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Contents

INTERNATIONAL RELATIONS

1. Indo-Pacific Economic Framework for Prosperity

Introduction

- In 2022, United States President Joe Biden launched a new Asia-Pacific trade initiative known as the Indo-Pacific Economic Framework for Prosperity (IPEF) in Tokyo.
- The framework includes 14 countries — **Australia, Brunei, India, Indonesia, Japan, the Republic of Korea, Malaysia, New Zealand, the Philippines, Singapore, Thailand, Vietnam, Fiji and the United States**.
- Together, the participants account for about 40 percent of global GDP and there are other countries that could join the initiative.

What would IPEF do?

- IPEF is **neither an agreement nor a trade bloc, but a framework.**
- It seeks to **strengthen economic partnership among participating countries** with the objective of enhancing resilience, sustainability, inclusiveness, economic growth, fairness and competitiveness in the region.
- IPEF foresees **integrating partners through agreed standards in four key pillars: fair and resilient trade, supply chain resiliency, clean energy decarbonisation, and tax and anti-corruption -** to deepen economic engagement in the region.
- The primary objective of the IPEF is to **ensure a high degree of regulatory coherence** and to make market access contingent upon realisation of regulatory standards.

Significance

- The IPEF is part of the U.S.'s more than a decade old **"Pivot to Asia" programme,** re-imagining the Indo-Pacific as a geographic construct including America.
- The **Quad**, consisting **India, Australia, Japan and the U.S.,** is part of the same pitch made by the U.S. administration.
- IPEF is intended to offer US allies an alternative to China's growing commercial presence across the Asia-Pacific.
- The IPEF's **non-specific and flexible nature** also suits India, which has held strong views on a range of issues like labour standards, environmental restrictions on fossil fuels, and data localisation.
- India's inclusion also comes from a **geopolitical need to counter China's virtual control over Asian trade**.

India's Engagement

- India has chosen to **stay out of the Trade Policy Pillar** - which deals with issues pertaining to labour, environment, digital, and agriculture - at the IPEF.
- IPEF has **four pillars — trade, supply chain, tax and anti corruption and clean energy.** The forum gives flexibility to the 14 member countries to choose which pillar/s they want to be part of.
- While India has not joined the trade pillar, it is **engaging in three other areas**. India's concerns are regarding issues like linking environment and labour to trade and having binding commitments about the same.

How does IPEF benefit India?

- The IPEF grouping would provide various benefits to India, including a **potential shift of production centres** in critical sectors and **mitigating risks of economic disruptions from supply chain shocks**.
- The other benefits include
    - **supply chain diversification,**
    - **mobilisation of investments,**
    - **deeper integration of India in global value chains,**
    - **support to MSMEs and**
    - **creation of a seamless regional trade ecosystem**, which would facilitate the flow of Indian products.
- The agreement would help India to **reduce its dependence on China**.

2. Abraham Accords and India

Introduction

- The Abraham Accords, which refers to the collective agreement between the **United States (US), the United Arab Emirates (UAE) and Israel,** was signed in 2020.
- These Accords were later extended to the countries of **Sudan, Bahrain and Morocco** and marks the **first normalisation of ties between Israel and an Arab country since Jordan in 1994.**
- The declaration of the Accords states that the **significance of strengthening and maintaining peace in West Asia is upheld and recognised**. The Accords also pursue an end to conflict and radicalisation and calls attention to art, medicine, science and commerce and its role in bringing countries together.
- It finally states that it seeks to **expand friendly relations between Israel and its neighbours** in the spirit of a shared commitment to a better future.

The challenges of the Abraham Accords

- The Abraham Accords, though geopolitically transformational, are not without their drawbacks, the most prominent of which is the **Palestinian cause.**
- Despite the violence that has persisted after the Accords, the new ties remain unaltered indicating that Arab-Israeli ties have adopted a different trajectory and are slowly becoming independent of the Israeli-Palestine conflict.
- Additionally, this **further exacerbates the divide with other nations** such as Qatar and Turkey.

The Economist

India and the Abraham Accords

- Although India officially welcomed the Abraham Accords, it reiterated its **"traditional support" for the two-state solution,** thus reiterating its stance on the Palestinian cause.
- The Abraham Accords provides the atmospherics for India to **foster stronger ties with Arabs countries as well as Israel.** As a result, some agreements have been signed between India and the members of the Accords.
- In 2021, the Foreign Affairs Ministers from the four countries, **the UAE, US, Israel and India** virtually met and

discussed potential partnerships and cooperation. This grouping was unofficially described as the **"West Asian Quad"** and the **"Indo-Abrahamic construct"**.

- These four countries have also formed a quadrilateral grouping known as **I2U2**. The I2U2 Group will focus on joint investments in water, energy, transportation, space, health, and food security.
- I2U2 partners will **mobilise private sector capital and expertise** to help modernize infrastructure, decarbonise industries, improve public health, and promote the development of green technologies.
- By embedding India—a key trade partner with the Middle East—deeper in the diplomatic and commercial architecture of the region, the Abraham Accords pave the way for **more trade and economic growth.**
- The Accords have paved the way for **greater regional and multinational cooperation** through major **commercial collaborations** between companies from the UAE, Israel, Bahrain and the United States with the Indian private sector.

Conclusion

- India is poised to gain from the Abraham Accords—and so is the world. They can **help advance New Delhi's foreign policy goals, and fortify its role on the global stage.**
- They can also contribute to regional and global growth and stability by bringing together major economic players to pursue trade and investment opportunities, and to partner on delivering key public goods, from clean energy technologies to pandemic vaccines.

3. Iran-Saudi Normalisation

Introduction

- In March 2023, **Saudi Arabia and Iran** signed an agreement in **Beijing, China**, to **re-establish diplomatic ties, respect each other's sovereignty and maintain non-interference** in the other's domestic affairs.
- The agreement came after months of deliberations and four days of **talks mediated by China.**

Saudi-Iran Ties

- This agreement ends seven years of diplomatic estrangement between the two Gulf neighbours.
- During this period, they have confronted each other in **proxy wars** in Syria and Yemen, carried out **media campaigns** of extraordinary mutual hostility, often on sectarian basis, and have on occasion come **close to direct conflict**, particularly in 2019 when suspected Iranian agents attacked Saudi oil facilities.
- Iran and Saudi Arabia operate on opposite sides of many conflicts in the Middle East; thus, many believe that this normalization will **contribute to peace efforts.**
- The positive impact of the agreement **would be felt in Lebanon, Yemen, Syria, and the region.**

Strategic Significance of the Agreement

- The agreement has confirmed that the **Arab states are prepared to pursue their interests without United States involvement.**
- This was largely the result of **increasing regional disenchantment with the U.S. as a security-provider**, alongside strong messages from Washington that it was less enthusiastic about being the regional security-guarantor. The **U.S.'s military failures in Iraq and Afghanistan** contributed to its loss of credibility among its regional allies.
- What regional states are seeking is not to disengage from the U.S. but to **broaden their options and build alternative relationships to suit their interests.**

China's Role

- **China** is an attractive partner. It has substantial energy, trade, investment and technology-related ties with West Asia: it is the region's largest buyer of crude oil, a major trade and

investment partner, and is also rapidly expanding its role as a technology-provider in most countries.

- West Asia is also crucial for the realisation of **China's Belt and Road Initiative (BRI),** with regional states being important for logistical connectivity, and investment, consultancy and contracting partnerships.
- China is looking at **greater political involvement with the region** on the basis of **"quasi-mediation diplomacy"** to promote its broad commercial, diplomatic and political interests rather than its hard security concerns.

Challenges for India

- China has affirmed that its role in West Asian affairs is likely to get more active and substantial. This **poses challenges for Indian diplomacy.**
- However, recognising that the management of its ties with China remains its diplomatic priority, India will need to engage with China in West Asia where they have a broad gamut of shared interests in energy security, free and open sea lanes, logistical connectivity, and, above all, regional stability. Here, they can work together to further mutual and regional interests.

4. NATO

About NATO

- Formed in **1949** with the signing of the **Washington Treaty,** NATO is a **security alliance of 30 countries from North America and Europe.**
- Established in the Cold War as a bulwark against Soviet aggression, NATO's fundamental goal is to safeguard the freedom and security of all its members by political and military means.
- **Article 5 of the Washington Treaty** states that an attack against one Ally is an attack against all — is at the core of the Alliance, a promise of **collective defence.**
    - Article 5 has been **invoked only once** in NATO history. It happened after the **September 11 attacks** on the United States in 2001, which led the alliance into Afghanistan.
- A **"NATO decision"** is the expression of the collective will of all 30 member countries since all decisions are taken by **consensus**.
- At present, NATO has **31 members.** In 1949, there were **12 founding members** of the Alliance: Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom and the United States. The other member countries are: Greece and Turkey (1952), Germany (1955), Spain (1982), the Czech Republic, Hungary and Poland (1999), Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia (2004), Albania and Croatia (2009), Montenegro (2017), North Macedonia (2020) and Finland (2023).
- NATO's Headquarters are located in **Brussels, Belgium**.

New Member

- **Finland** has become the 31st member of NATO recently, in a historic strategic shift provoked by Moscow's war on Ukraine.

Significance

- Finland shares a **1,340km long border with Russia** and during the Soviet days, both countries signed a **"friendship agreement,"** in which Finland agreed to be a **neutral country**.
- Russia's invasion of Ukraine last year prompted Finland and its neighbor **Sweden** to drop decades of military non-alignment.
- While Finland and Sweden applied together for membership in NATO, only Finland joined the military alliance as both countries faced certain hurdles in their bid for membership.

Implications for India

- The **fall of the Soviet Union with the end of the Cold War, the rise of India and China, the deepening of the India-US relationship and the**

war on Ukraine have profoundly affected India-Russia relations.

- **India has not joined the US** in supporting sanctions against Russia, showing that it **follows an independent foreign policy.** It has imported oil from Russia at a lesser rate and has engaged in dialogues and discussions at various summits and meetings.
- Even though India has not supported any sanctions against Russia, it has, along with the US, Japan, and Australia, formed the **Quadrilateral Security Dialogue (QUAD)**, which is also said as the **alternative to NATO in the Asian region.**
- India **engages with NATO in terms of strategic dialogues** as it states that it wants to engage with everyone who takes part actively in issues affecting globally. The organisation welcomes countries of South and South East Asia, including India and China, to take part in dialogues and discussions actively.
- However, India pursues its foreign policy by taking into **consideration its interests first** which are, **respecting the sovereignty of nations, maintaining goodwill with all, and not taking any sides** as we witnessed during the cold war but openly supporting and articulating diplomacy and peace to resolve issues rather than war.

Way Forward

- The international scenario is changing with new partnerships entering into global forums. The world is witnessing the rise of several powers capable of forming or entering into alliances to counter the more extensive forces.
- Amid all these events, India continues to follow its independent foreign policy by giving primacy to diplomacy and peace, which shows that no matter who is on the other side, India will always aim for peace and diplomacy, along with the safety and security of itself.

5. Understanding IMF bailouts

Introduction

- The International Monetary Fund (IMF) has confirmed a $3 billion bailout plan for Sri Lanka's struggling economy. IMF officials are also in negotiations with Pakistan for a $1.1 billion bailout plan as the country faces a severe economic crisis marked by a falling currency and price rise.

Mandate of IMF

- The IMF was set up in **1945** out of the **Bretton Woods conference.** The **primary goal** of the IMF back then was to bring about **international economic coordination** to prevent competing currency devaluation by countries trying to promote their own exports.
- Eventually, the IMF evolved to be a **lender of last resort to governments of countries that had to deal with severe currency crises.**

Why do nations seek an IMF bailout?

- Countries seek help from the IMF usually when their **economies face a major macroeconomic risk**, mostly in the form of a **currency crisis**.
- For instance in the case of Sri Lanka and Pakistan, both countries have witnessed domestic prices rise rapidly and the exchange value of their currencies drop steeply against the U.S. dollar.
- A rapid, unpredictable fall in the value of a currency can destroy confidence in said currency and affect economic activity as people may turn hesitant to accept the currency in exchange for goods and services. Foreigners may also be unwilling to invest in an economy where the value of its currency gyrates in an unpredictable manner.
- In such a scenario, many countries are forced to seek help from the IMF to meet their external debt and other obligations, to purchase essential imports, and also to prop up the exchange value of their currencies.

How does the IMF help countries?

- The IMF basically lends money, often in the form of **special drawing rights (SDRs),** to troubled economies that seek the lender's assistance.
    - SDRs is a reserve created by the IMF. The member countries have to contribute to this account in proportion to their IMF quota.
    - SDRs simply represent a **basket of five currencies**, namely **the U.S. dollar, the euro, the Chinese yuan, the Japanese yen, and the British pound.**
    - Also called **"paper gold",** an SDR is **neither paper nor gold but an accounting entry.** It is a **potential claim on the freely usable currencies of IMF members.**
    - Holders of SDRs can obtain these currencies in exchange for their SDRs in two ways: first, through the arrangement of voluntary exchanges between members; and second, by the IMF designating members with strong external positions to purchase SDRs from members with weak external positions.
- The IMF carries out its lending to troubled economies through a **number of lending programs** such as the **extended credit facility, the flexible credit line, the stand-by agreement, etc.**
- Countries receiving the bailout can **use the SDRs for various purposes** depending on their individual circumstances. Currently, both Sri Lanka and Pakistan are in urgent need for U.S. dollars to import essential items and also to pay their foreign debt. So any money that they receive from the IMF is likely to go towards addressing these urgent issues.

Are there any strings attached to an IMF bailout?

- It should be noted that the **IMF does not lend for specific projects**. Instead, the IMF provides financial support to countries hit by crises to create breathing room as they implement policies that restore economic stability and growth. It also provides **precautionary financing** to help prevent crises.
- The IMF usually **imposes conditions** on countries before it lends any money to them. For example, a country may have to agree to implement **certain structural reforms** as a condition to receive IMF loans.
- The IMF's conditional lending has been **controversial** as many believe that these reforms are **too tough on the public.** Some have also accused the IMF's lending decisions, which are taken by officials appointed by the governments of various countries, to be **influenced by international politics.**
- Supporters of the IMF's lending policies, however, have argued that conditions are essential for the success of IMF lending.

Pros and cons

- An IMF bailout ensures the **survival of a country** amid economic turmoil, also ensuring that essential industries and economic systems remain up and running.
- The IMF can also provide **technical expertise** to the affected country on how to implement reforms to strengthen the economy and institutions
- On the downside, the IMF's conditions can result in **reduced government spending and higher taxes,** measures which have been historically unpopular with the people and often resulted in **public unrest.**
- It can also create a **sense of dependency on external funding,** while also **harming the country's reputation in the eyes of investors.**

6. BIMSTEC

Introduction

- The year 2023 marks the completion of **25 years** since the 1997 **Bangkok Declaration** launched a modest grouping of Bangladesh, India, Sri Lanka and Thailand, with the acronym, **BIST-EC.**
- Three countries (Nepal, Bhutan and Myanmar) joined it later to make it the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (**BIMSTEC**).
- This unique set of **five countries from South Asia** and **two from Southeast Asia** are parents to an institution with lofty ambitions.

Key Achievements

- BIMSTEC has crafted a **new Charter** for itself, spelling out the grouping's vision, functions of its constituent parts, and has secured a legal personality.
- It has, finally, taken measures to **strengthen the Secretariat**, although some members are yet to extend adequate personnel support to it.
- Above all, its success lies in its survival through the turns and twists of **internal tensions.**
- The BIMSTEC region witnessed the influx of over a million **Rohingya refugees** into Bangladesh, the result of oppression by the Myanmar military; the **coup in Myanmar** that led to its virtual boycott by a large segment of the international community; and the grave **political and economic crisis afflicting Sri Lanka.**
- Unlike SAARC, post-2014, BIMSTEC has continued to **hold its summits and meetings of Foreign Ministers.**
- The grouping has also registered progress in **combating terrorism, forging security cooperation,** and creating mechanisms and practices for the better management of **humanitarian assistance and disaster relief**.
- A whole basket of memoranda of understanding, agreements and legal instruments provide the foundation for developing functional cooperation in select areas such as agriculture, trade, sustainable development and connectivity.
- Institutions such as an **Energy Centre and the Centre on Weather and Climate** are in place to push sectoral cooperation forward.

The Faultlines

- A major failure relates to the continuing **inability to produce a comprehensive Free Trade Agreement (FTA)** 18 years after the signing of the Framework Agreement.
- The other disappointment is connectivity in **infrastructure** (roads, railways, air, river, and coastal shipping links), energy, the digital and financial domain, and institutions that bring people closer together for trade, tourism and cultural exchanges. Only limited progress has been achieved so far.
- Much of the connectivity established recently is the outcome of **bilateral initiatives** taken by India, Bangladesh, Nepal and Bhutan to strengthen transport links.
- Mega-projects aimed to improve connectivity between India and Myanmar (and Thailand) have been delayed inordinately.
- The grouping has talked about the **Blue Economy** but is yet to begin any work on it.
- Business chambers and corporate leaders are yet to be engaged fully with the activities of BIMSTEC.
- This leaves the grouping largely in the **hands of officials and experts.**

BIMSTEC & India

- The BIMSTEC region hosts **22% of the world population** or 1.68 billion people; and the member states have a **combined GDP of US$3.697 trillion/per year.**
- For India, BIMSTEC aligns with its **'Act East' policy** for greater regional cooperation in southeast Asia. It could also be seen as aligning with India's larger goal to gain trade and security prominence in the Indian Ocean region and to cater to the concept of the **'Indo-Pacific' region,** a major focus of Quad countries.

- Another important factor for India in becoming a prominent leader in the Bay and maintaining peace and security, is **China making inroads in the Indian Ocean Region** over the years. Besides, China today is involved in a widespread drive to build infrastructure in South and Southeast Asian countries, it has projects under its **Belt and Road Initiative (BRI) in all BIMSTEC members except India and Bhutan.**
- The **progress of SAARC has stalled** over the years due to Indo-Pak relations and what experts call Pakistan's obstructionist approach to the organisation. BIMSTEC emerged as an **alternative platform for cooperation.**
- The **BIMSTEC Energy Centre** has been set up in **Bengaluru**, along with the **BIMSTEC Business Council,** a forum for business organisations to promote regional trade. It aims to create free-trade and power grid interconnectivity agreements, and a masterplan for transport connectivity in the Bay of Bengal region (adopted at the current summit).

Conclusion

- For greater regional connectivity, **more financial resources** are needed.
- The movement towards establishing the **BIMSTEC Development Fund** is needed.
- An exciting destiny awaits it as it works to realise the vision of the **Bay of Bengal Community (BOBC).**
- In this Indo-Pacific century, the BOBC has the potential to play a pivotal role, deepening linkages between South Asia and Southeast Asia.
- It should accelerate the region's economic development by collaborating with the newly minted **Indo-Pacific Economic Framework for Prosperity (IPEF)**. New synergy should be created between BIMSTEC and the IPEF.
- Finally, while all member-states are equal, **three have a special responsibility: Bangladesh** as the host of the BIMSTEC Secretariat; **Thailand** as the representative of Southeast Asia; and **India** as the largest state in South Asia.
- This trio must be the engine to pull the BIMSTEC train with imagination and determination.

7. AUKUS

Introduction

- AUKUS is a trilateral **security partnership for the Indo-Pacific** region, between the **UK, USA and Australia** which was formed in September 2021. It primarily focuses on enhancing the security and defense cooperation in the Indo-Pacific region. The major highlight of the cooperation is the **sharing of US nuclear submarine technology** to Australia and to check the assertive actions of China in the South China sea region.

How does it concern Asia?

- **Regional security:** This informal grouping is considered to be a **challenge for the security** of the region since it involves the sharing of confidential information like nuclear submarine technology which has raised concerns over the strategic balance of the region.
- **Economic consequences:** It has raised concerns over the economic factors for countries such as India as it **particularly involves defense industries.** This could lead to increased competition and could also impact other countries to sell their defense equipments with Australia.
- **Diplomatic relations:** This partnership has also been seen to sideline the partnerships of India, Japan and South Korea who have been the key allies of the United States in the region.

What can be the opportunities for Australia through this partnership?

- Through nuclear-powered submarines, it gives them **near infinite endurance** to operate and stay submerged – effectively, a nuclear

submarine **only needs to port/surface** when it is out of food and **other essential supplies** for the crew. Typically, nuclear subs are also **faster than conventional submarines**.

- This allows them to reach far out into the ocean and launch attacks on the enemy, an important capability for blue water navies (maritime forces capable of operating in the deep waters of the open oceans).
- It will give the **Royal Australian Navy** the capability to go into the **South China Sea** to protect its assets and conduct patrols, a capability which it currently does not possess.

AUKUS and its impact on India

- **Strengthening India's Security Architecture:** AUKUS aims to **promote security and stability** in the Indo-Pacific, which **aligns with India's strategic interests**. The grouping's emphasis on regional security and freedom of navigation could contribute to a more secure environment in India's maritime domain.
- **Balancing China's Influence:** AUKUS is seen as a **response to China's growing assertiveness** in the Indo-Pacific. The alliance's focus on **countering China's influence** could indirectly benefit India, as it shares concerns about Beijing's regional ambitions. AUKUS could help in **bolstering a collective approach** to maintaining a rules-based order and balancing China's power.
- **Developing a unique set of arrangements:** With the US trying to increase its strategic ties in the Indo-Pacific, **India has gotten a rare opportunity** to develop its own set of arrangements and capacities through **closer military operations, joint exercises and intelligence sharing.**
- **Implications for the Quad:** AUKUS **may influence** the dynamics within the Quad and potentially **create synergies or competition**. Coordination and collaboration between the two groupings **will be crucial for effectively addressing common challenges** in the region.
- **Impact on Regional Power Dynamics:** The formation of AUKUS has the **potential to reshape regional power dynamics.** It could lead to a **greater concentration** of military capabilities and influence among its members, potentially **impacting India's strategic calculations**. India would need to **carefully assess** these developments and adopt its own diplomatic and security strategies accordingly.

