the local population is not meaningfully engaged, the resulting tension **could spark new socio-environmental conflicts**.

Lithium

- **Lithium (Li), also known as "White gold"** due to its high demand for rechargeable batteries, is a soft, silvery-white metal.
- Depending on the deposit, lithium can be extracted in a variety of ways, including solar evaporation of large brine pools or hard-rock extraction of the ore.
- **Uses:** Lithium is an important component of electrochemical cells used in EV, laptop, and mobile batteries. It is also used in thermonuclear reactions. It is used to make alloys with aluminum and magnesium, increasing their strength and making them lighter.

Lithium Reserves in India

- A preliminary survey revealed estimated lithium reserves of 14,100 tonnes in a small patch of land surveyed in Southern Karnataka's Mandya district.
- Mica belts in Rajasthan, Bihar, and Andhra Pradesh.
- Pegmatite belts in Odisha and Chhattisgarh.
- Gujarat's Rann of Kutch.

Significance

- Lithium-ion batteries are used in wind turbines, solar panels, and electric vehicles, all of which are essential in a green economy.
- The demand for critical metals such as lithium (Li) and cobalt is expected to rise by nearly 500% by 2050.
- While the global electric vehicle market is expected to reach \$823.75 billion by 2030, with a compound annual growth rate (CAGR) of 18.2% from 2021 to 2030, India's market is expected to grow at a CAGR of 23.76% by 2028.
- India is attempting to secure critical mineral supplies and achieve self-sufficiency in this sector.
- India currently imports all of its Li from Australia and Argentina, and 70% of its Li-ion cell requirement from China and Hong Kong, the lithium reserves in J&K could help the domestic battery manufacturing industry.
- If further exploration confirms the perceived size of mineral reserves in J&K, India could leapfrog China in terms of its Li stockpile.

- The J&K reserves will also contribute to the Indian government's ambitious plan of "30% EV penetration in private cars, 70% for commercial vehicles, and 80% for two and three-wheelers by 2030 for the automobile industry."
- They will also help to strengthen India's National Mission on Transformative Mobility and Battery Storage.

Geostrategic concerns

- In the transition to net-zero carbon energy systems, critical mineral dependencies are a major geostrategic concern.
- As countries seek to avoid dependency and vulnerabilities related to critical minerals, the latter are likely to be at least as important as oil and gas in the near future.
- A high reliance on China for Lithium and other critical metals and their derivatives is also seen as a source of energy security risks.
- China currently controls 77% of global lithium-ion battery manufacturing capacity and is home to six of the world's ten manufacturing companies.
- As a result, the European Union, the United States, Canada, India, and other major economies have been attempting to leverage alternative supplies that can challenge China's geopolitical dominance in this area.
 - For example, in response to perceived national security concerns, the Canadian government has asked Chinese companies to divest from Canadian lithium-mining companies.

Geopolitical Rivalry with China

- The growing geopolitical rivalry with China makes India's security concerns more pressing, especially in light of long-standing, and recently escalating, territorial and border disputes.
- To reduce reliance on China, the Indian government and industry are pushing for a "**Rare Earths Mission**" to exploit the country's critical mineral reserves, which previously accounted for 6% of the world's rare-earth reserves prior to the discovery of Lithium in J&K.
- Given the geopolitical sensitivity of its wider location, the new discovery has greater geostrategic implications.
- Although Reasi is in the relatively more stable Jammu region, the Union territory of J&K has historically been the site of cross-border tensions between India and Pakistan, domestic insurgency, and terrorism.
- If the local population is not actively involved in the upcoming Li extraction project, the resulting tension could open up new avenues of socio-environmental conflict.

Environmental Effect of Lithium Mining

- The use of Lithium in renewable energy infrastructure frequently obscures its significant environmental consequences.
- Extraction of Lithium from hard rock mines, as proposed in J&K, entails open-pit mining followed by roasting the ore with fossil fuels. According to industry estimates, this process uses 170 cubic meters of water and emits 15 tonnes of CO₂ per tonne of Li extracted.

- Open-pit mining, refining, and waste disposal from these processes significantly degrade the environment, including depleting and contaminating waterways and groundwater, reducing biodiversity, and emitting significant air pollution.

Mining in India different from Australia

- The geological context of mining in J&K differs significantly from that of Australia, which has the largest Lithium stock in hard rock mines.
- Li-bearing pegmatite deposits can be found in Australia's ancient geological regions of the Pilbara and Yilgarn cratons, where continental rocks have been stable for over a billion years.
- The Himalaya, on the other hand, is the world's youngest mountain range and is far more unstable (as evidenced by the ongoing tragedy in Joshimath).
- Land sinking incidents have also been reported from a village in Doda district in Chenab valley, which extends into some parts of Reasi.
- The socio-environmental effects of mining in India's densely populated context are likely to be far worse than in Australia, and likely comparable to lithium extraction in South America.

The 'Lithium Triangle'

- India could learn from the experiences of South American countries, particularly the "**lithium triangle**" of **Bolivia, Chile, and Argentina**, which contains roughly half of the world's known Li.
- In Bolivia and Chile, Li extraction is either controlled by the state or requires mining companies to enter into a contract with state-owned companies.