Way forward

- AUKUS remains a military pact which has the potential **to shape the strategic contours** of maritime Asia.
- As far as India is concerned, it should also **work for strengthening the QUAD** which can act as a balancing factor to AUKUS in order **to promote regional stability and security.**
- India also needs to take into consideration the **interests of the smaller countries** which could be **overlooked by the AUKUS** in the region. These initiatives could lead to capacity building for smaller countries which could promote regional integration and connectivity.

8. G20

Introduction

- India recently assumed the presidency of the G20 forum, taking over from Indonesia.

About G20

- The Group of Twenty (G20) is an **intergovernmental forum comprising 19 countries** - Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, United Kingdom and United States and the **European Union.** The G20 members **represent around 85% of the global GDP**, over **75% of the global trade, and about two-thirds of the world population.** The G20 was founded in 1999 after the **Asian financial crisis** as a forum for

the **Finance Ministers and Central Bank Governors to** discuss global economic and financial issues.

India's priority and opportunities as the President of G20:

- **Open Application Programme Interface (API):** Economies across the world are moving towards Digitalization where it **can leverage an open API** and also an interoperable framework for public digital platforms **which can be accessed by private players** for innovation.
- **Promotion of LiFE philosophy:** This philosophy **places individual behaviour** at the centre of global action for climate change. This mission tries to establish a network of **Pro-Planet People** for taking actions against climate change by adopting environmentally friendly lifestyles.
- **Clean energy partnerships:** The G20 platform will give India the opportunity to have clean energy partnerships with different nations and also give impetus to the idea of "One Sun One World One Grid".
- **South-South Cooperation:** As a developing country with a significant presence in the Global South, India's presidency **allows for a greater focus on South-South cooperation** within the G20 framework. It provides an opportunity for India to advocate for the interests and **concerns of developing countries** and **promote inclusive and equitable** global development.
- **Reforms in multilateralism:** Today's multilateral institutions are perceived to be ineffective in bringing about **reforms in the Global Financial Order** to ensure adequate **credit availability** and also as far as environment is concerned, there is a **lack of consensus** for smooth transition to clean energy.

Challenges to Indian Presidency:

- **After effects of the pandemic:** Today's world is reeling under the after effects of COVID-19 in various dimensions **which has sparked various issues** across the world with the major share taken by the economic impact.
- **COVID-19 Pandemic Fallout:** The ongoing COVID-19 pandemic and its aftermath present additional challenges. Addressing the **health crisis, ensuring equitable access to vaccines,** and managing **the socio-economic impacts** of the pandemic require coordinated efforts and international collaboration.
- **Managing Domestic Priorities:** India's presidency **requires balancing domestic priorities** with the responsibilities of the G20 presidency. Managing internal challenges, such as economic reforms, social development, and political considerations, while actively **engaging in global discussions and initiatives can pose challenges**.
- **Climate Change and Sustainable Development:** Climate change and sustainable development are crucial issues on the G20 agenda. However, **achieving consensus** on climate commitments, financing for developing countries, and **other sustainability measures** can be **challenging due to differing perspectives**, priorities, and resource constraints.
- **Ensuring Implementation of Agreed Commitments:** The G20's effectiveness lies not only in making commitments **but also in implementing them**. Ensuring that member countries follow through on **agreed commitments and take concrete actions** can be a challenge. **Monitoring and accountability** mechanisms are crucial in this regard.

Criticisms surrounding G20

- **No permanent secretariat:** The informal structure of the G20 means that agendas are determined each year by the chair and **formal mechanisms to monitor** follow-through on countries' public commitments are weak.
- **No Enforcement mechanism:** The **G20's toolkit ranges from simple exchanges** of information and best practices to agreeing common,

measurable targets, to coordinated action. None of this is achieved without consensus, nor is it enforceable, except for the incentive of peer review and public accountability.

- **Not legally binding:** The decisions are based on **discussions and consensus** which culminates in the **form of declarations.** These declarations are **not legally binding**. It's just an advisory or consultative group of 20 members.
- **Transparency & accountability:** The G20's transparency and accountability have been questioned by critics, who highlight the **absence of a formal charter** and the fact that the most important G20 meetings are closed-door.

Way forward

- With India assuming the Presidency of G20 forum, it gives the opportunity for the country to lead the way in political, economic and intellectual leadership.
- India's leadership defines the global discourse and avenues of cooperation in the coming years.
- India has positioned itself as the "**voice of the Global South**" which acts as a reference to the developing and the less-developed countries and will seek to put its priorities on the global forum.

ECONOMY

1. ONDC

Introduction

- The government of India has launched the pilot phase of **open network for digital commerce (ONDC)** with an aim to **democratise the country's fast growing digital e-commerce space** that is currently dominated by the two U.S.-headquartered firms — Amazon and Walmart.

What is ONDC?

- ONDC is a network based on open protocol and will **enable local commerce across segments,** such as mobility, grocery, food order and delivery, hotel booking and travel, among others, **to be discovered and engaged through a single platform.**
- It is an initiative of the **Department for Promotion of Industry and Internal Trade (DPIIT)** under the **Ministry of Commerce and Industry.**

Role in Democratising Digital Commerce

- The ONDC platform aims to **create new opportunities, curb digital monopolies** and **support micro, small and medium enterprises and small traders** and help them get on online platforms.
- The ONDC aims to **enable buying of products from all participating e-commerce platforms by consumers through a single platform.**
- Currently, a buyer needs to go to Amazon website/app, for example, to buy a product from a seller on Amazon. Under ONDC, it is envisaged that a buyer registered on one participating e-commerce site (for example, Amazon) may purchase goods from a seller on another participating e-commerce site (for example, Flipkart).
- The ONDC model is trying to **replicate the success of the Unified Payments Interface (UPI)** in the field of digital payments.
- The open network concept also **extends beyond the retail sector, to any digital commerce domains including wholesale, mobility, food delivery, logistics, travel, urban services, etc.**

Significance

- The government believes that ONDC will put an **end to the domination of the e-commerce market by a few large platforms.** Amazon and Flipkart, for instance, have been accused of discriminating among sellers on their platforms and promoting certain seller entities in which they hold indirect stakes.
- With an open network like ONDC that connects buyers and sellers across platforms, the government hopes to **level the playing field** and **make platforms redundant.**
- It is said that buyers will also be able to access sellers across platforms without having to switch between multiple platforms.
- Over the next five years, the ONDC expects to bring on board 90 crore users and 12 lakh sellers on the network.
- The ONDC will **standardise operations** like cataloguing, inventory management, order management and order fulfilment, **hence making it simpler and easier for small businesses to be discoverable over network and conduct business.**

Challenges

- ONDC faces its own share of challenges and risks, which must be addressed.
- One of the pivotal challenges lies in ensuring the **adoption and acceptance of ONDC by the various stakeholders** within the e-commerce ecosystem.
- ONDC will have to **convince the existing large players** to join the network and share their data and customers with other platforms.
- ONDC will also have to create **awareness and trust** among the small businesses and consumers about the benefits and security of using the network.
- Another challenge is to **ensure the quality and reliability** of the services

and products offered on the network. ONDC will have to **establish clear standards and guidelines** for quality assurance, consumer protection, data privacy, cybersecurity, etc.

- ONDC will also have to ensure **effective dispute resolution mechanisms** for handling complaints and grievances.
- A third challenge is to **ensure the sustainability and scalability** of the network. ONDC will have to **secure adequate funding and resources** for developing and maintaining the network infrastructure and operations.
- ONDC also needs to make sure that the network can **handle the increasing volume and variety of transactions and data.**

Conclusion

- ONDC is a bold and ambitious initiative that can revolutionize India's digital commerce sector by making it more inclusive, competitive, innovative, and sovereign. It can serve as a model for creating open digital ecosystems in other sectors of the economy.

2. Internationalisation of Rupees

Introduction

- In 2022, the **Reserve Bank of India** announced its decision to allow trade settlements between India and other countries in Indian Rupees (INR). This measure is aimed at facilitating the growth of global trade with emphasis on export from India and to support the interests of the global trading community in Indian rupees.
- The framework involves **invoicing of exports and imports in INR, market-determined exchange rates** between the currencies of the trading partner countries, and **settlement through special Rupee Vostro accounts** opened with authorised dealer banks in India.
- Under this arrangement for settlement,
  (a) **Indian importers** undertaking imports through this mechanism shall make **payment in INR** which shall be credited into the **Special Vostro account** of the correspondent bank of the partner country, against the invoices for the supply of goods or services from the overseas seller /supplier, while
  (b) **Indian exporters**, undertaking exports of goods and services through this mechanism, shall be **paid the export proceeds in INR** from the **balances in the designated Special Vostro account** of the correspondent bank of the partner country.

Why International trade Settlement in Rupees?

- When countries import and export goods and services, they have to make payments in a **foreign currency.** Since the **US Dollar** is the world's reserve currency, most of these transactions are entered into US dollars.
- If an Indian buyer enters into a transaction with a seller from Germany, the Indian buyer has to first convert his rupees into US dollars. The seller will receive those dollars which will then be converted into Euros.
- This is where trade settlement in rupees comes in – instead of paying and receiving US dollars, the invoice will be made in **Indian rupees** if the counterparty has a Rupee Vostro account.

Benefits of international trade settlement in Indian Rupee

- The framework could **largely reduce the net demand for foreign exchange,** the **US dollar** in particular, for the settlement of current account related trade flows.
- At present, **60% of India's import-export payments are made in U.S. dollars.** As per data from the RBI, this figure stands at 86% in the case of imports. Any shift from the present mechanism will result in saving of foreign exchange reserves.
- Further, the use of INR in cross-border trade is expected to **mitigate currency risk for Indian businesses.**

- **Protection from currency volatility** not only **reduces the cost of doing business** but also **enables better business growth, improving the chances for Indian businesses to grow globally.**
- It also **reduces the need for holding foreign exchange reserves and dependence on foreign currency,** making the Indian economy **less vulnerable to external shocks.**
- Further, it could assist Indian exporters in getting advance payments in INR from overseas clients and in the longer term **promote INR as an international currency** once the rupee settlement mechanism gains traction.
- One of the prerequisites for the **emergence of an international currency** is that the said currency needs to be **increasingly used for trade invoicing.** In terms of foreign exchange market turnover (daily averages), as per the BIS Triennial Central Bank Survey 2022, the **US dollar** is the **dominant vehicle currency** accounting for **88 per cent of the global forex turnover.** The **INR accounted for 1.6 per cent.**
- If the INR turnover rises to equal the share of non-US, non-Euro currencies in global forex turnover of **4 per cent**, **INR could be regarded as an international currency,** reflecting India's position in the global economy.

Measures by RBI & Government of India

- In line with the framework suggested by the RBI, the **Ministry of Commerce** has amended the relevant portion in the **Foreign Trade Policy (FTP).**
- India's new **Foreign Trade Policy 2023** focuses on **international trade settlement in rupees.**
- International trade settlement in rupee is allowed under the new policy as per RBI norms.

3. Global Minimum Tax

Introduction

- A global minimum tax is a proposal to impose a minimum rate of taxation on corporate income in most countries of the world by international agreement.
- In 2021, 136 countries and jurisdictions agreed to a proposal from the **Organisation for Economic Co-operation and Development (OECD).** It was set to take effect in 2023, but has since been delayed to 2024.
- The proposal was designed to discourage tax-motivated profit shifting and tax base erosion by multinational corporations (MNCs).

Two Pillars

- The **framework has two pillars,** one dealing with **transnational and digital companies** and the other with **low-tax jurisdictions** to address cross-border profit shifting.
- The first pillar ensures that **large multinational enterprises, including digital companies, pay tax where they operate and earn profits.** Most such companies have so far been paying low taxes by shifting profits to low-tax jurisdictions.
- Under Pillar One, taxing rights on more than **$100 billion** of profit are expected to be reallocated to market jurisdictions each year.
- The second pillar seeks to **put a floor on competition over corporate income tax,** through the introduction of a **global minimum corporate tax rate** (currently proposed at **15%)** that countries can use to protect their tax bases.
- If implemented, countries such as the Netherlands and Luxembourg that offer lower tax rates, and so-called tax havens such as Bahamas or British Virgin Islands, could lose their sheen. It is estimated that the minimum tax rate would **boost global tax revenues by $150 billion annually.**
- Supporters of the OECD's tax plan believe that it will end the global "race to the bottom" and help governments **collect the revenues required for social spending.**

Impacts on India

- A global minimum corporate tax rate of 15% is expected to be **beneficial to India.** It will enable tax creation by individuals operating in India but not

located in India and hence not paying any taxes.
- The **Tax Justice Network** estimates the country to gain **at least $4bn (Rs 300 bn)** corporate tax collections. However, we will need to **focus on capacity building and timely resolution of disputes.**
- Further, it will **prevent base erosion of tax** in the country as the government will be able to claw back any shortfall in tax paid below 15 % by an overseas business owned by an Indian resident, once the global threshold rule becomes operational.
- Overall, **countries with a moderate tax rate system stand to benefit at the cost of 'tax havens'** with low or nil tax rates.

4. Foreign Trade Policy (FTP) 2023

Introduction

- The government has unveiled its new Foreign Trade Policy 2023 (FTP 2023) which came into force on 1 April.
- The previous policy, launched in 2015, had to be extended several times due to the pandemic and geo-political developments.

Key Changes

- The government has **broken away from the conventional practice of setting a five-year cycle.**
- The new policy is intended to be responsive to changing circumstances and will be **modified as and when required.**
- Additionally, the government will consistently gather input from relevant stakeholders to enhance and revise the policy.

What are its key thrust areas?

- It has **four pillars**. These are:
    - **replacing the incentive-based system** of promoting exports with **remission and entitlement-based regimes;**
    - facilitating **enhanced collaboration** among exporters, states, districts and Indian missions;
    - **reducing transaction costs** and introducing **e-initiatives** for ease in business operations; and
    - developing **additional export hubs.**

What are the goals and targets?

- The government aims to increase India's overall exports to $2 trillion by 2030, with equal contributions from the merchandise and services sectors.
- The policy will prioritize enhancing the ease of doing business and targets emerging **sectors, such as e-commerce and export hubs.**
- Under FTP 2023, the **towns of Faridabad, Moradabad, Mirzapur, and Varanasi** have been newly designated as **Towns of Export Excellence (TEE)** for apparel, handicrafts, handmade carpets and dari, and handloom and handicraft products, respectively. These additions expand the TEE list to **43 towns.**
- Also, the **dairy sector** will be **exempted from maintaining average export obligations** under the new policy.
- Further, the **special advance authorization scheme** has been extended to **apparel and clothing**. Under the Advance Authorization Scheme, **inputs required for manufacturing export products can be imported duty-free**.
- The new FTP aims to **boost the internationalization of trade in rupees** by allowing international trade settlement in India's currency.

5. Central Bank Digital Currency (CBDC)

CBDC

- Reserve Bank of India broadly defines CBDC (Digital Rupee (e₹)) as the **legal tender issued by a central bank in a digital form.**
- It is akin to sovereign paper currency but takes a different form, **exchangeable at par** with the existing currency and shall be **accepted as a medium of payment, legal tender and a safe store of value.**

Rationale behind introduction of CBDC

- CBDC, being a sovereign currency, holds **unique advantages** of central bank money, viz. **trust, safety, liquidity, settlement finality and integrity.**
- The key motivations for exploring the issuance of CBDC in India, among others, include
    - **reduction in operational costs** involved in physical cash management,
    - **fostering financial inclusion**,
    - bringing **resilience, efficiency, and innovation** in the payments system,
    - **adding efficiency** to the settlement system,
    - **boosting innovation** in cross-border payments space and
    - providing the public with **uses that any private virtual currencies can provide, without the associated risks.**
    - CBDCs will provide the public with the **benefits of virtual currencies while ensuring consumer protection** by avoiding the damaging social and economic consequences of private virtual currencies/ Crypto Currencies.

Value Addition

Types of CBDC

- CBDC can be classified into two broad types, viz. **general purpose or Retail (CBDC-R)** and **Wholesale (CBDC-W).**
- Retail CBDC (e₹-R) would be **potentially available for use by all,** viz., private sector, nonfinancial consumers and businesses, while Wholesale CBDC (e₹-W) is designed for **restricted access to select financial institutions.**
- While Wholesale CBDC is intended for the settlement of interbank transfers and related wholesale transactions, Retail CBDC is an electronic version of cash primarily meant for retail transactions.

FEATURES OF CBDC:

6. Competition (Amendment) Act, 2023

Introduction

- The Competition (Amendment) Act, 2023 was recently passed by the Parliament.
- The Act makes a number of changes to the **Competition Act, 2002,** which is the country's primary competition law.
- The amendments aim to strengthen competition regulation, streamline operations, and foster a business-friendly environment.

Highlights of the Act

Threshold:

- One of the most significant changes introduced by the amendment is the **establishment of a new deal value threshold.** Under this provision, **transactions involving acquisition, merger, or amalgamation that meet or exceed INR 2,000 Cr and involve entities with substantial business operations in India** will necessitate **approval from the Competition Commission of India (CCI).**
- This threshold **expands the scope of CCI review,** ensuring that even transactions that would typically fall under the minimum exemption are subject to scrutiny if their deal value surpasses the prescribed limit.

Concept of Material Influence:

- One important change is the **updated definition of "control,"** which now includes the **concept of "material influence."**
- This change acknowledges that having the **ability to exert significant influence** over the management, affairs, or strategic commercial decisions of an entity or group of entities is a **key factor in determining control.**
- **CCI has the authority to establish additional criteria**, through regulations, to clarify what constitutes "material influence."
- This addition aims to provide clearer guidelines on what control means and reduce uncertainty when determining its extent in various business arrangements.

Timeline for the Implementation:

- The amendment has also **reduced the timeline for the implementation of a combination from 210 days to 150 days.**
- Additionally, the CCI is now required to formulate a **prima facie opinion on a combination within 30 days;** failure to do so results in the combination being deemed approved.
- These modifications offer **enhanced certainty to businesses** by reducing waiting periods and streamlining the review process, thereby enabling timely execution of transactions.

Limitation Period:

- The Competition (Amendment) Act also introduces a **three-year limitation period** for entertaining information or references regarding alleged contraventions under the Act.
- This limitation period imparts certainty and finality to competition law enforcement, preventing the reopening of cases long after the alleged contravention. It establishes a clear timeframe for parties to file complaints and ensures the timely execution of competition law enforcement.

Conclusion

- The Competition (Amendment) Act, 2023, has brought significant amendments to the Competition Act, 2002, in view of the dynamic changes in the fast-growing Indian market.
- The Amendment Act aims to bring the antitrust law in India at par with changing Indian and global markets.

7. Insolvency and Bankruptcy Code (IBC)

About Insolvency and Bankruptcy Code, 2016

- **Insolvency** is a situation where individuals or companies are unable to repay their outstanding debt.
- The Insolvency and Bankruptcy Code (IBC) provides a time-bound process

for resolving the insolvency of corporate debtors called the **corporate insolvency resolution process (CIRP).**

- Earlier, the **minimum amount of default** after which the creditor or debtor could apply for insolvency was ₹1 lakh, but considering the stress on companies amid the pandemic, the government increased the minimum amount to **₹1 crore.**
- Under CIRP, a **committee of creditors** is constituted to decide on the insolvency resolution. The committee may consider a **resolution plan** which typically provides for the payoff of debt by merger, acquisition, or restructuring of the company. If a resolution plan is not approved by the committee of creditors within the specified time, the company is **liquidated** (the assets of the borrower will be sold to repay creditors).
- During CIRP, the affairs of the company are managed by the **Resolution Professional (RP),** who is appointed to conduct CIRP.
- The **National Company Law Tribunal (NCLT)** adjudicates insolvency resolution for companies and Limited Liability Partnerships. The **Debt Recovery Tribunal (DRT)** adjudicates insolvency resolution for individuals and partnership firms.
- The **Insolvency and Bankruptcy Board of India (IBBI)** regulates the functioning of IPs, IPAs and IUs.
- The code was amended in 2019 which mandated a deadline for the completion of the resolution process **within 330 days**, **including all litigation and judicial processes.**

Insolvency and Bankruptcy Code (Amendment) Act, 2021

- Last year, the Parliament passed the Insolvency and Bankruptcy Code (Amendment) Act, 2021 to expedite and provide an efficient **alternate insolvency resolution process for corporate persons classified as micro, small and medium enterprises (MSMEs)** under IBC.

Highlights of the Act

Pre-packaged insolvency resolution

- The Act introduces an **alternate insolvency resolution process for micro, small, and medium enterprises (MSMEs),** called the **pre-packaged insolvency resolution process (PIRP).**
- Unlike CIRP, **PIRP may be initiated only by debtors.** The debtor should have a **base resolution plan** in place. During PIRP, the **management of the company will remain with the debtor.**

Minimum default amount

- Application for initiating PIRP may be filed in the event of a **default of at least one lakh rupees.** The current law limits the pre-pack resolution mechanism to **defaults not exceeding one crore rupees.**

Debtors eligible for PIRP

- PIRP may be initiated in the event of a default by a corporate debtor classified as an MSME under the **MSME Development Act, 2006.**
    - Currently, under the 2006 Act, **an enterprise with an annual turnover of up to Rs 250 crore, and investment in plant and machinery or equipment up to Rs 50 crore,** is classified as an MSME.

What are the challenges for the IBC?

- According to its regulator, the **Insolvency and Bankruptcy Board of India (IBBI),** the **first objective of the IBC is resolution**— a way to save a business as a going concern, through restructuring, change in ownership, mergers and other methods. The second objective is to **maximize the value of assets** of the corporate debtor and the third objective is to **promote entrepreneurship, availability of credit, and balancing the interests.**
- However, in the last six years, **more than 50% of the cases ended in liquidation, and only 14% could find a proper resolution,** which is the first objective.

Time Taken

- The IBC is a time-bound mechanism. The IBC initially stipulated a **180-day deadline** to complete the resolution

process, with a permitted **90-day extension.** The IBC was subsequently amended to further make the total timeline for completion **330 days.**

- While in 2018, when the timeline was 180+90 days, most cases were completed in under 300 days. However, in FY22, it took **772 days** to resolve cases involving companies that owed more than ₹1,000 crore. The average number of days it takes to resolve such cases **increased rapidly over the past five years**.
- Besides, when a resolution happens, it is envisaged that creditors can realise the maximum value of the outstanding claims. On the other hand, when liquidation takes place, it is a **piecemeal selling of the company's assets.** This means the **value realisable through resolution should be more than through the last resort of liquidation.**
- But the **gap between these two values has been narrowing over the years**, and in the last quarter of 2022, the amount realised fell below what the assets would have fetched if they were liquidated.

Haircuts

- A haircut is the **debt foregone by the lender as a share of the outstanding claim.** The **Parliamentary Standing Committee on Finance** pointed out in 2021, that in the five years of the IBC, creditors on an average had to bear an **80% haircut in more than 70% of the cases.**
- There are also other challenges to the IBC, some of which were pointed out by the Standing Committee. These were related to the **conduct of the CoCs and the IPs.** The Committee stated that the committee of creditors has significant discretion in accepting resolution plans and appointing IPs and called for **more transparency and the framing of a professional code of conduct for the CoC.**

Other Recommendations

- In order to address the delays, the Parliamentary Standing Committee suggested that the **NCLT should not take more than 30 days after filing,** to admit the insolvency application and transfer control of the company to a resolution process.
- Citing the **more than 50% vacancy** in the Tribunal compared to the sanctioned strength, it suggested **recruitment in advance** based on the projected number of cases.
- It also recommended the setting up of **dedicated benches of the NCLT for IBC cases.** To reduce caseloads,the Committee suggested that the **pre-packs option be extended to all corporates after review**. This is because, under PIRP, unlike CIRP, the debtor continues to manage company operations during the resolution process.

8. Promotion of Co-operative Banks

About Co-operative banks

- Co-operative banks are financial entities **established on a co-operative basis and belonging to their members.** This means that the **customers of a co-operative bank are also its owners.**
- These banks provide a wide range of regular banking and financial services.

Cooperative movement in India

- By definition, cooperatives are organisations formed at the grassroots level by people to **harness the power of collective bargaining towards a common goal.** The aim of the co-operative movement was to help farmers overcome the burden of debt and help them sell their products easily to get maximum profit.
- In **agriculture**, cooperative dairies, sugar mills, spinning mills etc are formed with the pooled resources of farmers who wish to process their produce.
- In **banking and finance**, cooperative institutions are spread across rural and urban areas. **Village-level primary agricultural credit societies (PACSs)** formed by farmer associations are the best example of grassroots-level credit flow. These societies anticipate the credit demand

of a village and make the demand to the district central cooperative banks (DCCBs).

Structure of co-operative banks in India

- Broadly, co-operative banks in India are divided into two categories - **urban and rural.**
- The rural co-operative credit system in India is primarily mandated to ensure flow of credit to the **agriculture sector.** It comprises **short-term and long-term co-operative credit structures.**
    - The short-term co-operative credit structure operates with a **three-tier system - Primary Agricultural Credit Societies** at the village level, **Central Cooperative Banks (CCBs)** at the district level and **State Cooperative Banks (StCBs)** at the State level.
    - Meanwhile, the long-term institutions are either **State Cooperative Agriculture and Rural Development Banks (SCARDBs)** or **Primary Cooperative Agriculture and Rural Development Banks (PCARDBs).**
- **Primary Cooperative Banks (PCBs), also referred to as Urban Cooperative Banks (UCBs),** cater to the financial needs of customers in urban and semi-urban areas. UCBs are of two kinds- **multi-state** and those operating in a **single state.**

What laws govern cooperative societies?

- The functioning of Cooperative Banks is guided by the **Cooperative Societies Act of the respective states.**
- While the administrative control of the cooperatives are with the states, its banking functions are regulated by the **Reserve Bank of India** under the Banking Regulation Act, 1949.
- In 2002, the Centre passed a **Multi-State Cooperative Societies Act** that allowed for registration of societies with operations in more than one state.
- The **Banking Regulation (Amendment) Act, 2020** was passed in 2020 to **bring all urban cooperative banks and multi-state cooperative banks under the direct supervision of the RBI,** following public scandals in certain banks and claims of mismanagement.
- The **National Cooperative Development Corporation (NCDC),** a statutory Corporation under the Ministry of Agriculture & Farmers Welfare, works for the promotion of the cooperative movement in India. It is tasked with planning, promoting, coordinating and financing cooperative development programmes at the national level.

9. Recommendations of 15th Finance Commission

Introduction

- The Fifteenth Finance Commission (Chair: **Mr. N. K. Singh**) was set up in November 2017 with a mandate to make recommendations for the five-year period from 2020-21.
- While the Constitution requires a Finance Commission to be set up every five years, the 15th FC's mandate was **extended by a year till 2025-26**, breaking the cycle.
- In late 2019, the Commission was asked to give a standalone report for 2020-21 and another report for an extended five-year period till 2025-26.

Key recommendations in the report for 2021-26 include:

Share of states in central taxes

- The share of states in the central taxes for the 2021-26 period is **recommended to be 41%,** same as that for 2020-21. This is less than the 42% share recommended by the 14th Finance Commission for 2015-20 period.
- The adjustment of 1% is to provide for the newly formed union territories of Jammu and Kashmir, and Ladakh from the resources of the centre.

Criteria for devolution

1 : Criteria for devolution

Criteria	14th FC 2015-20	15th FC 2020-21	15th FC 2021-26
Income Distance	50.0	45.0	45.0
Area	15.0	15.0	15.0
Population (1971)	17.5	-	-
Population (2011)#	10.0	15.0	15.0
Demographic Performance	-	12.5	12.5
Forest Cover	7.5	-	-
Forest and Ecology	-	10.0	10.0
Tax and fiscal efforts*	-	2.5	2.5
Total	**100**	**100**	**100**

- **Income distance:** It is the distance of a state's income from the state with the highest income. Income of a state has been computed as average per capita GSDP during the three-year period between 2016-17 and 2018-19. A state with lower per capita income will have a higher share to maintain equity among states.
- **Demographic performance:** The Commission used **2011 population data** for its recommendations. The demographic performance criterion has been used to **reward efforts made by states in controlling their population.** States with a lower fertility ratio will be scored higher on this criterion.
- **Forest and ecology:** This criterion has been arrived at by calculating the share of the dense forest of each state in the total dense forest of all the states.
- **Tax and fiscal efforts:** This criterion has been used to reward states with higher tax collection efficiency. It is measured as the ratio of the average per capita own tax revenue and the average per capita state GDP during the three years between 2016-17 and 2018-19.

Grants

- Over the 2021-26 period, the following grants will be provided from the centre's resources.
- **Revenue deficit grants:** 17 states will receive grants worth Rs 2.9 lakh crore to eliminate revenue deficit.
- **Sector-specific grants:** Sector-specific grants of Rs 1.3 lakh crore will be given to states for eight sectors: (i) health, (ii) school education, (iii) higher education, (iv) implementation of agricultural reforms, (v) maintenance of PMGSY roads, (vi) judiciary, (vii) statistics, and (viii) aspirational districts and blocks. A portion of these grants will be **performance-linked.**

- **State-specific grants:** The Commission recommended state-specific grants of Rs 49,599 crore. These will be given in the areas of: (i) social needs, (ii) administrative governance and infrastructure, (iii) water and sanitation, (iv) preservation of culture and historical monuments, (v) high-cost physical infrastructure, and (vi) tourism.
- **Grants to local bodies:** The total grants to local bodies will be Rs 4.36 lakh crore (a portion of grants to be performance-linked) including: (i) Rs 2.4 lakh crore for rural local bodies, (ii) Rs 1.2 lakh crore for urban local bodies, and (iii) Rs 70,051 crore for health grants through local governments.
- Grants to local bodies (other than health grants) will be distributed among states **based on population and area, with 90% and 10% weightage,** respectively.
- **Disaster risk management:** The Commission recommended retaining the existing cost-sharing patterns between the centre and states for disaster management funds. The cost-sharing pattern between centre and states is: (i) 90:10 for north-eastern and Himalayan states, and (ii) 75:25 for all other states.

Fiscal roadmap

- **Fiscal deficit and debt levels:** The Commission suggested that the centre bring down the fiscal deficit to **4% of GDP by 2025-26**. For states, it recommended the fiscal deficit limit (as % of GSDP) of: (i) 4% in 2021-22, (ii) 3.5% in 2022-23, and (iii) 3% during 2023-26.
- **Extra annual borrowing worth 0.5% of GSDP** will be allowed to states during first four years (2021-25) upon undertaking power sector reforms including: (i) reduction in operational losses, (ii) reduction in revenue gap, (iii) reduction in payment of cash subsidy by adopting direct benefit transfer, and (iv) reduction in tariff subsidy as a percentage of revenue.
- The Commission observed that the recommended path for fiscal deficit for the centre and states will result in a **reduction of total liabilities of**: (i) the centre from 62.9% of GDP in 2020-21 to 56.6% in 2025-26, and (ii) the states on aggregate from 33.1% of GDP in 2020-21 to 32.5% by 2025-26.
- It recommended forming a **high-powered inter-governmental group to**: (i) review the Fiscal Responsibility and Budget Management Act (FRBM), (ii) recommend a new FRBM framework for centre as well as states, and oversee its implementation.
- **GST:** GST rate structure should be rationalised by **merging the rates of 12% and 18%.** States need to step up field efforts for expanding the GST base and for ensuring compliance.
- **Financial management practices:** A comprehensive framework for public financial management should be developed. An **independent Fiscal Council** should be established with powers to assess records from the centre as well as states. The Council will only have an **advisory role**.
- The centre as well as states **should not resort to off-budget financing or any other non-transparent means of financing** for any expenditure.
- States may form an **independent debt management cell** to manage their borrowing programmes efficiently.

Other recommendations

- **Health: Primary healthcare expenditure** should be **two-thirds of the total health expenditure. All India Medical and Health Service** should be established.
- **Funding of defence and internal security:** A dedicated non-lapsable fund called the **Modernisation Fund for Defence and Internal Security (MFDIS)** will be constituted to primarily bridge the gap between budgetary requirements and allocation for capital outlay in defence and internal security.

10. GST Ruling and Cooperative federalism

Introduction

- The Supreme Court has ruled that the **recommendations of the Goods and Services Tax (GST) Council are not binding on the Central and state governments.**

Highlights of the Ruling

- The Court pointed out that **Article 246A,** introduced through an amendment to the Constitution made in 2016, gives **both Parliament and State legislatures the power to make laws relating to GST.** The **Constitution has not specifically mentioned that all GST Council decisions will become law.**
- The apex court held that the Parliament intended for the recommendations of the GST Council to only have a **persuasive value,** to foster cooperative federalism and harmony between the constituent units.
- The order has reminded the **States** that they **can reject decisions made by the GST Council** and set different rates for goods and services in their jurisdiction.

GST Council

- To ensure that every State could play a part in decisions involving GST rates, exemptions, thresholds, relaxations and procedural issues, the **GST Council** was established in 2016 as a **constitutional body.**
- The GST Council is headed by the **Union Finance Minister** and includes all State Finance Ministers.
- Decisions in GSTC are taken by a **majority of not less than three-fourths of weighted votes cast**. The **Centre has one-third weightage** of the total votes cast, and **all the States taken together have two-thirds of the weightage** of the total votes cast.

Recommendations

- The Centre might try to be more accommodative to states' concerns and fiscal difficulties.
- The **Council should meet more frequently** to keep the crucial fiscal federalism conversation moving in the right path and to reduce trust deficiencies.
- Even though the Court has stated that the GST Council is a **forum for political contestation as well as cooperative federalism**, statesmanship is required. The Council should go beyond current political disputes.
- The **freedom to dissent** in the Council should be respected, and their voices should not be drowned out in the quest of unanimity in decision-making.
- On a variety of fronts, **cooperation between the Centre and states** is necessary at both the vertical (between the Centre and states) and horizontal (among states) levels. This involves fine-tuning developmental metrics for intended outcomes, policy decisions connected to development, welfare changes, administrative reforms, and strategic decisions, among other things.

Conclusion

- The spirit of co-operative federalism is already entrenched in GST. The Court has not brought about any change to the law. The States and the Centre need to keep the spirit going to ensure that the GST system functions.
- Despite having a brute majority, the Centre should pay heed to the problems faced by States and suggest corrective measures, whenever possible. The States should also desist from making preposterous demands without considering the problems in Central Government finances.

11. FINANCIAL INCLUSION

What is financial Inclusion?

- Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way.

Steps taken towards financial inclusion

- Financial Inclusion is an important priority of the Government. The objective of Financial Inclusion is to extend financial services to the large hitherto un-served population of the country to unlock its growth potential.
- The Government initiated the **National Mission for Financial Inclusion (NMFI)**, namely, **Pradhan Mantri Jan Dhan Yojana (PMJDY)** to provide universal banking services for every unbanked household.
- **From Jan Dhan to Jan Suraksha**- For creating a universal social security system for all Indians, especially the poor and the under-privileged.
- **Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY)**- The PMJJBY is available to people in the age group of 18 to 50 years having a bank account who give their consent to join / enable auto-debit.
- **Pradhan Mantri Suraksha Bima Yojana (PMSBY)**- The risk coverage under the scheme is Rs. 2 lakh for accidental death and full disability and Rs. 1 lakh for partial disability.
- **Atal Pension Yojana (APY)-** Under APY, the monthly pension would be available to the subscriber, and after him to his spouse and after their death, the pension corpus, as accumulated at age 60 of the subscriber, would be returned to the nominee of the subscriber.
- **Standup India Scheme**- The Scheme facilitates bank loans between Rs.10 lakh and Rs.1 crore to at least one Scheduled Caste/ Scheduled Tribe borrower and at least one Woman borrower per bank branch for setting up greenfield enterprises.
- **Pradhan Mantri Vaya Vandana Yojana (PMVVY)**- to protect elderly persons aged 60 years and above against a future fall in their interest income due to uncertain market conditions, as well as to provide social security during old age.
- **Kisan credit card scheme-** To provide adequate and timely credit aid from the banking system under a single roof to the farmers.

Challenges in achieving financial inclusion

- The penetration of financial services in the rural areas of India is still very low. The reasons for low demand for financial services could be **low income level, lack of financial literacy**, other bank accounts in the family, etc.
- On the other hand, the supply side factors include **no bank branch in the vicinity, lack of suitable products meeting the needs of the poor people, complex processes and language** barriers.
- Low penetration of credit is the result of lack of access to credit among the rural households. Only the **urban areas have a large number of bank branches compared to rural areas**.
- **Less efficiency of the Banking correspondents (BCs)** and lack of trust in BCs and prospective alternatives like using post offices and fair price shops for bank related work, is also a major reason for low levels of financial inclusion.
- **Digital illiteracy** which results in hesitation in using mobile phones for availing financial services is also a major hurdle.

Way forward

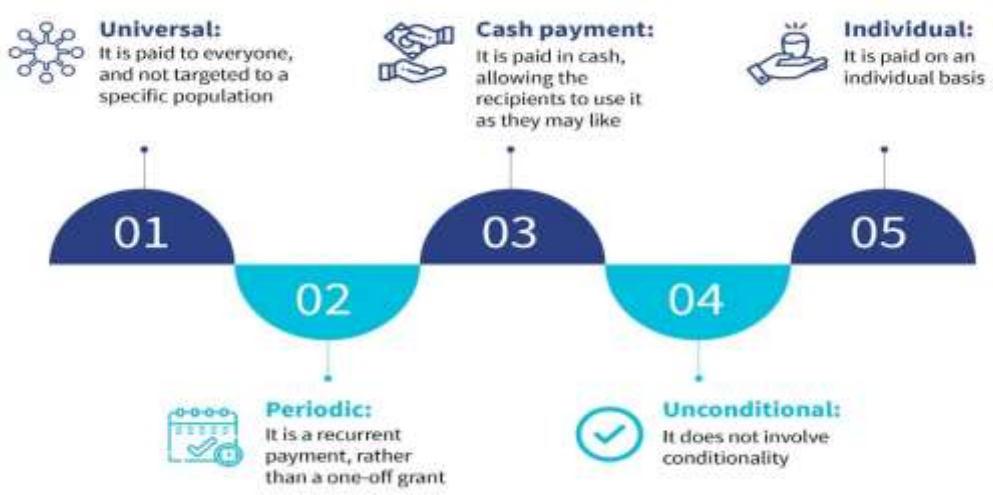
- Financial inclusion provides a unique opportunity to construct a sustainable financial system.
- It accelerates growth in the real sector and triggers overall economic development.
- Financial inclusion provides opportunities to the banking sector to cut across various layers of people, regions, gender, and income and encourage the public to inculcate banking habits.

12. UNIVERSAL BASIC INCOME

What is universal basic income?

- Universal basic income (UBI)—defined as a transfer that is provided universally, unconditionally, and in cash—holds an attractive promise of change across many lines. These include coverage potential, fairness in social contracts, power relations in

labor markets, and gender equity, among others.



What is the UBI paradox?

- UBI can be understood as a basic living stipend in which all citizens of a given population regularly receive a legally stipulated and equal financial grant paid by the government without a means test. But there are roadblocks to it being a successful scheme.
- **Inflation plays a major role in the economic graph of a country**. More the amount of money, less the value of money. So, if inflation keeps increasing, then in response the government will also have to increase the amount of basic income by years. It will affect tax return and services, and work experience, and by extension, the economy. **It will affect fund management and balancing. It will affect health and poverty.**
- **UBI doesn't distinguish between deserving and undeserving.** So, giving a fair and equal amount of money to both productive and unproductive will be unfair. This has also been raised as an argument among critics. So, assuming UBI as a potential solution to automation might get easy acceptance. We will have to wait and watch before making any judgment.

Advantages and Disadvantages of Universal Basic Income

Potential advantages of UBI:

1. **Poverty Alleviation:** UBI has the potential to significantly reduce poverty by providing a basic income floor to all individuals, regardless of their employment status or income level. It ensures that everyone has access to a minimum level of economic security, meeting their basic needs for food, shelter, and healthcare.
2. **Reduced Inequality:** UBI can help reduce income and wealth inequality by providing a more equal distribution of resources. It offers financial support to those who are economically disadvantaged, helping to bridge the wealth gap and create a more equitable society.
3. **Economic Stimulus**: UBI can act as an economic stimulus by injecting money directly into the hands of individuals. This money is likely to be spent on essential goods and services, thereby increasing consumer demand and stimulating economic activity. This can have positive effects on local businesses and contribute to economic growth.
4. **Increased Entrepreneurship and Innovation**: With a guaranteed basic income, individuals have a greater ability to take risks, pursue entrepreneurial ventures, or engage in creative pursuits. UBI provides a safety net that reduces the fear of failure and allows people to explore new ideas,

start businesses, or invest in their education or skills development.

5. **Improved Health and Well-being:** UBI can have positive impacts on physical and mental health outcomes. By providing a stable income, it reduces stress and financial insecurity, which can lead to improved mental well-being. It also enables individuals to afford better healthcare, nutrition, and living conditions, resulting in better overall health outcomes.
6. **Simplified Social Welfare Systems**: UBI has the potential to streamline and simplify existing social welfare programs. By providing a universal cash transfer, it reduces bureaucracy and administrative costs associated with means-testing and monitoring eligibility for various social assistance programs.
7. **Adaptability to Changing Labor Markets**: As automation and technological advancements continue to reshape the job market, UBI can provide a safety net for individuals whose livelihoods are disrupted by these changes. It allows people to transition between jobs, acquire new skills, or pursue education without the fear of immediate financial hardship.
8. **Good governance**: schemes have varied targeting mechanisms, conditionality requirements, and modes of implementation. These targeting mechanisms are often crippled by exclusion and inclusion errors and high bureaucratic costs, resulting in inefficiencies and sub-optimal effectiveness. GoI's Economic Survey 2016-17 posited that the implementation of UBI could substantially overcome these issues.

Disadvantages of UBI:

1. **Financial Feasibility**: Implementing UBI on a large scale in a country as populous as India would require substantial financial resources. The cost of providing a basic income to every citizen could strain government budgets and potentially lead to increased taxes or reduced funding for other essential public services.
2. **Inflationary Pressure**: Introducing UBI without appropriate economic safeguards could lead to increased inflation. If everyone receives a basic income, there may be a surge in demand for goods and services, potentially driving up prices and reducing the purchasing power of the basic income itself.
3. **Dependency and Work Incentives:** Critics argue that UBI may disincentivize work or reduce workforce participation. If individuals receive a basic income regardless of their employment status, some may choose not to seek employment or engage in productive activities. This could have negative consequences for economic productivity and growth.
4. **Targeting and Equity Concerns:** India has a diverse population with varying levels of socio-economic needs. Implementing a universal cash transfer may not effectively target those who are most in need of support. Certain vulnerable groups, such as those living in extreme poverty or with specific needs, may require more targeted and tailored social welfare interventions.
5. **Impact on Existing Social Programs:** Introducing UBI could potentially result in the dismantling or reduction of existing social welfare programs. This could have unintended consequences, particularly for those who rely on specific programs that address their unique needs, such as healthcare subsidies or targeted poverty alleviation schemes.
6. **Regional Disparities:** India has significant regional disparities in terms of income levels, cost of living, and access to resources. Providing a uniform basic income across the country may not adequately address these regional variations and could exacerbate existing inequalities.
7. **Implementation Challenges:** Implementing UBI effectively would require robust administrative systems to ensure accurate and timely

distribution of funds to every citizen. Setting up such systems and preventing leakages or corruption can be complex and challenging, particularly in a country with a vast population like India.

Implementation challenges of UBI in India

- Implementing UBI would be difficult in a country like India, where 22% of the population is classified as below the poverty line. **This is because adopting a UBI would come at the cost of providing benefits to upwards of 78% of the population who would not need it immediately.**
- A better model for India would be to start with a **targeted approach.** Although this appears to be more affordable, it has its own set of challenges, including those around identifying the target segment (the poor) and limiting the flow of benefits to them. A targeted approach would require a robust database of beneficiaries and clear guidelines around exclusion parameters. Such an approach has always been subject to exclusion and inclusion errors. While wrongful inclusions lead to unnecessary expenditures, wrongful exclusions defeat the program's purpose.

What is Universal Basic Insurance?

- Universal Basic Insurance is where social security is provided in the form of food security, health security and income security.

Types of Social security nets

- Income shocks result in a free fall of those living on the line of basic living wages (say line 1) down towards the critical survival line (say line 2). In any case, a fall that is further below line 2 needs to be prevented as it can be catastrophic — a household can end up facing a poverty trap. Social security systems are like a safety net placed at line 2.
- These social security nets can be of three types.
- The first is a passive safety net which catches those falling from line 1 and prevents a fall below line 2.
- The second is an active safety net which works like a trampoline so that those who fall on it are able to bounce back to line 1.
- The third is a proactive safety net which acts like a launchpad so that those who fall on it will not only bounce back but will also move up beyond line 1.
- The first type of safety net is basically a social assistance programme meant for the most income-deprived sections of society. The second type of safety net is a scheme with a higher outlay. The third type of social security net is the most desirable option but requires immense resources and institutional capacity. For social security, people on the south end of the income line need social assistance schemes. Those on the north end of the income line should have voluntary insurance.
- **Social security mainly encompasses food security, health security and income security.** India operates the widest spectrum of social security schemes which cater to the largest number of people than any other country. The sheer scale of Indian social security programmes delivered to millions of households spread over a vast geography is mind-boggling.
- The Indian food security programme, for example, has over 800 million beneficiaries being provided heavily subsidized food grain under the National Food Security Act (NFSA). **The NFSA is the world's largest food security programme.** About 120 million children are provided free lunch under the Mid-Day Meal Scheme. In addition, some 50 million people benefit from the free meals programme run by a few State governments. Nevertheless, there are issues of financial sustainability and leakages in the food security programme.
- **On the health security front, for the unorganized sector, there is the Ayushman Bharat Scheme of the**

central government with over 490 million beneficiaries.

- In the organized sector, the Central government runs the Employees State Insurance Corporation (ESIC) and Central Government Health Scheme (CGHS) catering to 130 million and four million beneficiaries, respectively. Health insurance schemes run by various State governments cover about 200 million people.
- **Only about 110 million people in India have private health insurance. Despite these large-scale provisions, about 400 million Indians are not covered under any kind of health insurance.**
- Income security is the trickiest part to tackle in the social security basket. For the organised sector, there are three types of provident fund schemes:
    - **General Provident Fund (GPF)** which is availed by about 20 million Central and State government employees in the country.
    - The second is the **Employees' Provident Fund (EPF)** which is availed by about 65 million workers in the other organized sector.
    - The third is **Public Provident Fund (PPF)** that can be availed by any Indian citizen but has contributions from the organized sector mostly. There are about 53 million New Pension Scheme subscribers in the country (about 2.2 million in the Central government, 5.6 million in the State government and the rest in the private sector).
- In the unorganized sector, the **Pradhan Mantri Kisan Maan-Dhan Yojana (PM-KMY)** and the PM-KISAN scheme is available to about 120 million farmers. Atal Pension Yojana (APY) benefits 40 million people. The **Pradhan Mantri Shram Yogi Maandhan Yojana** has about five million beneficiaries while there are about 50,000 beneficiaries under the **National Pension Scheme for Traders and Self-Employed Persons (NPS-Traders) scheme**. The largest unorganized sector income security programme is the scheme under the **Mahatma Gandhi National Rural Employment Guarantee Act**, which has about 60 million beneficiaries. Thus, out of 500 million workers in India, about 100 million have no income security (pension, gratuity or other income) coverage. Proponents of universal basic income cite the informality of the Indian economy as the hurdle in rolling out schemes such as unemployment insurance in the country. However, **besides huge fiscal implications (around 4.5% of GDP), the proposal of universal basic income runs the risk of implementation failure due to large-scale beneficiary identification requirements.**

Why is universal basic insurance a better proposition than universal basic income?

- One, **the insurance penetration** (premium as a percentage of GDP) in India has been hovering around 4% for many years compared to 17%, 9% and 6% in Taiwan, Japan and China, respectively.
- Two, though the economy largely remains informal, **data of that informal sector are now available** both for businesses (through GSTIN, or Goods and Services Tax Identification Number) and for unorganized workers (through e-Shram, which is the centralized database of all unorganized workers).
- As a result of the recent initiatives by the Government, the Goods and Services Tax (GST) portal has 13.5 million registrations and the e-Shram portal has over 280 million registrations.
- As a prototype of a social security portal based on such data, the social registry portal, 'Kutumba', developed by Karnataka is available as a blueprint. Till the Indian economy grows to have adequate voluntary insurance, social security can be

boosted through the scheme of universal basic insurance.

13. FREE TRADE AGREEMENTS (FTAs)

What are FTAs?

- FTA is an agreement between the countries or regional blocks **to reduce or eliminate trade barriers, through mutual negotiations** with a view to enhancing trade. It can however be comprehensive to include goods, services, investment, intellectual property, competition, government procurement and other areas.
- On goods, the key areas covered are **customs duties or tariffs, rules of origins, non-tariff measures such as technical barriers to trade (TBT), sanitary phytosanitary (SPS) measures, trade remedies** etc.
- On services, the negotiations are on barriers to various modes of supply including domestic regulations.

India's Global Trade Engagements

- India has always stood for an **open, equitable, predictable, non-discriminatory, and rule-based international trading system.** India considers **Regional Trading Arrangements (RTAs)** as 'building blocks' towards the overall objective of trade liberalization and as complementing the multilateral trading system.
- The economic rationale for FTAs/RTAs was the **diversification and expansion of India's exports** to its trading partners, providing a **level playing field vis-à-vis the competing countries** having preferential access in our trading partners, as well as **gain easier access to raw materials and intermediate products**, at lower costs, for stimulating value-added domestic manufacturing.
- In the case of the **India-Association of Southeast Asian Nations (ASEAN), India-Korea, and India-Japan Agreements,** this was also part of a **geopolitical strategy** that dovetailed well into India's **"Look East Policy."**
- India has so far concluded **13 Free Trade Agreements (FTAs)** and **6 Preferential Trade Agreements (PTAs).** The most recent in the list are the **India-UAE Comprehensive Economic Partnership Agreement (CEPA)** which entered into force in May 2022 and the **India-Australia Economic Cooperation and Trade Agreement (Ind-Aus ECTA),** which entered into force in December 2022.
- Further, India is presently engaged in **FTA negotiations** with some of its trading partners, notable among these FTAs are – (i) India-UK FTA, (ii) India-Canada CEPA/ Early Progress Trade Agreement (EPTA), (iii) India-EU FTA.
- Moreover, India has also initiated action to **review some of the existing FTAs,** namely, India-Singapore CECA, India-South Korea CEPA, and India-ASEAN Trade in Goods Agreement.

Advantages of FTAs

- FTAs support the growth of a nation in several ways by **contributing to its rapid development**. As it allows more focus on exports and resources where they have a strong comparative advantage.
- The significant focus helps countries **to attract foreign investment capital** and provide relatively **high-paying jobs for local workers** as well.
- Free trade also creates a competitive environment where countries strive to provide the **lowest possible prices for their resources which is in a way beneficial for consumers**.
- As soon as countries prioritize the production of goods, they can produce more at a comparatively cheaper cost than other countries (which is where they have a comparative advantage) they will be **able to produce more goods in total** than they would by limiting trade.

Disadvantages of FTA's

- FTAs have contributed to an increase in India's imports compared to the exports leading to a **trade imbalance and increasing current account deficit**.
- FTAs **increase the complexity of the international trading system** and

can raise transaction costs for business.
- Complicated rules of origin are required to prevent third country products entering via the other party. With different rules negotiated under different agreements, **enforcement of these rules and compliance with them by business can be a complicated task.**
- Incase of defaults by the partnering countries, **lack of proper dispute settlement mechanism** can become a major issue.
- The **negotiation of FTAs is resource intensive** and there can be an 'opportunity cost' in devoting resources to bilateral or regional, as opposed to multilateral. The NAFTA agreement, for example, was over one thousand pages long and required the establishment of more than two dozen committees and working groups.

Way forward

- India has been working closely across the globe to establish more FTAs. The negotiation under FTA should include terms and conditions to introduce more transparency and predictability in terms of non-tariff barriers to ensure a less cumbersome compliance procedure.
- There should be a discussion on resolving geopolitical issues and there should be reform in the selection of trade partners to expand free trade policy.
- India is also exploring more regions that are ready for a trade agreement with India and there is a huge potential to widen the access of the market to regions like Africa, and Central and Southeast Asia.

14. START-UP ECOSYSTEM

Introduction

- As per the **Global Innovation Index (GII) 2022 report**, India occupied the **40th rank** in 2022 by improving its rank from 81 in 2015. Further, India became the **most innovative nation in the lower middle-income group** overtaking Vietnam (48th) and leading the Central and Southern Asia region
- India ranks **amongst the largest startup ecosystems in the world.** About **48 per cent of our startups** are from **Tier II & III cities**.

Steps taken for fostering start-up ecosystem in India

- The **Startup India initiative** of the Government of India envisages building a robust Start-up ecosystem in the country for nurturing innovation and providing opportunities to budding entrepreneurs.
- **Startup India Seed Fund Scheme (SISFS)** is an initiative under the Startup India programme to provide financial assistance to early-stage startups.
- As part of the umbrella schemes of the **National Initiative for Developing and Harnessing Innovations (NIDHI)** and **Atal Innovation Mission (AIM),** entrepreneurship and innovation are fostered across the start-up ecosystem in the country.
- The **Fund of Funds for Start-ups (FFS)** and **Credit Guarantee Scheme for Start-ups (CGSS)** support seed funding and successive credit needs.
- Further, the **Support for International Patent Protection in E&IT (SIP-EIT) Scheme** encourages international patent filing by Indian MSMEs and start-ups.

Impacts on the Indian Economy

- India is the **third-largest startup ecosystem** in the world. The Startup India initiative has had a significant impact on the Indian economy, particularly in terms of job creation and economic growth.
- According to a report by NASSCOM, the Indian startup ecosystem is **expected to create 12-15 million direct jobs by 2025.**
- The initiative has also **attracted significant foreign investment**, with the total funding raised by Indian startups increasing from $3.9 billion in 2014 to $14.5 billion in 2019.

- The initiative has also encouraged the **growth of innovation and entrepreneurship** in India.
- According to the Global Innovation Index, India's rank in innovation has improved from 81st in 2015 to 48th in 2021.
- The initiative has also encouraged the growth of startups in various sectors, including technology, healthcare, and agriculture.

Impacts on Marginalized Communities

- The Startup India initiative has provided various incentives and support to entrepreneurs, including those from marginalized communities. This had a positive impact on the development of marginalized communities in India. For instance, the Stand-Up India scheme provides **loans to women and SC/ST entrepreneurs** to start new ventures.
- Similarly, the **National Handicapped Finance and Development Corporation** provides financial assistance to people with disabilities to start their businesses.
- According to a report by the Ministry of Commerce and Industry, the number of women-led startups in India has increased by 50% since the launch of the initiative.
- Similarly, the initiative has helped in the inclusion of SC/ST entrepreneurs in the mainstream economy, who were previously excluded due to discrimination and lack of access to resources.

Challenges and Limitations faced by startups in India

- One of the main challenges is the l**ack of access to funding for startups**, particularly for early stage startups.
- Another challenge is the **lack of skilled manpower** in the startup ecosystem. Many startups struggle to find skilled employees with relevant expertise and experience.
- Another limitation of the Startup India initiative is its focus on technology startups. Although technology startups have attracted significant funding and attention, other sectors, such as **healthcare, agriculture, and education still have untapped potential**.
- The initiative also faces **several legal challenges**. The regulatory framework for startups in India is complex and often cumbersome, making it difficult for startups to comply with the regulations.
- There is also a **lack of clarity on the definition of a startup**, which creates confusion and ambiguity in the regulatory framework.
- Additionally, there is a need to **strengthen the legal framework for intellectual property rights** to protect the innovations of startups.
- The majority of startups in India are **concentrated in urban areas** and are led by people from privileged backgrounds.
- According to a report by Oxfam India, **only 17% of startups in India are founded by women, and less than 1% are founded by people with disabilities**.
- Similarly, startups in sectors such as healthcare and education are mostly focused on urban areas and serve the needs of the affluent population

Way forward

- The Startup India initiative has been successful in promoting entrepreneurship and innovation in the country. The initiative has created a conducive ecosystem for the growth of startups by providing them with access to funding, mentorship, and other support services.
- However, the initiative also faces several legal challenges, such as the complex regulatory framework and the lack of clarity on the definition of a startup.
- There is a need for a more targeted and comprehensive approach to promoting entrepreneurship among marginalized communities in India. This approach should address the structural challenges and provide adequate support and incentives to promote the growth of startups in marginalized communities.

15. DE DOLLARIZATION

What is De Dollarization?

- According to the basic definition, the de-dollarization refers to **countries reducing their reliance on the US dollar, and advancing trade and economic reserves in their own currency or alternate resources,** including gold and precious metals.
- This practice is being followed by China and Russia, the latter being a strong ally of India. Apart from Bangladesh, countries like Russia, Germany, the UK, Singapore, Sri Lanka, Malaysia, Oman, and New Zealand have already advanced trade with India in the Indian currency.
- Apart from promoting their own currency, the World Bank has also revealed that a lot of international governments are now increasing their gold reserves, rather than relying on the US dollar for the growth in their economy and trade.

How can dollarization help India?

- According to Global Times, the de-dollarization phase in India can greatly help its economy, especially as many countries are currently going through a recession. This is because this practice can **help strengthen the value of the Indian rupee in global trade**.
- As India is expanding its domestic manufacturing sector, trading and dealing in the US dollar can reduce its position in the international market. Further, **the tightening monetary policy of the US Federal Reserve has put pressure on India to stop its reliance on the US dollar as a currency.**
- This means that the Indian rupee can be strengthened greatly due to the de-dollarization of the country, and **can also avert a possible recession in India**.
- **Reduced trade volatility and risk** ,the "de-dollarization" of several central banks is imminent, driven by the desire to insulate them from geopolitical risks, where the status of the US dollar as a reserve currency can be used as an offensive weapon.

Challenges in de dollarization

- **Finding alternatives to the dollar with the right amount of availability, acceptability, and stability** will be a challenge.
- A sudden dumping of dollar assets by adversarial central banks will also put their **balance sheets at risk** by eroding the value of their overall dollar-denominated holdings.
- **Finding the true exchange rate becomes a challenge**—the US dollar serves as the link currency for calculating the value of any two currencies. a new international payments system that could operate as an alternative to the US-dominated SWIFT, as international trade needs a payment and financial system to take place.
- Due to the **dollar's continued primacy as the medium of exchange** in international currency markets, de dollarization cannot happen overnight.

India's Dilemma

- The **US considers India a valuable ally and strategic partner in the Indo-Pacific region**. The Indian government considers Russia and China's efforts to reduce dollar usage, more ideological than practical, and does not explicitly support the mobilisation by BRICS to challenge dollar's hegemony. Recent **military standoffs between India and China may also prevent India from supporting China's plan to dethrone the dollar**.
- In the past also India has explored the possibility of reducing her dependence on dollars. In 2012, India's Ministry of Commerce and Industry had appointed a task force to analyse the idea of using Indian Rupee in India's bilateral trade, especially the idea of utilising the rupee to trade with oil exporting countries. The Indian government had also created a multi-agency task force with representatives from India's economic policymaking agencies to compile a list of countries, where India could trade in rupees.

- In recent times, India has been trying to move away from the dollar. **To this effect, RBI has approved the opening of Special Rupee Vostro Accounts (SRVAs) of correspondent banks from 18 countries,** with permission to trade in Indian rupees. Currency volatility and geopolitical events like US sanctions on Russian oil and China's plans to internationalise the renminbi have encouraged India to promote greater use of rupee for international transactions.

Way forward

- By promoting the Indian rupee, expanding regional trade, forging currency swap agreements, strengthening financial infrastructure, diversifying reserves, and encouraging the internationalization of Indian companies, India can harness the benefits of de-dollarization and strengthen its financial sovereignty.

16. INSURANCE MARKET

- Insurance, an integral part of the financial sector, plays a **significant role in economic development**. Apart from protecting against mortality, property, and casualty risks and providing a safety net, the insurance sector **encourages savings and provides long-term funds for infrastructure development. India** is **one of the fastest-growing insurance markets** in the world. India is expected to emerge as **one of the top six insurance markets** in the world by 2032.

Status of Insurance penetration and Insurance density in India

- Internationally, the potential and performance of the insurance sector are **generally assessed based on two parameters**, viz., **'insurance penetration',** which refers to the **ratio of total insurance premiums to Gross Domestic Product (GDP)** in a year and **'insurance density',** which refers to the **ratio of insurance premium to population,** i.e.; insurance premium per capita and is measured in US Dollar, as they reflect the level of development of the insurance sector in a country.
- **Insurance penetration in India increased steadily** from 2.7 per cent around the turn of the millennium to **4.2 per cent** in 2020 and remained the same in 2021. **Life insurance penetration in India was 3.2 per cent** in 2021, almost twice more than the emerging markets and slightly above the global average. The **insurance density in India has increased** from US$ 11.1 in 2001 to **US$ 91** in 2021 (density for Life insurance was US$ 69 and Non-Life insurance was US$ 22 in 2021).

Figure IV.26a: Steady increase in Insurance Penetration

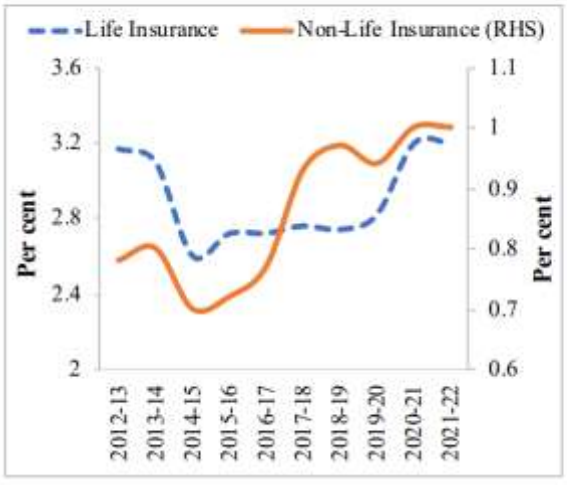
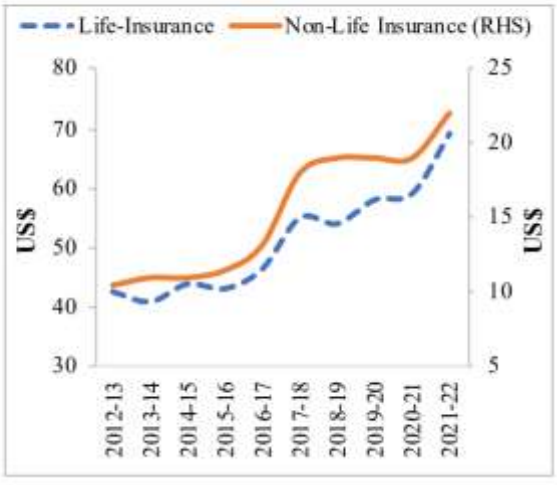


Figure IV.26b: Significant rise in Insurance Density



Government Insurance schemes that promoted the insurance market

- **Government schemes and financial inclusion initiatives** have driven insurance adoption and penetration across all segments. A list of various Government Insurance schemes and progress made so far is given below:

Scheme name	Brief description	Achievement
Ayushman Bharat Yojana	The scheme provides health coverage of ₹5 lakh per beneficiary family per annum to poor and vulnerable families identified based on select deprivation and occupational criteria	Since inception, 19.7 crore beneficiaries have been provided Ayushman cards, and over 4.3 crore hospital admissions worth over ₹0.49 lakh crore have been authorised through a network of 28,667 empanelled health-care providers, including 13,115 private hospitals as of 20th January 2023.
Pradhan Mantri Suraksha Bima Yojana	Under the scheme, risk coverage of ₹2 lakh for accidental death and complete disability and ₹1 lakh for partial disability is given to beneficiaries	Since its inception, 31.3 crore beneficiaries have been enrolled under the scheme, and 1.07 lakh claims have been disbursed as of 30th November 2022.
Pradhan Mantri Jeevan Jyoti Bima Yojana	Under the scheme, risk coverage of ₹2 Lakh is credited to the savings bank account of the holder in case of the death of the insured	Since its inception, 14.4 crore beneficiaries have been enrolled under the scheme, and 6.3 lakh claims have been disbursed as of 30th November 2022.
Pradhan Mantri Vaya Vandana Yojana	Under the scheme, old age income security is provided to senior citizens through the provision of an assured pension/return linked to the subscription amount based on a government guarantee to LIC	A total number of 8.6 lakh subscribers with a subscription amount of ₹84,659.4 crore deposited by these subscribers have benefited under the scheme as of 30th September 2022
Pradhan Mantri Fasal Bima Yojana	Under the scheme, risk insurance is provided to farmers against crop damage due to non-preventable natural risks from pre-sowing to post-harvest for the crops/areas notified by the concerned State Government	During 2016 and 2022, 2763.9 lakh applications were received under the scheme, and claims of about ₹ 1.28 lakh crore have been paid to the farmers.

Challenges in Insurance penetration in India

- **Few buyers & sellers in rural areas** lead fixed costs to remain high, further leading to lower penetration.
- The industry is filled with **perceptions of slow and unreliable agents** who do not have the policy takers' best interests in mind.
- While online and Point of Sale (PoS) channels are slowly gaining popularity, there is a **heavy reliance on traditional distribution channels,** making it tougher for advanced insurance plans to gain traction.
- Insurers in India **lack sufficient capital,** and their financial health, particularly that of the public sector insurers, is in a precarious state.
- The **dominant position of state-owned insurers** is proving to be a cause for concern for private sector insurers as well as foreign insurers.

- Rural participation of insurers remains deficient, and l**ife insurers, especially private ones, gravitate towards the urban population**, to the detriment of the rural population.

Steps that can be taken to improve Insurance penetration in India

- Eliminating the goods and services tax (GST) for term and health insurance.
- Introducing a separate section under the Income-tax Act (over and above Section 80C) that gives a tax benefit on the premium paid towards pure life and health insurance policies. These changes will help provide the much-needed incentives for the wider spread of insurance products.
- Government and insurance companies should **focus on distribution reforms such as increasing the number of insurance agents and insurance brokers**, particularly in rural areas.
- **Providing support and training to insurance agents** to effectively sell the insurance products as per the needs of the people.
- **Raising awareness about the benefits of insurance** and financial protection.

17. Government e-Marketplace

About GeM

- Launched in 2016, the Government-Marketplace (GeM) is a 100 percent government-owned company setup under the aegis of the **Ministry of Commerce and Industry.**
- It is a completely **paperless, cashless and system driven e-market place** that enables procurement of common use goods and services with minimal human interface.
- GeM aims to **enhance transparency, efficiency and speed in public procurement**.
- In 2017, the government made it **mandatory for all the departments and ministries to source goods and services from the GeM.**
- The Union Cabinet has given its approval for expanding the mandate of GeM to allow procurement by Cooperatives as buyers on GeM.
- At present, the platform is open for procurement by all government buyers:
    - central and state ministries,
    - departments,
    - public sector enterprises,
    - autonomous institutions,
    - local bodies, etc.
- As per existing mandate, GeM is not available for use by private sector buyers.
- Suppliers (sellers) can be from across all segments: government or private.
- More than 8.54 lakh registered cooperatives and their 27 Crore members would be benefited with this initiative.

Challenges

- There are **multiple portals in Central government departments**, such as the defence procurement portal, and the Indian Railways eProcurement System, limiting GeM's effort to become a National Public Procurement Portal.
- GeM also faces a challenge in getting all Central organisations to comply with **Rule 149 of the General Financial Rules (GFR) 2017**
    - The rule mandates that **all common-use goods and services that are available on the GeM portal should necessarily be procured on the platform.**
- **Problems with vendor onboarding and verification** as the process may be time consuming and not friendly for new users.
- **Technical infrastructure and connectivity issues.** Inadequate infrastructure or connectivity issues can disrupt the procurement process.
- **Ensuring the quality of goods and services** procured through GeM is crucial. However, maintaining quality standards and addressing counterfeit or substandard products can be challenging.

Way Forward

- **Unification of different procurement verticals** across departments to bring them under this portal.

- **Simplification of the registration process** and proper support team to address the glitches faced during registration.
- **Strengthening of the technical infrastructure** to face the increased load on the system.
- Developing **mechanisms to regularly check the quality** of the goods and services in the system.

18. Cooperatives

Definition

- The International Labour Organization defines a cooperative as an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise.

Cooperative movement in India

- The aim of the co-operative movement in India was to help farmers overcome the burden of debt and help them sell their products easily to get maximum profit.
- Globally, there are more than 30 lakh cooperatives that engage more than 12 percent of the world's population. **India has 8.55 lakh Cooperatives and about 13 crore people are directly associated with them.**
- Different types of Cooperatives in India are
    - Cooperative Credit society.
    - Cooperative Producers society.
    - Cooperative Consumers Society.
    - Housing Cooperative Society.
- Some of the largest cooperatives in India are --
    - Gujarat Cooperative Milk Marketing Federation popularly referred as Amul,
    - Indian Farmers Fertiliser Cooperative (IFFCO) and
    - Krishak Bharati Cooperative Limited (KRIBHCO).

Constitutional and Legal provisions

- **Article 19(1)(c)** of the Constitution of India guarantees to all its citizens the right "to form associations and unions or cooperative societies"
- **Article 43B** states that, the State shall endeavour to promote voluntary formation, autonomous functioning, democratic control and professional management of co-operative societies.
- The functioning of Cooperatives is guided by **the Cooperative Societies Act of the respective states.**
- While the administrative control of the cooperatives are with the states, **its banking functions are regulated by the Reserve Bank of India** under the Banking Regulation Act, 1949.
- **In 2002,** the Centre passed a **MultiState Cooperative Societies Act** that allowed for registration of societies with operations in more than one state.
- **The Banking Regulation (Amendment) Act, 2020** was passed to bring all urban cooperative banks and multistate cooperative banks under the direct supervision of the RBI, following public scandals in certain banks and claims of mismanagement.

Role of Cooperatives

- Co-operative sector plays a vital role in the **process of socioeconomic development** of a country like India where more than two third of the population and 72.4 percent of the workforce reside in rural areas.
- The cooperatives play **a major selfhelp role in rural area**s, particularly where private entrepreneurs hesitate to make investments and public authorities are not able to provide the required services due to paucity of funds.
- The cooperative societies engaged in the rural sector **provide adequate, affordable and timely credit** for the production, processing, storage and marketing of agricultural crops and other allied products.
- They not only **inculcate the habit of saving** but also enable the **communities to pool together their resources** to solve their common socio-economic problems.

- They are **instrumental in providing opportunities** for productive employment, income generation as well as offering health care, education, improved sanitation, roads and market access.
- They encourage **'Production by Masses' instead of mass production**, which is essential for inclusive and sustainable growth of the economy.The contribution of cooperatives in the country's economy is immense.
    - The cooperative sector provides 20 percent of the total agricultural credit in the country. It contributes 10 percent of milk production, 21 percent of fish production, 25 percent of fertiliser production and 31 percent of total sugar production.
    - Apart from this, nearly 13 percent procurement of wheat, 20 percent of paddy and 35 percent distribution of fertiliser is carried out by the cooperative sector.

Challenges in Cooperative functioning

- Inadequacies in governance,
- Politicisation and excessive role of the government,
- Inability to ensure active membership,
- Lack of efforts for capital formation,
- Inability to attract and retain competent professionals and
- There have also been cases where elections to co-operative boards have been postponed indefinitely.

Government Initiatives

- Recognising the significance of the co-operative sector, the **National Cooperative Development Corporation (NCDC)** was established by an Act of Parliament in 1963, to speed up cooperative movement in the country.
- Assistance is provided under **'Central Sector Integrated Scheme on Agricultural Cooperation' (CSISAC)** through NCDC. Under the scheme, a subsidy varying from 15 percent to 25 percent is provided to the cooperatives depending on the category of state of their operation.
- To encourage youth towards cooperatives, **'Yuva Sahakar Cooperative Enterprise Support and Innovation Scheme'** was launched in 2018.
    - The scheme aims at providing mentorship and financial assistance to the enterprising youth to establish start-ups in different types of business activities under the cooperative sector.
- In order to give renewed impetus to the cooperative movement in the country, the Union Government has created the Ministry of Cooperation in 2021, for realising the vision of **'Sahakar se Samriddhi' (Prosperity through Cooperation).**
    - It aims at providing a separate administrative, legal and policy framework for strengthening the cooperative movement in the country.
- Marketing of products and services have remained a challenge for the cooperatives. Recently, cooperatives have been allowed to register on the Government eMarketplace (GeM) as 'buyers'.

Recent Initiative: The Multi-State Co-operative Societies (Amendment) Bill, 2022

- The Multi-State Co-operative Societies (Amendment) Bill, 2022 has been passed by the LokSabha.
- The Bill amends the Multi-State Co-operative Societies Act, 2002 and **establishes the Co-operative Election Authority** to conduct and supervise elections to the boards of multi-state co-operative societies.
- A multi-state co-operative society will require prior permission of government authorities before the redemption of their shareholding.
- **A Co-operative Rehabilitation, Reconstruction and Development Fund will be established for the revival of sick multi-state co-operative societies.** The Fund will be financed through contributions by

profitable multi-state co-operative societies.

- The Bill **allows state co-operative societies to merge into an existing multi-state co-operative** society, subject to the respective state law
- As per the Bill, **the central government will appoint** one or more **Co-operative Ombudsman with territorial jurisdiction.** The Ombudsman shall inquire into complaints made by members of multi-state co-operative societies.
    - **Appeals** against the directions of the Ombudsman may be filed with the **Central Registrar** (who is appointed by the central government) within a month.

Issues with the Bill

- Sick multi-state co-operative societies will be revived by a Fund that will be financed through contributions by profitable multi-state co-operative societies. This effectively **imposes a cost on well-functioning societies.**
- **Giving the government the power to restrict redemption** of its shareholding in multi-state co-operative societies may **go against the co-operative principles of autonomy and independence.**

Way Forward

- **Complete Overhaul:** It is urgent to infuse efficiency, accountability, transparency in the entire system and adopt modern technology and professionalism.
- **Mentoring:** Effective cooperation and coordination amongst cooperatives would mutually benefit their business initiatives and maximise community development. **Bigger cooperatives can mentor the weaker and smaller ones** and ensure that these units retain their competitiveness in the market.
- **Regional Balancing:** Nearly two third of total cooperative societies are located only in seven states viz. Maharashtra, Gujarat, Andhra Pradesh, Telangana, Uttar Pradesh, Madhya Pradesh and Karnataka.
    - In order to ensure their growth in an egalitarian manner, it is necessary to promote the cooperatives in the lagging states particularly the Union Territories and North-East States of the country.
- **Diversification of their activities** by including some new sectors such as, real estate, power, healthcare, insurance, communication, tourism and other services is needed for their revitalisation.
- **Creating Brand value and recognition:** There is also a need to promote the brand of cooperatives through upgradation and value addition in the products and services delivered by them.
- **Realignment of Training programmes:** The Government needs to evaluate the training needs of cooperatives, along with designing and imparting training programmes to ensure that they come at par with the current business environment.

Polity and governance

1. Digital Personal Data Protection Bill, 2023

Introduction

- President Droupadi Murmu has granted assent to the Digital Personal Data Protection Bill, 2023 (DPDP Bill) after it was passed by both Houses of Parliament.

Highlights of the Act

- The Bill will apply to the **processing of digital personal data within India** where such data is collected online, or collected offline and is digitised. It will also apply to **such processing outside India, if it is for offering goods or services in India.**
- Personal data may be processed only for a lawful purpose upon **consent of an individual. Consent may not be required for specified legitimate uses** such as voluntary sharing of data by the individual or processing by the State for permits, licenses, benefits, and services.
- **Data fiduciaries** will be obligated to maintain the accuracy of data, keep data secure, and delete data once its purpose has been met.
- The Bill grants **certain rights to individuals** including the right to obtain information, seek correction and erasure, and grievance redressal.
- The central government may **exempt government agencies** from the application of provisions of the Bill in the interest of specified grounds such as security of the state, public order, and prevention of offences.
- The central government will establish the **Data Protection Board of India** to adjudicate on non-compliance with the provisions of the Bill.

Key Issues and Analysis

- Exemptions to data processing by the State on grounds such as national security may lead to **data collection, processing, and retention beyond what is necessary.** This **may violate the fundamental right to privacy.**
- The Bill **does not regulate risks of harms arising from processing of personal data.**
- The Bill **does not grant the right to data portability and the right to be forgotten** to the data principal.
- The Bill allows **transfer of personal data outside India**, except to countries notified by the central government. This mechanism **may not ensure adequate evaluation of data protection standards** in the countries where transfer of personal data is allowed.
- The members of the Data Protection Board of India will be appointed for **two years** and will be eligible for re-appointment. The short term with scope for re-appointment may **affect the independent functioning of the Board.**

2. National Capital Territory of Delhi (Amendment) Bill 2023

Introduction

- President Droupadi Murmu has granted assent to the Government of National Capital Territory of Delhi (Amendment) Bill 2023. The Bill amended the Government of National Capital Territory of Delhi Act 1991.

Highlights of the Act

- The bill establishes the **National Capital Civil Services Authority (NCCSA)** which will make **recommendations to the Lt Governor,** who is appointed by the Union government.
- The NCCSA will include the **Chief Minister** who will serve as the **chairperson**, the **Principal Home Secretary** of Delhi, who will serve as the member secretary and the **Chief Secretary of Delhi,** who will serve as **member**.
- Both the principal home secretary and chief secretary will be **appointed by the central government.**
- The NCCSA will make **recommendations** to the Lt

Governor on **matters related to transfers and postings, vigilance, disciplinary proceedings and prosecution sanctions of civil servants of Group A of All India Services (except Indian Police Service) and DANICS** (Delhi, Andaman and Nicobar, Lakshadweep, Daman and Diu and Dadra and Nagar Haveli (Civil) Services).

- The decisions of the body will be based on a **majority**, and therefore creates the possibility for the Union government appointed members to overrule the decisions of the chief minister.
- The LG will have the power to **approve** the recommendations of the NCCSA or ask for a **reconsideration**. The **LG's decision will also prevail over the NCCSA if there is a difference of opinion.**
- The bill also empowers the LG to **exercise his "sole discretion" on several matters.** The matters that are at the LG's sole discretion include matters outside the legislative competence of the Delhi Legislative Assembly but which have been delegated to the LG, or matters where he is required by a law to act in his discretion or exercise any judicial or quasi-judicial functions.
- The law also **curtails the elected government's powers to issue orders on important matters** by giving the final word to the LG on matters relating to those affecting peace and tranquility in Delhi, matters affecting Delhi government's relations with the Central government, or any state government, the Supreme Court of India or the High Court of Delhi and such other authorities, summoning, prorogation and dissolution of the Legislative Assembly, among others.
- The bill also **allows department secretaries to take matters to the LG, chief minister and chief secretary** without consulting the concerned minister.
- The bill states that the power to appoint authorities, boards, commissions, statutory bodies, or office bearers will be with the **President** for any law of Parliament, and with the **LG** for any law of Delhi legislature.

Criticisms

- In its analysis of the bill, **PRS Legislative Research** noted that by taking away the Delhi government's power over services, it **violates the constitution's basic structure.**
- The Bill replaces an **ordinance** promulgated by the Centre brought in May, **overriding an order by the apex court** which ruled that **only Delhi's elected government has authority over civil servants.**
- The court also ruled that except for issues linked to land, police and public order, the lieutenant governor has **"no independent decision-making powers" under the Constitution.**

3. Safety Net for Farmers

Introduction

- Agriculture is the mainstay of the Indian economy accounting for the **primary livelihood of approximately 52 per cent of the population** and a chief source of raw materials for many major industries.
- The **share of agriculture and allied sectors in total GVA (Gross Value Added)** of the economy has improved to **20.2 per cent** (2020-21) and **18.8 per cent** recently.
- Farming in India is **dominated by marginal and small farmers** (below 1 hectare and 1-2 hectare land holdings respectively) who **account for nearly 86 per cent of all the farmers** in the country, but own just 47.3 per cent of the crop area (10th Agriculture Census, 2015-16).
- Smallholder farmers are unable to capture commensurate value for their farm produce mainly due to low visibility of demand; limited access to efficient and low-cost logistics; and low power of bargaining. Their land

holdings are too small to generate sufficient household income.

- According to the National Sample Survey (77th Round, 2019), **50.2 per cent of agri-households in India are in debt** and an average household has debt equivalent to 60 per cent of its annual income.
- The survey also showed **increasing fragmentation of holdings vis-à-vis an increasing number of small farmers.** Hence, it was befitting to formulate and implement social security schemes for the farming community by and large, and specifically for small and marginal farmers.

Definition of Social Security

- **International Labour Organization (ILO)** defines social security as the **protection that a society (Government) provides to under-privileged/disadvantaged groups to ensure access to healthcare and to guarantee income security.**

Initiatives by Government of India

1. MGNREGA:

- The National Rural Employment Guarantee Act 2005 (later renamed as Mahatma Gandhi NREGA) was passed by the Parliament as a legal social security measure that **guaranteed the 'right to work'.**
- Accordingly, a scheme (**Mahatma Gandhi NREGS**) was launched in a **demand-driven model** to **provide livelihood security to rural households.** Basically, it is an employment programme that **guarantees at least 100 days of wage employment** in every financial year to every household whose adult members volunteer to do unskilled manual work.
- In case of non-offering of work, the beneficiary is eligible for **unemployment allowances** to be paid by the State as per the provision of MGNREGA. In addition to this, there is a provision for an **additional 50 days of unskilled wage employment in a financial year in drought/ natural calamity-notified rural areas.**
- A major chunk of resources are spent on works related to **natural resource management** (check dams, ponds, renovation of traditional water bodies, field bunds, water conservation, irrigation works, etc.) which ensure **higher income to farmers** by enhancing both the area under cultivation and yield of crops.
- The creation of durable community and individual beneficiary assets (goat sheds, dairy sheds, vermi-compost pits, water soak pits, etc.) has **helped the underprivileged to have access to an alternative sustainable livelihood.**

2. Deendayal Antyodaya Yojana:

- Day-National Rural Livelihoods Mission (DAYNRLM) is a unique social security scheme that **aims to reduce poverty by enabling poor households to access gainful self-employment and skilled wage employment opportunities.**
- The Mission seeks to alleviate rural poverty by **mobilising rural poor women into Self Help Groups (SHGs).** The Mission aims to mobilise 8-10 crore rural poor households into SHGs in a phased manner and provide them long-term support such that they diversify their livelihoods, and improve their incomes and quality of life.
- **Financial support** is provided to budding SHGs by providing **Revolving Fund** (at Rs.10,000 – 15,000 per SHG) and **Community Investment Support Fund** (upto Rs. 2.50 lakh per SHG). SHGs use these funds to provide loans to their members to undertake income generating socio-economic activities as per their micro-credit or investment plans.
- Under a sub-component of DAY-NRLM (**Mahila Kisan Sashaktikaran Pariyojana or MKSP**), women farmers are being empowered by making systematic investments to create sustainable and diversified livelihood opportunities for them.
- Women farmers are trained in several areas of livelihood importance (kitchen gardening and nutrition

gardening, development of low/minimum cost diet with high nutrient efficiency, latest agricultural and allied technologies, processing and value addition, rural crafts, etc.) through community resource persons and extension agencies.

3. National Social Assistance Programme:

- The **Ministry of Rural Development** operates a wide-angle social security scheme– National Social Assistance Programme (NSAP)— to provide **financial assistance to the elderly, widows, and persons with disabilities in the form of social pensions.**
- It **covers urban as well as rural citizens** that include a large number of farmers, rural artisans, landless labourers, and their families.
- The programme is being implemented through defined and structured pension and welfare schemes for target groups. It is **funded by Central and State Governments.**

4. PM-KISAN:

- Launched in 2019, Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) aims to **supplement the financial needs of farmers** in procuring various inputs to ensure proper crop health and appropriate yields, commensurate with the anticipated farm income at the end of each crop cycle. This would also **protect them from undue reliance on moneylenders** for meeting such expenses and ensure their continuance in the farming activities.
- Under the Scheme, **financial assistance of Rs 6,000 per annum is provided to all landholding farmer families across the country**, subject to certain exclusion criteria related to higher-income strata.
- The amount is transferred in three monthly installments of Rs 2,000 each, directly into the bank accounts of the beneficiary farmers identified by the State/Union Territory Governments.

5. Pradhan Mantri Kisan Maandhan Yojana:

- Small and marginal farmers have minimal or no savings to sustain their livelihood during their old ages. Acting proactively on the sensitive issue, the Government of India launched a customised pension scheme for farmers in 2019.
- Named as Pradhan Mantri Kisan Maandhan Yojana (PMKMY), the Scheme aims to provide a **social security net for the small and marginal farmers by way of pension.** A **minimum fixed pension of Rs 3,000 per month** is provided to the eligible small and marginal farmers on attaining the age of 60 years.
- The Scheme is **voluntary and contributory** in nature with an **entry age of 18 to 40 years.** The beneficiary is required to contribute Rs 100 per month at the median entry age of 29 years, whereas the Central Government also contributes an equal amount to the Pension Fund.

6. Pradhan Mantri Fasal Bima Yojana:

- The Pradhan Mantri Fasal Bima Yojana (PMFBY) is a uniquely designed social security scheme under which **financial assistance is provided to farmers in distress due to loss/damage to crops arising out of natural calamities.**
- The Scheme has been able to provide financial assistance to the most vulnerable farmers, as around 85 per cent of the farmers enrolled under it are small and marginal farmers.

Way Forward

- Besides specific schemes, farmers and agricultural workers need a **comprehensive social security programme** that must cover all the exigencies as enumerated by ILO.
- These include death, disability, sickness, health, injury, unemployment and various types of accidents. Such programmes need to be implemented with an effective and widespread infrastructure at the grassroots level so that last mile connectivity is ensured.
- Details and benefits of such schemes must be disseminated through various media to maximise their impact on the social well-being of farmers.

4. Empowering Divyangjan

Introduction

- India has been known across the world as having a composite and inclusive culture since ancient times.
- India being a party to the **United Nations Convention on Rights of Persons with Disabilities,** it is an obligation on the government to streamline domestic law, governing the disability sector.

Measures Taken

1. Rights of Persons with Disabilities Act, 2016:

- The Government of India has enacted the Rights of Persons with Disabilities Act, 2016 to broaden the horizon of rights and entitlements of persons with disabilities, besides providing adequate safeguards for protecting these rights.
- The Act guarantees equality, protection from cruelty, exploitation and violence, the right to live with family and community, access to justice, accessibility to voting, legal capacity, etc.
- It also **mandates the Government to take measures to promote health, education, skill development, and employment opportunities for PwDs and to create an environment for participation of PwDs in sports, recreation, and cultural activities.**
- The Act guarantees **5% reservation in seats in Government and Government aided higher educational institutions** for persons with benchmark disabilities and **4% reservation in Government jobs** for certain persons or class of persons with benchmark disability.

2. Unique Disability Identity Project:

- With a view to having a uniform and hassle-free mechanism for the certificate of disability and creating a national database for PwDs, the Government has launched the Unique Disability Identity (UDID) Project since 2015-16.
- It aims to issue a Unique Disability Identity Card to each person with disabilities.

3. Accessible India Campaign:

- The Government of India launched the Accessible India Campaign in 2015, which focuses on **accessibility in the built-up environment, transportation system, and ICT ecosystem.**
- The campaign is based on the **principles of the Social Model of Disability,** that disability is caused by the way society is organised, and not the person's limitations and impairments.
- The physical, social, structural and attitudinal barriers prevent People with Disabilities from participating equally in the socio-cultural and economic activities. A barrier-free environment facilitates equal participation in all the activities and promotes an independent and dignified way of life.

4. Early Intervention Centres:

- **Early childhood (0-6 years)** is a critical period that determines a person's ability to reach her/his lifelong health, social, and economic potential. As such, **early identification of disability** is crucial for therapeutic intervention to reduce the disability burden.
- Recognising this, the Department of Empowerment of Persons with Disabilities (DEPwD) has set up 14 Early Intervention Centres. These centres are equipped with facilities for screening at-risk cases, providing therapeutic services such as speech therapy, occupational therapy, physiotherapy, behavioural therapy, parental/peer counselling, and preparatory school for enhancing the cognitive and physical abilities of children with disabilities.

5. ADIP Scheme

- DEPwD also implementing the **Assistance to Disabled Persons for Purchase/Fitting of Aids and Appliances (ADIP) scheme**, under which aids and assistive devices are distributed to Divyangjan to improve their mobility so that, apart from carrying out daily living activities

independently, they can also go to work and earn a living.

6. Other Initiatives:

- The Government has also set up the **Indian Sign Language Research and Training Centre** in Delhi to promote the use of sign language and also to develop human resources in the field.
- DEPwD also set up the **National Institute of Mental Health Rehabilitation (NIMHR)** at Sehore, Madhya Pradesh. The institute aims to work towards capacity building in the field of mental health rehabilitation besides developing community-based rehabilitation protocols for mainstreaming persons with mental illness who have been successfully cured.
- DEPwD through its flagship scheme, **Deendayal Disabled Rehabilitation Scheme** has been supporting the NGOs to run various projects such as special education with residential facilities for children with hearing, visual, intellectual disabilities, their vocational training, etc.
- The Minister for Social justice and Empowerment has developed **Sugamya Bharat App**, a mobile application for crowdsourcing problems related to accessibility.
- The Ministry of Information & Broadcasting has issued guidelines in 2019 for **making TV viewing accessible for persons with hearing impairment.**

Conclusion

- The goal of having a truly inclusive society cannot be achieved through Government initiatives alone without the active participation of all stakeholders including NGOs, PwD associations, academic bodies and civil society organisations.

5. Special Initiatives and Schemes for Women

1. National Commission for Women:

- In 1992, the Government set-up this **statutory body** with a specific mandate to study and monitor all matters relating to the constitutional and legal safeguards provided for women, review the existing legislation to suggest amendments wherever necessary, etc.

2. Reservation for Women in Local Self-Government:

- The 73rd and 74th Constitutional Amendment Acts ensure **one-third of the total seats** for women in all elected offices in local bodies whether in rural areas or urban areas.

3. Mission Shakti

- It is an **umbrella scheme for the safety, security and empowerment of women.** It aims at **strengthening interventions for women safety, security and empowerment.**

Components

- Mission Shakti has two sub-schemes - **'Sambal'** and **'Samarthya'.**
    - In the **"Sambal"** sub-scheme, which is for **safety and security of women,** the existing scheme of **One Stop Centre (OSC), Women Helpline (WHL), BetiBachaoBetiPadhao (BBBP)** have been included with a new component of **Nari Adalats** - women's collectives to promote and facilitate alternative dispute resolution and gender justice in society and within families.
    - In the **"Samarthya"** sub scheme, which is for **empowerment of women**, existing schemes of **Ujjwala, SwadharGreh and Working Women Hostel** have been included with modifications. In addition, the existing schemes of **National Creche Scheme for children of working mothers** and **Pradhan Mantri Matru Vandana Yojana (PMMVY)** have now been included in Samarthya.

4. One Stop Centre Scheme:

- It is a centrally sponsored scheme which provides for a range of services including police facilitation, medical aid, psycho-social counselling, legal counselling and temporary shelter to

women affected by violence in an integrated manner under one roof.

5. Swadhar Greh:

- The Ministry of Women and Child Development is implementing the Swadhar Greh Scheme which targets the women victims of difficult circumstances who are in need of institutional support for rehabilitation so that they could lead their life with dignity.

6. National Creche Scheme:

- The National Creche Scheme for the children of working mothers provides daycare facilities to the children. Under this scheme, the creches provide daycare services to children in the age group of 0 to 6 years of working mothers.

7. Nirbhaya Fund:

- A dedicated non-lapsable corpus fund for implementation of initiatives aimed at enhancing the safety and security of women in the country. The fund is administered by the **Department of Economic Affairs, Ministry of Finance.** The **Ministry of Women and Child Development (MWCD)** is the nodal Ministry to appraise/recommend proposals and schemes to be funded under Nirbhaya Fund.

8. Protection of Women from Sexual Harassment at Workplace (Prevention, Prohibition and Redressal) Act 2013:

- It was passed to facilitate action against any form of sexual harassment at work which would disincentivise women from participating in the economy.
- Every employer is required to constitute an **Internal Complaints Committee** at each office or branch with **10 or more employees.**
- Every district will have a **Local Complaints Committee (LCC)** so as to enable women in the unorganised sector or small establishments to work in an environment free of sexual harassment.
- The LCC will receive complaints:
    - From women working in an organisation having less than 10 workers;
    - When the complaint is against the employer himself;
    - From domestic workers.
- At least **50 percent** of the nominated members in any Internal or Local Committee must be women.

9. Sexual Harassment electronic–Box (SHe-Box):

- An online complaint management system for registering complaints related to sexual harassment at the workplace by women, including government and private employees.

10. Beti Bachao Beti Padhao (BBBP):

- It is a tri-ministerial, convergent effort of Ministries of Women and Child Development, Health & Family Welfare and Education. The scheme is envisaged to **address the declining Child Sex Ratio** and related issues of women empowerment over a life-cycle continuum.

11. Pradhan Mantri Matru Vandana Yojana:

- It is a direct benefit transfer (DBT) scheme under which cash benefits are provided to pregnant women in their bank account directly to meet enhanced nutritional needs and partially compensate for wage loss. A conditional **cash benefit of Rs. 5,000** in three installments is provided for the **first living child of the family.**

12. Janani Suraksha Yojana (JSY):

- A safe motherhood intervention under the National Health Mission (NHM) for curbing maternal and neonatal mortality by **promoting institutional deliveries** especially among the pregnant women belonging to weaker socio-economic strata (SC, ST, BPL households).

13. Maternity Benefit (Amendment) Act 2017:

- The amendment increased the **duration of paid maternity leave** available for women from 12 weeks to **26 weeks**, introduced an enabling provision relating to **"work from home" for women** and also made **crèche facilities** mandatory for every establishment employing 50 or more employees.

14. Support to Training and Employment Programme for Women (STEP):

- STEP has been envisaged to train women with no access to formal skill training facilities, especially in rural India. The initiative reaches out to all Indian women above 16 years of age. The programme imparts skills in several sectors such as agriculture, horticulture, food processing, handlooms, traditional crafts like embroidery, travel and tourism, hospitality, computer and IT services.

15. Stand-Up India:

- This scheme facilitates loans between **10 lakh and 1 crore** to **at least one scheduled caste/scheduled tribe and one woman per bank branch** for setting up a greenfield enterprise (manufacturing, services or the trading sector). In case of non-individual enterprises, at least 51 per cent of the shareholding and controlling stake should be held by either an SC/ST or woman entrepreneur.

16. Rashtriya Mahila Kosh (RMK):

- RMK provides micro-credit to women in the informal sector without collateral for income generation activities.

17. Mahila E-Haat:

- It is a website which leverages technology for showcasing products made/ manufactured/sold by women entrepreneurs. It provides access to markets for women entrepreneurs across the country.

18. Pradhan Mantri Ujjwala Yojana (PMUY):

- The Ministry of Petroleum & Natural Gas launched PMUY in 2016 to provide clean cooking fuel to poor households. It provides **deposit free LPG connections to poor households.** The connections are issued in the name of women of the households.

6. Transgender Persons (Protection of Rights) Act, 2019

About Transgender Persons (Protection of Rights) Act, 2019

- **Definition**: The act defines a transgender person as one whose gender does not match the gender assigned at birth. It includes transmen and trans-women, persons with intersex variations, gender-queers, and persons with socio-cultural identities, such as kinnar and hijra.
- **Certificate of identity**: The Act allows **self perception of gender identity**. But it mandates that each person would have to be recognised as 'transgender' on the basis of a certificate of identity issued by a **District Magistrate.**
- **Welfare measures by the government:** The Act states that the relevant government will take measures to ensure the full inclusion and participation of transgender persons in society. It must also take steps for their rescue and rehabilitation, vocational training and self-employment, create schemes that are transgender sensitive, and promote their participation in cultural activities.
- **Prohibition against discrimination:** The Act prohibits the discrimination against a transgender person, including denial of service or unfair treatment in relation to education, employment, healthcare, access to, or enjoyment of goods, facilities, right to movement, right to reside, rent, or otherwise occupy property, opportunity to hold public or private office and access to a government or private establishment in whose care or custody a transgender person is.
- **Right of residence:** Every transgender person shall have a right to reside and be included in his/her household.
- **Employment:** No government or private entity can discriminate against a transgender person in employment matters, including recruitment, and promotion.
- **Offences and penalties:** The Act recognizes the following offences against transgender persons: (i) forced or bonded labour (excluding compulsory government service for

public purposes), (ii) denial of use of public places, (iii) removal from household, and village, (iv) physical, sexual, verbal, emotional or economic abuse. Penalties for these offences vary between six months and two years, and a fine.

- The Act makes it mandatory to constitute the **National Council for Transgender persons (NCT)** headed by the **Union Minister of Social Justice & Empowerment** to advise the central government as well as monitor the impact of policies, legislation and projects with respect to transgender persons. It also redresses the grievances of transgender persons.

Major Judgements

- **National Legal Services Authority of India (NALSA) Vs. Union of India Case (2014)** under which the Supreme Court for the very first time **recognised transgendered persons as a "third gender"** and directed the government to safeguard their rights and extend certain reservations for admission into education institutions and public appointments to third gender persons.
- In the **Navtej Singh Johar Vs. Union of India Case (2018)**, Supreme Court decriminalised some part of **Section-377 of Indian Penal Code** that barred even consensual homosexual sex between adults, thereby strengthening transgender rights.
- In this case, the Supreme Court introduced the concept of the **Doctrine of progressive realisation of rights** which mandates that the laws of a country should be in consonance with its modern ethos, it should be "sensible" and "easy to apply".
- Using this legal doctrine, then Chief Justice of India Dipak Misra held that once a right is recognised and given to the public, it cannot be taken back by the state at a later date. Once a step is taken forward, there is no going back.

Criticisms of the current Act

- In the **NALSA judgement**, the state and central govts were asked to **extend backward class reservation to transgenders** in education and public employment. But the act fails to address that issue.
- A **transgender commission at the national level is not enough**. There is need for a welfare board for transgender, and a helpline number for those in distress at regional and local levels.
- The act **does not mention any punishments for rape or sexual assault** of transgender persons as according to Section 375 of the Indian Penal Code stands, rape is something that only a man can do to a woman.
- There are **lighter punishments** for several criminal offences, such as "sexual abuse" and "physical abuse" if they are committed against transgender people in comparison to females

7. Initiatives related to Education

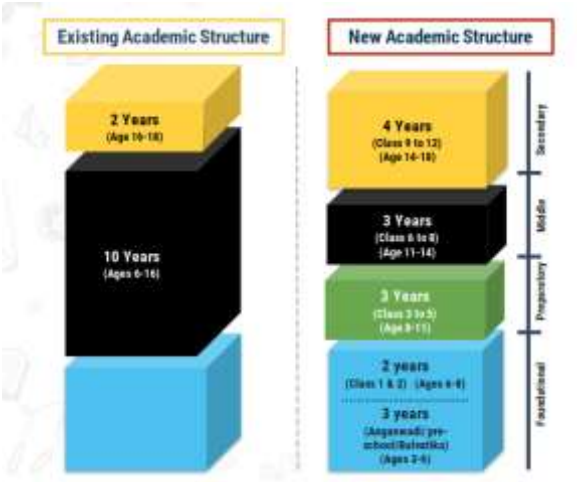
1. National Education Policy 2020

- In 2020, the Union Cabinet approved the National Education Policy 2020. This policy replaced the 34 year old National Policy on Education (NPE), 1986.
- The policy is based on the pillars of **"access, equity, quality, affordability, accountability"** and will transform India into a vibrant knowledge hub.

Highlights of the Policy

Early Childhood Care & Education

- The current 10+2 system to be replaced by a new **5+3+3+4 curricular structure** corresponding to ages 3-8, 8-11, 11-14, and 14-18 years respectively. This will bring the hitherto uncovered age group of 3-6 years under school curriculum, which has been recognized globally as the crucial stage for development of mental faculties of a child.



- The new system will have **12 years of schooling with three years of Anganwadi/ pre schooling.**
- New Policy aims for **universalization of education from preschool to secondary level** with **100 % Gross Enrolment Ratio (GER) in school education by 2030.**
- NEP 2020 will bring 2 crore out of school children back into the mainstream through an open schooling system.

Reforms in school curricula and pedagogy

- The school curricula and pedagogy will aim for holistic development of learners by equipping them with the key 21st century skills, reduction in curricular content to enhance essential learning and critical thinking and greater focus on experiential learning. Students will have increased **flexibility and choice of subjects.**
- There will be no rigid separations between arts and sciences, between curricular and extra-curricular activities, between vocational and academic streams.
- **Vocational education** will start in schools from the 6th grade, and will include internships.
- NEP 2020 calls for the setting up of **a National Mission on Foundational Literacy and Numeracy** by the Education Ministry. States will prepare an implementation plan for attaining **universal foundational literacy and numeracy in all primary schools for all learners by grade 3 by 2025.**

Medium of instruction

- The policy states, the medium of instruction until at least class 5 (and preferably till class 8) should be **"home language or mother tongue or local/regional language".** The policy gives the freedom to the state, region, and child to choose **three languages** to be learned. However, at least two of the three languages should be native Indian languages.
- Assessment reforms with **360 degree Holistic Progress Card, tracking Student Progress for achieving Learning Outcomes.**

NCFTE 2021

- A new and comprehensive National Curriculum Framework for Teacher Education, NCFTE 2021, will be formulated by the National Council for Teacher Education (NCTE) in consultation with NCERT.
- By 2030, the **minimum degree qualification for teaching will be a 4-year integrated B.Ed.** degree.
- Every state/district will be encouraged to establish **"Bal Bhavans"** as a special daytime boarding school, to participate in art-related, career-related, and play-related activities.

Higher Education

- **Gross Enrolment Ratio in higher education to be raised to 50% by 2035**.
- **Multidisciplinary Education and Research Universities (MERUs)**, at par with IITs, IIMs, to be set up as models of best multidisciplinary education of global standards in the country.
- The **National Research Foundation** will be created as an apex body for fostering a strong research culture and building research capacity across higher education.

Higher Education Commission of India (HECI)

- HECI will be set up as a single umbrella body for the entire higher education, excluding medical and legal education. Public and private higher education institutions will be governed by the same set of norms for regulation, accreditation and academic standards.

- **Internationalization of education** will be facilitated through both institutional collaborations, and student and faculty mobility and allowing entry of top world ranked Universities to open campuses in our country.

Others focus areas

- The policy aims to achieve **100% youth and adult literacy.**
- An autonomous body, the **National Educational Technology Forum (NETF)**, will be created to provide a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning, administration.
- NEP 2020 emphasizes setting up of **Gender Inclusion Fund, Special Education Zones for disadvantaged regions** and groups
- A new National Assessment Centre, **PARAKH** (Performance Assessment, Review, and Analysis of Knowledge for Holistic Development), will be set up as a standard-setting body.
- New Policy **promotes Multilingualism** in both schools and higher education.
- **National Institute for Pali, Persian and Prakrit, Indian Institute of Translation and Interpretation** to be set up.
- The Centre and the States will work together to increase the public investment in the **Education sector to reach 6% of GDP at the earliest.**

2. Exemplar

- The Scheme of Exemplar aims to **prepare more than 15000 schools of excellence** which will help showcase the implementation of the NEP 2020 and emerge as exemplars and schools of excellence over a period of time.
- They will provide leadership in their respective regions in providing high-quality education in an equitable, inclusive, and joyful school environment that takes care of the diverse background, multilingual needs, and different academic abilities of children and makes them active participants in their own learning process as per the vision of NEP 2020.

3. New India Literacy Programme (NILP)

- It is a new Centrally Sponsored Scheme of **Adult Education** for Financial Years 2022-27. The objective of the scheme is to impart not only **foundational literacy and numeracy** but also to cover other components which are necessary for a citizen of 21st century such as **critical life skills, vocational skills development, basic education** and **continuing education.** The scheme will cover non-literates of the age of 15 years and above in all state/UTs in the country.

4. Operation Digital Board (ODB)

- The Scheme of ODB provides **class-centric digital intervention** for teaching and learning and is proposed to be implemented for **class IX to XII in all the government and aided schools in the country.**

5. Pradhan Mantri Poshan Shakti Nirman (PM POSHAN)

- PM POSHAN is one of the foremost rights-based Centrally Sponsored Schemes under the National Food Security Act, 2013 (NFSA).
- The main objectives of the Scheme (earlier known as **Mid-Day Meal Scheme**) are to address two of the pressing problems for the majority of children in India, viz. **hunger and education** by improving the nutritional status of eligible children in Government and Government-aided schools as well as encouraging poor children, belonging to disadvantaged sections, to attend school more regularly and help them concentrate on classroom activities.

6. Pradhan Mantri Innovative Learning Programme (DHRUV)

- This Scheme is an initiative to provide **guidance from renowned/prominent persons** in their field to select talented students.

7. Samagra Shiksha

- The erstwhile Schemes of Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA), and Strengthening of Teacher Training

Institutions have been merged to form the Scheme of Samagra Shiksha. The merger intends to give a **holistic and integrated approach to School Education** in line with NEP 2020.

8. Strengthening Teaching-Learning and Results for States (STARS)

- The STARS project seeks to support the States in developing, implementing, evaluating, and improving interventions with direct linkages to improved education outcomes and school to work transition strategies for improved labour market outcomes.

9. ASPIRE (Accelerating State Education Program to Improve Results)

- ASPIRE is a Centrally Sponsored Scheme **supported by Asian Development Bank.** ASPIRE will assist the central government in implementing Samagra Shiksha, to **improve education outcomes in Assam, Gujarat, Jharkhand, Tamil Nadu, and Uttarakhand.**

8. Leveraging India's Tourism Sector

Introduction

- As the government gets into the act of robust post covid recovery in the economy, grabbing the opportunity and promoting the travel and tourism sector for further economic growth and employment is needed.

Signs of Recovery

- Pandemic had snatched the livelihood of millions of people in direct and indirect employment. The **share of the travel and tourism industry** in the Indian GDP went down to just **5.3 per cent** in 2020 from as much as 10.3 per cent in 2019.
- However, the **share of the tourism industry** in the overall GDP had **risen to 6.1 per cent** in 2021. There is an **addition of 18 million jobs** in 2021 as compared to the previous year.

Significance of Developing the Tourism Sector

- **Multiplier effect on other industries:** A booming travel and tourism industry can have a spiralling effect on various other sectors like food, restaurant, catering and hospitality. For instance,
    - Organizing food festivals and establishing food hubs at places close to major tourist destinations will result in further growth in the restaurant sector.
- **Livelihood opportunities:** The tourism industry is a significant driver of employment creation for **women, migrant workers and young people,** particularly to the **rural youth**.
- **Developmental objectives:** Social development and poverty alleviation can be achieved through social inclusion and regional integration through the development of this important sector.
- **Forex earnings:** Higher forex reserves because of foreign tourists' arrival in India is of great significance, especially when the global energy and food prices are northward bound.
    - Foreign tourist arrivals account for the country's **third largest share of foreign exchange (forex) earnings.**
    - Forex earnings from the tourism sector saw around **9.4 per cent annual growth** in the 2011 to 2019 period.

Opportunity within the G20 group

- G20 member nations account for the **highest foreign tourist arrival numbers in India**.
- In 2021, **Bangladesh, the United States, the United Kingdom, France and Germany** took the top five places for foreign tourist arrivals in India. Except for Bangladesh, all the others are G20 members.
- To clinch the rightful place of India's tourism industry in the global arena ahead of other G20 countries, the government of **India can work with the tourism ministers of member nations** to further ease the norms and do away with redundancies in granting E-tourist and E-medical visas to visitors of these countries.

Multi-pronged Approach

- To support a fast-growing travel and tourism industry, the government will have to have a multi-pronged approach which includes:
    - **Ensuring ample skilled labour** is available;
    - Providing **vocational education and training** the youth;
    - **Improving the sector's working conditions** to improve the industry's service quality;
    - Need for institutes and colleges that can **impart professionalism and soft skills** to the youth to support the industry's growth;
    - **Intertwining the development of the travel and tourism industry** with the prospects and growth of **other related sectors** like handicrafts, transport, infrastructure development, etc;
    - Making improvements in **road and water connectivity** in some prime tourist destinations, apart from **security arrangements.**

Conclusion

- As India marches ahead in its dream of having a $5 trillion economy, the emphasis on developing the tourism industry will be a step in the right direction.

9. Production Linked Incentive Scheme (PLI)

Introduction

The Production Linked Incentive (PLI) aims to **give companies incentives on incremental sales** from **products manufactured in domestic units**. Apart from inviting foreign companies to set shop in India, the scheme also **aims to encourage local companies to set up or expand** existing manufacturing units.

The need for PLI scheme

- The strategy behind these schemes is to offer companies incentives on incremental sales from **products manufactured in India**, over the base year.
- The subsidies can create avenues for **employment generation** within the domestic sectors thereby leading to increased hiring and decreasing the unemployment rates.
- By providing incentives and subsidies to domestic industries, the government can reduce the dependency on imports which **leverages import substitution**.
- The subsidies can also foster innovation and technology development thereby leading to the expansion of the domestic industrial base.
- They have been specifically designed to **boost domestic manufacturing in sunrise and strategic sectors** like automobile components, alternative solutions for electricity and so on.
- The PLI schemes have been introduced as a **key element under the Atma Nirbhar Bharat Package** to transform the manufacturing landscape of the Indian economy.
- By offering financial incentives, it creates a **favourable business environment** for attracting investments **into the domestic sectors**. This can create opportunities for various businesses to **expand or establish their businesses** within the domestic boundaries of the country.

Challenges in effective implementation of PLI

- **Identifying the right sectors for providing incentives** is a crucial step for the success of the PLI scheme. This requires **careful analysis and assessment** for the proper transmission of the incentives.
- **Efficient administration** is also inevitable for the proper implementation of the scheme. This **requires proper compliance** by the beneficiary companies for a strong administration of the PLI.
- There is also a **requirement of a common set of parameters** for understanding the value added by companies which are **likely to receive incentives under the scheme**.

- Different sectors within the manufacturing industry **face different challenges** which should be taken into consideration during the implementation of the scheme. The challenges could **include supply chain complexities, skill gaps and global market dynamics**.
- There is also a risk of **becoming overly dependent on the subsidies** and may not invest adequately in improving their skills or innovation capacities.

Way forward

- To strengthen the **supply chain integration** for improved efficiency, reducing costs and enhancing competitiveness.
- The implementation of the PLI scheme involves **robust monitoring and evaluation** mechanisms. The progress of the scheme **lies on regular assessments** to identify the potential challenges and requires course correction.
- By **simplifying and rationalizing the regulatory frameworks** which can reduce bureaucratic burdens and **streamlining the processes** and increasing transparency which creates a conducive environment for the business to thrive in the field.
- By **facilitating market access and reducing the trade barriers** and also promoting export-oriented policies are essential for global growth of the business.

10. Child marriage

Introduction

The Indian government has recently raised the age of marriage for girls to prevent child marriage among young children through the Prohibition of Child marriage (Amendment) Bill which has raised the age of marriage for girls from 18 years to 21 years of age. The National Family Health Survey estimates that 40% of the 60 million child marriages worldwide occur in India.

Reasons for child marriage

- The major cause for the rampant prevalence of child marriage in India is due to the **prevailing patriarchal ideals** to marry off the girls at a lower age to reduce the burden on the family.
- Governments are frequently unable to implement the laws related to child marriage due to the **ingrained beliefs in the customs and traditions**. The acceptance of the prevailing **customary traditions and religious beliefs** are the major reasons for the prevalence of child marriage in India.
- **Poverty is the major reason** for the prevalence of child marriage as poor families are unable to provide for themselves as well as the girl child.
- **Demand is high for younger brides** as they are seen as productive social labour.
- To **control the sexuality of girls**, they are married on reaching puberty.

Consequences

- Children born to relatively young moms have **significant mortality rates.** Health issues are likely to arise in the youngsters that survive.
- **Domestic violence and abuse** can have significant impact on the mental health of young moms.
- Some females are also **less likely to have children** if they pursue higher education which feeds the cycle of poor literacy and scarce job opportunities.
- **Fertility rates are directly impacted** by lower marriage age. The reproductive rate increases as the age of marriage decreases.

Measures taken to reduce the prevalence of child marriage

Prohibition of Child Marriage Act, 2006

- It **replaced the The Child Marriage Restraint Act of 1929**
- This Act is **equipped with enabling measures** that will make **child marriage illegal, offer victims' rights protection, and strengthen penalties** for those who aid, abet, promote, or solemnize such weddings.

- According to the law, **men must be 21 years old** to get married, and **girls must be 18 years old.**
- Any marriage between two persons who are less than these ages is termed child marriage, which is against the law and is penalized by law.
- **Annulment of marriage permitted** for boys till age of 23 years and girls till the age of 20 years.
- Where child marriage has been declared void, the **children born out of the marriage** before the passing of the decree would be **deemed to be legitimate children.**
- **Child marriage prohibition officer** is to be appointed.
- The Act prescribes **a punishment of up to 2 years of rigorous imprisonment** along with a **fine of up to Rupees 1 lakh** for anyone who abets, directs, conducts or performs a child marriage.
- A **similar punishment is prescribed** for those who promote child marriages or act negligently and fail to prevent it or attend a child marriage or permit its solemnisation.

Right to Education Act, 2009

- All children between the **age group of 6 and 14 years** are entitled to receive education as enshrined in the Constitution under Article 21.
- The Act **seeks to prevent problems like child marriage** by fostering an environment that is conducive to learning for all children.

Way forward

- Empowerment measures to prevent child marriages are required, as in the community **engagements through Mahila Samkya.**
- The prohibition of the Child Marriage Act, 2006 **must be effectively enforced**, and this requires strong political and administrative resolve.
- An intervention technique of **increasing the marriageable age for girls** and also providing access to education and employment opportunities.
- Paying attention to the **adolescent girls who are struggling** and also to strictly enforce **Juvenile Justice Act to provide for their rehabilitation**.

11. Enforcement Directorate (ED) and Prevention of Money Laundering Act,2002 (PMLA)

Introduction

Enforcement Directorate:

- It is a **specialized law enforcement agency** in India which is empowered by the PMLA and this multi-disciplinary organization is responsible for combating **financial crimes** and enforcing **financial laws**. It operates under the **Ministry of Finance** and is primarily **focused on investigating money laundering and foreign exchange violations**.

The statutory functions of the Directorate includes:

- **COFEPOSA**: under the Conservation of Foreign Exchange and Prevention of Smuggling Activities Act (COFEPOSA) of 1974, ED is empowered to **sponsor cases of preventive detention** with regards to the contraventions of FEMA.
- **FEMA**: according to the Foreign Exchange Management Act (FEMA) of 1999, 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.
- **FEOA:** the Government of India implemented the Fugitive Economic Offenders Act in 2018 and **ED is entrusted with the responsibility of 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. The Directorate 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.

Prevention of Money Laundering Act (PMLA), 2002

Following the recommendations of the **Financial Action Task Force (FATF)**, the Government of India enacted the PMLA in 2002.

The key features of the Act includes:

- **Money Laundering Offense:** The Act **defines money laundering** as any process by which proceeds of crime are derived or used to project it as untainted property. It covers various offenses, such as drug trafficking, organized crime, corruption, terrorism, and smuggling.
- **Investigation and Adjudication:** The ED **investigates cases of money laundering** and has the **power to attach** and confiscate proceeds of crime. It also has the **authority to arrest individuals** involved in money laundering activities. The Act provides for the establishment of **special courts for the speedy trial** of money laundering cases.
- **Obligations of Reporting Entities:** The PMLA places **obligations on various entities**, such as banks, financial institutions, intermediaries, and professionals like chartered accountants and lawyers, **to report certain transactions** and maintain records of financial transactions.
- **Financial Intelligence Unit:** The Act establishes a **Financial Intelligence Unit (FIU)** as **the central agency responsible** for receiving, analyzing, and disseminating information relating to suspicious financial transactions.
- **International Cooperation:** The PMLA **enables international cooperation** in money laundering investigations through **mutual legal assistance treaties** and agreements between countries.
- **Penalties:** The Act also prescribes **stringent penalties** for offenses related to money laundering including fines and imprisonments.

Why is ED being criticized in recent times?

- **Used for ordinary crimes:** PMLA is often used for **ordinary crimes** and is also involved in **attaching assets** of genuine victims. The **Supreme Court** is also looking into the **rampant misuse of the PMLA** by the government and also the ED.
- **Lack of transparency and clarity:** Critics may argue that the ED lacks transparency in its **operations, investigations, and decision-making processes**. They may claim that the agency **does not provide sufficient information** about its actions, leading to concerns about accountability and fairness.
- **Poor track record of convictions:** Another criticism is that **ED has a poor track record** of the conviction and recovery cases. It also has a poor record of success rate and securing justice for economic crimes.
- **Often used as a political tool:** It is often used as a political tool by the ruling party to **target its opponents and critics**. The ED has been accused of **selective and arbitrary enforcement** of cases, harassment and intimidation of witnesses and accused. It raised questions **about the independence and impartiality of the ED** and its susceptibility to political interference.

What can be the way forward?

- **Strengthening the autonomy** of the organization by creating a statutory body or a committee to appoint and supervise its officials.
- **Streamlining the legal framework** by consolidating the laws and reducing pendency in courts and integrating strict penalties for economic offenders.
- **Enhancing the professionalism** and competency of the officials by providing regular training, incentives and recognition and also **ensuring their security** and welfare.
- 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

12. Skill Development

Introduction

- Skill development is very significant to harness the potential demographic dividend of the country. The 2015 Report on **National Policy on Skill Development and Entrepreneurship** estimated that **only 4.7% of the total workforce in India** had undergone formal skill training compared with **52% in the US, 80% in Japan, and 96% in South Korea.**

Need for Skill development in India

- **Employment Generation:** India has a vast population, and creating sufficient employment opportunities is essential. **Skill development programs** help equip individuals with the necessary knowledge and abilities to meet the demands of the job market. By enhancing employability, **skill development can lead to increased job opportunities** and reduced unemployment rates.
- **Bridging the Skills Gap:** There exists a significant gap between the skills possessed by the workforce and the skills required by industries. **Skill development initiatives address** this gap by **providing specific training programs** tailored to the needs of different sectors. By **aligning skills with industry requirements**, skill development can promote a better match between job seekers and employers.
- **Enhancing Productivity:** Skill development programs focus on improving the **productivity and efficiency of individuals** in the workforce. By providing specialized training, workers **can acquire technical skills**, soft skills, and industry-specific knowledge. This, in turn, **boosts productivity**, improves the quality of output, and contributes to economic growth.
- **Promoting Entrepreneurship:** Skill development **fosters an entrepreneurial mindset** by providing individuals with the knowledge and tools to start and manage their own businesses. By promoting entrepreneurship, **skill development contributes to job creation**, innovation, and economic diversification.
- **Inclusive Growth and Poverty Reduction:** Skill development can contribute to inclusive growth and poverty reduction by **empowering marginalized sections of society**. By providing **skill training to individuals** from economically disadvantaged backgrounds, women, and other vulnerable groups, skill development programs can enhance their employability and socioeconomic status.

Government schemes to promote skill development

- **Pradhan Mantri Kaushal Vikas Yojana (PMKVY):** Launched in 2015, PMKVY is a flagship **skill development scheme** that aims to provide skill training to youth across the country. It offers **short-term training programs** aligned with

industry requirements, certification, and placement assistance. PMKVY **aims to skill 10 million youth** by providing training in diverse sectors.

- **National Skill Development Corporation (NSDC):** NSDC is a **public-private partnership** initiative established to promote skill development in India. It collaborates with various stakeholders, including industry, government, and training providers, to facilitate skill training, assessment, and **certification across multiple sectors.**
- **Skill Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP): SANKALP is a World Bank-supported project** that aims to strengthen institutional mechanisms for skill development. It focuses on providing quality skill training, improving the overall skill ecosystem, and enhancing the employability of youth.
- **National Apprenticeship Promotion Scheme (NAPS): NAPS promotes apprenticeship training by providing financial incentives** to employers who engage apprentices. It encourages industry participation in skill development by supporting the training of apprentices in various sectors, **bridging the gap between theoretical knowledge** and practical skills.
- **Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA): PMGDISHA aims to** make six crore rural households **digitally literate** by providing **training on digital skills and digital technologies.** The program empowers individuals with the knowledge to access information, government services, and participate in the digital economy.

Challenges in skill development

- **Excessive centralization:** In most central skill development schemes, the process of planning and monitoring are handled by the Centre. Due to which, the state governments and district committees have virtually no role. This makes various skill development schemes more centralized.
- **Mismatch between Skills and Industry Requirements:** There is often a gap between the **skills possessed by the workforce and the skills required** by industries. **Rapid technological advancements and changing market dynamics** make it challenging to keep pace with evolving skill needs. Skill development programs need to be agile and adaptable to bridge this gap effectively.
- **Infrastructure and Training Facilities:** Adequate infrastructure and training facilities are essential for effective skill development. Many regions, **especially rural areas,** lack sufficient training institutes and infrastructure. **Expanding the reach of skill development** programs, particularly in remote areas, requires investment in infrastructure development.
- **Awareness and Perceived Value:** Raising awareness and changing perceptions regarding skill development is essential. There is often a **societal bias** that values traditional academic education over vocational or skill-based training. **Creating awareness** about the importance and potential of skill development can encourage more individuals to opt for skill training.
- **Scaling and Sustainability:** Scaling **skill development initiatives** to reach a larger population and ensuring **their long-term sustainability** is a significant challenge. Adequate funding, effective implementation, and continuous monitoring and evaluation are essential to **ensure the scalability and sustainability** of skill development programs.

What could be the way forward?

- Increasing the **role of states to promote** decentralization of schemes.
- Understanding the **socio-economic profile** of the district population for effective implementation of the scheme.

- Interacting with **industrial representatives** to identify relevant industrial skills.
- The scheme should be implemented effectively **without being caste or societal specific**.

13. PENSION SECTOR IN INDIA

National Pension Scheme (NPS)

- NPS, regulated by the **Pension Fund Regulatory and Development Authority (PFRDA),** is a contributory pension scheme under which **employees contribute 10 per cent of their salary.** The **government contributes 14 per cent towards the employees' NPS accounts.**
- Under NPS, **individual savings are pooled into a pension fund** which are invested by PFRDA regulated professional fund managers as per the approved investment guidelines into the **diversified portfolios** comprising **Government Bonds, Bills, Corporate Debentures and Shares.** These contributions would grow and accumulate over the years, depending on the returns earned on the investment made.
- At the time of normal exit from NPS, the subscribers may use the **accumulated pension wealth** under the scheme to purchase a **life annuity** from a **PFRDA empaneled Life Insurance Company** apart from withdrawing a **part of the accumulated pension wealth as lump-sum,** if they choose so.

Old Pension Scheme (OPS)

- The OPS, on the other hand, is a **defined benefit scheme** that provides a **pension based on the individual's last drawn salary and the number of years of service.**
- The scheme is **open to government employees who have completed at least 10 years of service.**

Difference between NPS and OPS

- One of the key differences between the NPS and OPS is the **level of guaranteed pension provided.** Under the NPS, the **government does not provide any guaranteed pension.** Instead, the **pension received is based on the investment returns generated by the pension funds**. Whereas the OPS provides a **guaranteed pension** based on the individual's last drawn salary and the number of years of service.
- Another important difference between the two schemes is the **age limit.** The NPS is **open to citizens between the ages of 18 and 60**, while the OPS is **open to government employees who have completed at least 10 years of service.**

Benefits of OPS over NPS

- **Return Certainty**: The old pension scheme provides **return certainty, as it bases the monthly pension on the last wage received** by the employee. On the other hand, the new pension scheme **offers market-linked returns without any guarantee.**
- **Tax Benefits**: Under the old pension scheme, **income is not subject to taxation**. However, under the new pension scheme, 60% of the corpus on maturity is tax-free, while the remaining 40% is taxable when invested in annuities.
- **Contributions**: Monthly payments under the old pension scheme are equivalent to 50% of the last salary drawn. In the new pension scheme, employees are required to contribute 10% of their salaries, while employers can contribute up to 14%.

Issues with OPS

- The Reserve Bank of India has cautioned states against reverting to the old pension scheme (OPS), stating that it will **add to the fiscal burden of States in the coming years.**
- The RBI warning has come after more states joined the queue to bring back OPS instead of the NPS.
- OPS is considered **fiscally unsustainable**, and state governments do not have the money to fund it. OPS had **no accumulated funds or stock of savings for pension obligations** and hence was a **clear fiscal burden.**

- OPS involved a **direct transfer of resources from the current generation of taxpayers to fund the pensioners.** The scheme is always an attractive dispensation for political parties as the current aged people can benefit from it even though they may not have contributed to the pension kitty.

Benefits of NPS

- NPS is a defined **contribution pension scheme.** NPS enables an individual to undertake retirement planning while in employment.
- NPS is designed to deliver a **sustainable solution of having adequate retirement income in old age or upon superannuation.**
- **Eligibility**: Only government employees are eligible for receiving a pension under the old pension scheme after retirement. On the other hand, the new pension scheme can be availed by all citizens between 18 and 65 years.
- **Flexibility**: The old pension scheme did not have much flexibility as it provided a fixed monthly income. The new pension scheme, however, gives the subscriber more freedom and control over their finances. They have the option to choose their asset allocation, allowing them to generate higher returns and build a larger retirement corpus.
- **Voluntary** - A Subscriber can contribute at any point of time in a Financial Year and also change the amount he wants to set aside and save every year.
- **Simple** - Subscriber is required to open an account with any one of the POPs (Point of Presence) or through eNPS.
- **Portable** - Subscribers can operate their account from anywhere, even if they change the city and/or employment.
- **Regulated** - NPS is regulated by PFRDA, with transparent investment norms and regular monitoring and performance review of fund managers by NPS Trust.

14. GST ALLOCATION TO STATES

Goods and Service Tax

- In July 2017 through the implementation of the Constitution **(One Hundred and First) Amendment Act, 2016, GST** was implemented and subsequently, it was adopted by the Parliament and all the State legislatures.
- 'one-nation-one-market-one-tax' model resulting in the reduction of the complexity in the tax structure and removal of the hurdles to domestic production and trade.
- GST is a consumption-based tax on goods and services levied by the centre and the states. Both the central government and the state governments earn revenue from this tax. The tax revenue earned by a state government through GST includes its own tax revenue and its share in the central taxes.

Tax system

- The states levy and collect the State GST (SGST), and the center levy and collect the Centre GST (CGST). Here, the GST rate on any particular supply of good or service is equivalent to the sum of the rates of SGST and CGST, and both of the rates are exactly half of the rate of GST. That means the tax collected through this by the centre and the respective state is shared equally between the two.
- Further, in the case of inter-state supply of goods and services, the Integrated GST (IGST) is applied. This tax is collected by the centre and kept in a separate account. It then gets distributed between the centre and the corresponding state after the verification of the destination of the goods and services.
- The shared part of IGST by the state and the SGST collectively then becomes a part of states' own tax revenue. Whereas the CGST and the rest of the IGST is added to the centre's tax revenue.

Devolution of central taxes

- Article 280 of the Constitution mandates the finance commission to

make recommendations regarding the distribution of net proceeds of taxes between the centre and the states. The first commission was formed in the year 1951 and there have been fifteen till now.

- The distribution of net proceeds of taxes between the Union and states (called vertical devolution) and also among states (called horizontal devolution).
- The formula of horizontal sharing of taxes is intended to emphasis on definitive goals that can be accomplished by this devolution. They are:
    1. to assist in bridging the states' vertical fiscal gap;
    2. to provide equality among the states;
    3. to account the states for cost differences in delivering basic public services;
    4. revenue equalization.

The criteria used by the fifteenth finance commission for horizontal devolution, along with the weight assigned to them is mentioned in the table given below.

Parameter	
Population (1971)	
Population (2011)	
Area	
Forest and Ecology	
Income Distance	
Tax and fiscal efforts	
Demographic performance	

Source: Reports of the 14th and 15th Finance Commissions

- Population of a state indicates the expenditure needs of that particular state. This indicator has a vital role in equalizing the impact. Since the sixth finance commission, the commissions have been using population data of the 1971 census while giving recommendations. However, the fourteenth finance commission used population data of 2011 for the devolution formula. And the fifteenth finance commission followed the same.
- Area is also used as a measure in the formula because the state having the larger area would require greater administrative cost for providing services.
- Forest cover as a criterion was firstly used by the fourth finance commission since it shows that the states with significant forest covers bear the consequences of not providing enough area for other economic sectors. As a result, these states are granted a larger share.
- Income distance or distance per-capita income is a criterion that intends to equalize
- the devolution formula. It is calculated by finding out the difference between the state's per capita income with the average of per capita income taken for all the states. Lower the per capita income of the state, higher the share.
- Tax effort is used as a criterion in the devolution formula to award the state's own tax results.
- Demographic performance of a state is the effort made by them in implementing various policies for improving its demographic management.

What is GST compensation?

- The Constitution (One Hundred and First Amendment) Act, 2016, was the law which created the mechanism for levying a nationwide GST. Written into this law was a provision to compensate the States for loss of revenue arising out of implementation of the GST.
- The adoption of the GST was made possible by the States ceding almost all their powers to impose local-level indirect taxes and agreeing to let the prevailing multiplicity of imposts be subsumed under the GST.
- While the States would receive the SGST (State GST) component of the GST, and a share of the IGST (Integrated GST), it was agreed that revenue shortfalls arising from the transition to the new indirect taxes regime would be made good from a

pooled GST Compensation Fund for a period of five years that ended in 2022.

Issue between center and states over GST allocation

Over the years, the central government has been allocating the tax revenues to the state governments on the recommendation of the finance commission. However, with the introduction of the GST, the states have lost their fiscal autonomy, and hence increased their reliance on the system of intergovernmental transfers to satisfy their expenditure needs. Therefore, now it is the centers' responsibility to distribute the net proceeds of taxes fairly between the two.

Issue of Vertical Fiscal Imbalance between center and states

- The Union government is endowed with more tax powers than the States, while the States are assigned more expenditure responsibilities than the Union government. This gives rise to a vertical fiscal imbalance (VFI) between the Union and State governments.
- First, the divisible taxes of the Union government expanded from two to all the Union taxes, thus enlarging the revenue base to be shared with the States.
- Second, fiscal responsibility legislation was implemented to constrain the fiscal deficits of the States. States directly borrow from the market subject to limits imposed by the Union government.
- Third, the Union Planning Commission was dissolved, leading to the withdrawal of Plan grants.
- Fourth, GST was introduced in 2017. These changes have considerably altered the States' revenue structure. States have little revenue autonomy and are more dependent on the Union government.

Way forward

- The Union government has exclusive power to levy excise duty on petroleum products, and the States have exclusive power to levy excise duty and sales tax on liquor. All other commodities fall under the GST. The CGST and the excise duty on petroleum products must be assigned to the States so that the entire GST is assigned to the States.
- Or we should bring all commodities, including petroleum products, under GST. And the Union government should continue to collect IGST only to settle revenue on a destination basis. This will ensure harmonization of GST across States.
- GST shall continue as a tax determined by the GST Council. However, the veto power of the Union government should be removed. Then, the GST Council will truly become a body by the States to settle tax issues among themselves, with the Union government facilitating the arrival of consensus among the States on tax issues.
- The unequal tax base with unequal expenditure requirements between the States creates horizontal fiscal imbalance among the States. Therefore, the Union government should effect equalization transfers to address this issue of horizontal fiscal inequality.

15. FORMALISATION OF LABOUR

What are the Labour codes?

- In 2020, the Parliament passed three labour law codes that complete the government's consolidation of 29 labour laws into four codes. The three Acts were the Industrial Relations Code, 2020, the Occupational Safety, Health and Working Conditions Code, 2020 and the Social Security Code, 2020.
- The first of the four codes- Code on Wages Act was passed in 2019.
- It should be noted that as labour falls under the concurrent list of the Constitution, both Parliament and state legislatures can make laws regulating labour.

Code on Wages

- The Code replaces the following four laws:
  - **the Payment of Wages Act, 1936**
  - **the Minimum Wages Act, 1948**
  - **the Payment of Bonus Act, 1965**
  - **the Equal Remuneration Act, 1976**

- The Code will apply to all employees to enforce minimum wage among both formal and informal sector workers.

Code on Social security

- It replaces nine laws related to social security, including the Employees' Provident Fund Act, 1952, the Maternity Benefit Act, 1961, and the Unorganised Workers' Social Security Act, 2008. Social security refers to measures to ensure access to health care and provision of income security to workers.
- The Code changes the definitions of certain terms. These include: (i) expanding the definition of 'employees' to include workers employed through contractors, (ii) expanding the definition of "inter-state migrant workers" to include self-employed workers from another state, (iii) expanding the definition of "platform worker" to additional categories of services or activities as may be notified by the government, (iv) expanding the definition of audio-visual productions to include films, web based serials, talk shows, reality shows and sports shows, and (v) exempting construction works from the ambit of "building or other construction work" if the total cost of construction work exceeds Rs 50 lakhs (and if they employ more than a certain notified number of workers).
- The central government will set up a social security fund for unorganised workers, gig workers and platform workers.
- Further, state governments will also set up and administer separate social security funds for unorganised workers.
  - **Gig workers refer to workers outside of the traditional employer employee relationship (e.g., freelancers). Platform workers are workers who access other organisations or individuals using online platforms and earn money by providing them with specific services. Unorganised workers include homebased and self-employed workers.**
- The Code makes provisions for registration of all **three categories of workers - unorganized workers, gig workers and platform workers.**
- The Code provides for the establishment of the **National Social Security Board and various state-level boards for welfare of unorganised sector workers, gig workers and platform workers** and can recommend and monitor schemes for them.

The occupational safety, Health and working conditions code, 2020

- The Code seeks to regulate health and safety conditions of workers in establishments with 20 workers for premises where the manufacturing process is carried out using power, and 40 workers for premises where it is carried out without using power.
- Welfare facilities, working conditions and work hours for different types of establishments and workers will be prescribed by the central or state governments through rules.
- **It subsumes and replaces 13 labour laws relating to safety, health and working conditions. These laws include: Factories Act, 1948; Mines Act, 1952; Dock Workers Act, 1986; Contract Labour Act, 1970; and Inter-State Migrant Workers Act, 1979.**

Industrial relations code, 2020

- It seeks to replace three labor laws: **(i) the Industrial Disputes Act, 1947, (ii) the Trade Unions Act, 1926, and (iii) the Industrial Employment (Standing Orders) Act, 1946.**
- It introduces 'fixed term employment', giving employers the flexibility to hire workers based on requirement through a written contract. Fixed term employees should be treated on a par with permanent workers in terms of hours of work, wages, allowances and other benefits, including statutory benefits such as gratuity.

Advantages of the labor codes

Benefits for employers

- Under the new codes, companies will be able to hire workers on fixed-term contracts. This will give companies

greater flexibility in hiring, allowing them to adjust their workforce according to their business needs.
- The new codes will also make it easier for companies to maintain detailed records of their workers, including their wages, working hours, and other benefits.
- Further, many definitions across new codes are common, this is one of the major changes which would eliminate the ambiguity.

Benefits for workers

- The new codes will provide greater protection and benefits for workers, including provisions for minimum wages, social security benefits, and grievance redressal mechanisms.
- The codes will also provide for a new social security net for workers, including insurance and pension benefits.

Concerns associated with the labor codes

- The new codes may lead to the exploitation of workers, particularly those on fixed-term contracts.
- The new codes may also lead to a dilution of labor rights and protections.
- The Industrial Relations Code also introduces new conditions for carrying out a legal strike.
- The new Labour Codes do not provide clarity over the jurisdiction of the appropriate government. The definition of 'appropriate government' varies from Code to Code.

16. Criminal Procedure Identification Rules(2022):

- The Ministry of Home Affairs (MHA) has notified the rules governing The Criminal Procedure (Identification) Act, 2022.
- The Act was passed by the Parliament. Until rules are notified, an Act cannot be implemented or come into force.

Key Features of the Act

- The Act repeals The Identification of Prisoners Act, 1920.
    - The over 100-year-old Act's scope was limited to capturing of finger impression, foot-print impressions and photographs of convicted prisoners and certain categories of arrested and non-convicted persons on the order of a Magistrate.
- The new Act will allow police and prison authorities to collect, store and analyse physical and biological samples including retina and iris scans of convicted, arrested and detained persons.
- The Act expands:
    - the type of data that may be collected,
    - persons from whom such data may be collected, and
    - the authority that may authorise such a collection.

Changes from Earlier act:

Provisions	Identification of Prisoners Act, 1920	Changes in the 2022 Act
1.Data permitted to be collected	Fingerprints, footprint impressions, photographs	Adds: (i) biological samples, and their analysis, (ii) behavioural attributes including signatures, handwriting, and (iii) examinations under sections 53 and 53A of CrPC (includes blood, semen, hair samples, and swabs, and analyses such as DNA profiling)
2. Persons whose data may be	Convicted or arrested for offences punishable with rigorous imprisonment of one	Convicted or arrested for any offence. However, biological samples may be taken forcibly only from persons arrested for

collected	year or more; Persons ordered to give security for good behaviour or maintaining peace; Magistrate may order in other cases collection from any arrested person to aid criminal investigation.	offences against a woman or a child, or if the offence carries a minimum of seven years imprisonment. Persons detained under any preventive detention law; On the order of Magistrate, from any person (not just an arrested person) to aid investigation.
3. Persons who may require/ direct collection of data	Investigating officer, officer in charge of a police station, or of rank Sub-Inspector or above; Magistrate.	Officer in charge of a police station, or of rank Head Constable or above. In addition, a Head Warder of a prison; Metropolitan Magistrate or Judicial Magistrate of first class. In case of persons required to maintain good behaviour or peace, the Executive Magistrate.

Significance of these changes

- Use of the **latest techniques** in solving the cases is made possible. The old law has become highly outdated.
- Helps to **solve the high pendency** with the investigation agencies as more data from related persons can be collected. The ambit of related persons is extended by this act.

Problems with the act

- **Privacy violation** on most of the citizens as samples can be collected not only from convicts but also from accused.
- **Vagues provisions** which may be interpreted in favour of investigative agencies.
- **Coercive collection of samples** is allowed which goes against the article 20 of the Indian Constitution.
- **Personal data** collected can be stored for **75 years** and the details about how it will be **handled and disseminated is not transparent.**
- The **right of detainees to refuse the provision of personal data is** allowed but most of the **detainees will be unaware** of the right to refuse.

Key Features of the Rules

- The Rules empower the National Crime Records Bureau to specify guidelines for taking measurements, and handling, storage, processing, matching, destruction and disposal of these records.
- The Rules provide that an authorised police officer or prison officer, a registered medical practitioner, or any person skilled in taking the measurements may take such measurements under the Act.

Key Issues and Analysis of the Rules

- The Act specifies the grounds under which measurements may be collected and who can collect such measurements.
    - The Rules change the scope of the Act by altering the grounds under which measurements may be collected, and the list of persons who may take measurements.
- The Act delegates certain powers to the government.
    - The Rules further delegate these to the NCRB.
    - The Supreme Court has held that tasks entrusted to an entity in subordinate legislation may not be further delegated to another entity.
    - These delegated powers include guidelines to NCRB on maintaining records. NCRB issuing guidelines for itself also violates the principle of separation of powers between an entity that issues the guidelines and one that has to follow these guidelines.

- The Act provides for destruction of measurement records if a person is acquitted.
    - The Rules put the onus on the person to request for the destruction of such records.
- When the Bill was debated in Parliament in March this year, the Opposition members termed it "unconstitutional" and an attack on privacy as it allowed the record of samples of even political detainees.
- However, the rules notified recently state that samples of those detained under preventive Sections such as 107, 108, 109, 110, 144, 145 and 151 of the CrPC shall not be taken unless such person is charged or arrested in connection with any other offence punishable under any other law.

Way forward:

- **A comprehensive Data protection law** can ensure that the personal data is used only in a proper and law abiding way.
- **Development of infrastructure and manpower** in the investigative agencies to handle the vast amount of data which could be collected.

17. Election Commissioner and the appointment procedure:

Current process of selection of Election Commissioners:

- The appointment of Election Commissioners falls under the purview of **Article 324(2)** of the Constitution.
- The provision states, "The Election Commission shall consist of **the Chief Election Commissioner and such number of other Election Commissioners,** if any, as **the President** may from time to time fix and the appointment of the Chief Election Commissioner and other Election Commissioners shall, subject to the provisions of any law made in that behalf by Parliament, be made by the President."
- As per the 'subject to' clause, the number and tenure of the ECs are subject to the provisions of **"any law made on that behalf by Parliament". No such law has,** however, been made for appointments yet.
- Currently, the **President appoints the CEC and two ECs** on the **advice of the Prime Minister** and council of ministers.
- Under the **Election Commission (Conditions of Service of Election Commissioners and Transaction of Business) Act, 1991,** an EC can have a tenure of **six years or up to the age of 65, whichever is earlier.**
- Typically, the senior-most election commissioner is appointed as the CEC.
- Once appointed, the **Chief Election Commissioner** can be **removed from office only through Parliamentary impeachment.**
- However, **no such protection of tenure is available to Election Commissioners**, who can be removed by the government on the recommendation of the CEC.

Problems with the current appointment procedure:

- **Appointment procedure** is fully in the hands of the **Union Government.** This is not in the lines of appointment procedure of other independent bodies.
- **Security of tenure** is available **only** to the Chief and not to the members.

Other issues with the functioning of Election Commission:

- **Independence and neutrality of the commission** has been questioned with allegations of favouring the ruling party. Eg: In enforcing Model code of conduct.
- **Allegations of biassed role in disqualification** of legislators under Representation of People's Act, 1951. Eg: Reducing the term of disqualification of Prem Singh Tamang, a legislator in Sikkim.
- Expenses of ECI are **not a part of charged expenditure** affecting the independent functioning.

Recent Judicial intervention:

- The Supreme Court heard a series of petitions seeking functional independence for Election Commissioners. The **court**

specifically examined the question of setting up an Collegium-type body to appoint Election Commissioners and the Chief Election Commissioner.

- The top court also referred to Article 324 that asks the parliament to make laws for the appointment of CEC. However, till the date it has not been made.
- The Court gave the verdict, "The appointment of the Chief Election Commissioner and the Election Commissioners shall be **made by the President on the advice of a Committee** consisting of **the Prime Minister, the Leader of the Opposition of the Lok Sabha,** and in case no leader of Opposition is available, **the leader of the largest opposition Party** in the Lok Sabha in terms of numerical strength, and **the Chief Justice of India".**

Other general measures for effective functioning of ECI:

- ECI should be accorded with the **power to de-register political parties.**
- A **cooling-off period** or a total ban on future government postings for the Commissioners to protect its autonomy.
- **Parity in removal procedure** of the Election Commissioners and the Chief Election Commissioner (CEC).
- The entire expense of the ECI should be **made a charged expenditure.** It will work to insulate/protect the body from the pulls and pressures of the ruling dispensation

18. Non Resident Indian Voting:

Current Status:

- While some observers ask why those who migrated abroad should be given special privileges in voting, others argue that NRIs should not be deprived of the franchise because they exercised their right to freely practise a profession or trade.
- According to estimates, **India has the largest diaspora population,** with nearly 1.35 crore non-resident Indians spread across the globe.
- Many of them are in the Gulf countries, the U.S. and the U.K. As of now there are only 1.12 lakh registered overseas electors.
- After the passing of **the Representation of the People (Amendment) Act, 2010, eligible NRIs who had stayed abroad beyond six months have been enabled to vote, but only in person** at the polling station where they have been enrolled as an overseas elector.
- Yet, the provision of having to visit the polling booth in person has discouraged eligible voters from exercising their mandate.
- Only a **very low proportion of eligible overseas residents actually registered or turned up** to vote.
- Since the in-person provision of the amended Act discouraged many, petitions were filed in the Supreme Court between 2013 and 2014 by NRIs.

Measures taken by the Government:

- The **Election Commission of India (ECI) formed a Committee** in 2014 on the Court's direction to explore the options for overseas electors.
- The committee narrowed it down to two remote voting options — **e-postal ballot and proxy voting.**
    - **The Electronically Transmitted Postal Ballot System (ETPBS)** is developed by Election Commission of India with the help of Centre for Development of Advanced Computing (C-DAC). It involves the NRI voter sending an application to the returning officer in person or online. The returning officer will send the ballot electronically.
    - **Proxy voting,** meanwhile, enables voters to appoint proxies to vote on their behalf.
- In its report, the ECI said proxy voting would be a "convenient" and "doable" method.
- In 2017, the government introduced **a Bill to amend the Representation of**

People Act to remove the condition of in-person voting for NRIs and enable them to vote through proxies. The Bill was passed in the Lok Sabha in 2018 but never introduced in the Upper House, eventually **lapsing with the 16th Lok Sabha.**

- **In 2020, the ECI** wrote to the Law Ministry that it was "technically and administratively **ready" to facilitate ETPBS for NRIs in the 2021 Assembly elections** in five States but the **External Affairs Ministry flagged "huge logistical challenges"** relating to identity verification of voters, absence of polling agents, the burden on embassy staff etc.
- The Law Ministry in March said that the Centre was exploring the possibility of allowing online voting for NRIs. The Chief Election Commissioner Sushil Chandra said in April that ETPBS for NRIs was being contemplated.

Way Forward:

- Giving **clarity to the NRIs** about the measures being taken to enable their right to vote.
- **Addressing the challenges raised by the External Affairs Ministry,** as their role is important in ensuring free and fair NRI voting.
- **Early adoption** of a method acceptable to all stakeholders.

19. Delimitation

What is Delimitation?

- Delimitation is the **act of redrawing boundaries** of Lok Sabha and state Assembly seats to represent **changes in population.**
- The main objective of delimitation is to provide **equal representation to equal segments of a population**. It also aims at **a fair division of geographical areas** so that one political party doesn't have an advantage over others in an election.
- In India, delimitation is carried out by an **independent Delimitation Commission.**

How is delimitation carried out?

- Under **Article 82,** the constitution gives power to the Parliament of India to enact a law for the purpose of Delimitation.
- The **Delimitation commission, a statutory body, is set up under the law enacted by the parliament of India**.
- The Delimitation Commission is **appointed by the President** of India which works in collaboration with the Election Commission of India.
- The Delimitation Commission consists of
    - **a retired Supreme Court judge,**
    - **the Chief Election Commissioner** and
    - **the respective State Election Commissioners.**
- The Commission is supposed to determine the number and boundaries of constituencies in a way that the population of all seats, so far as practicable, is the same.
- The **Commission is also tasked with identifying seats reserved for Scheduled Castes and Scheduled Tribes**.
- All this is done **on the basis of the latest Census** and, in case of difference of opinion among members of the Commission, the opinion of the majority prevails.

Special powers of the Delimitation Commission

- The **orders of the Delimitation Commission have the force of law** and **cannot be called in question before any court** as it would hold up an election indefinitely.
- The copies of its orders are laid before the House of the People and the State Legislative Assembly concerned, but no modifications are permissible therein by them.

How often has delimitation been done in the past?

- In India, **Delimitation Commissions** have been **constituted 4 times – 1952, 1963, 1973 and 2002 under the Acts of 1952, 1962, 1972 and 2002.**

- There was **no delimitation after the 1981 and 1991 Censuses** because the union government had suspended delimitation in 1976 until after the 2001 census so that **states' family planning programs would not affect their political representation in the Lok Sabha.**
- The fear of losing meaningful political representation was especially great in the southern states which had greater success in controlling populations.
- This freeze on the number of seats in Lok Sabha and Assemblies was postponed until 2026 by another amendment.
- So, **the last delimitation exercise was based on the 2001 Census and only readjusted boundaries of existing Lok Sabha and Assembly seats and reworked the number of reserved seats (without changing the number of seats in Lok Sabha and Assemblies).**
- The 2002 Act also left out a few states including Assam, Arunachal Pradesh, Nagaland and Manipur from the exercise due to security risks.
- Jammu and Kashmir was also left out of that delimitation exercise for similar reasons.
- The central government reconstituted the Delimitation Commission for these four states as well as the Union Territory of Jammu and Kashmir in March 2020.

20. Scheduled tribes identification

Context

- The Union Cabinet has recently approved a proposal to add several tribes to the list of Scheduled Tribes (ST) in States such as Himachal Pradesh, Tamil Nadu, Chhattisgarh and Uttar Pradesh, so that they can avail of benefits meant for STs, including reservation.

Which communities have been added to the ST list?

- The communities approved for inclusion in the ST list are
    - the Hatti tribe in the Trans-Giri area of Sirmour district in Himachal Pradesh,
    - the hill tribes of Narikoravar and Kurivikkaran of Tamil Nadu,
    - the Binjhia community in Chhattisgarh and
    - the Gond community in certain districts of Uttar Pradesh.
- The Cabinet has approved the addition of several alternative names for already existing Scheduled Tribes in Chhattisgarh and Karnataka so that the difference in spellings and pronunciations do not result in members of these communities being left out of the benefits meant for them.
- Significantly, even as the Union Cabinet has decided to include these communities under the ST list, this is not the first time they have been categorised for benefits of reservation.
- Most of these communities had been either included in the list of Scheduled Castes (SC) or Most Backward Classes till now.

Process of adding a community into ST list

- The **process begins at the level of a State or Union Territory,** with the concerned government or administration seeking the addition or exclusion of a particular community from the ST list.
- The **final decision rests with the President's office** issuing a notification specifying the changes under powers vested in it from Articles 342.
- The **inclusion or exclusion of any community in the Scheduled Tribes list** come into effect only after **the President assents to a Bill that amends the Constitution (Scheduled Tribes) Order, 1950,** as is appropriate, after it is passed by both the Lok Sabha and Rajya Sabha.
- A State government may choose to recommend certain communities for addition or subtraction from the list of STs based on its discretion.

- This recommendation may come from studies it commissions like in the case of classifying the Hatti community in Himachal Pradesh.
- Following this, the proposal to include or remove any community from the Scheduled List is sent to the Union Ministry of Tribal Affairs from the concerned State government.
- After this, the Ministry of Tribal Affairs, through its own deliberations, examines the proposal, and sends it to the Registrar General of India (RGI).
- Once approved by the RGI, the proposal is sent to the National Commission for Scheduled Castes or National Commission for Scheduled Tribes, following which the proposal is sent back to the Union government, which after inter-ministerial deliberations, introduces it in the Cabinet for final approval.

Criteria to begin the process

- To establish whether a community is a Scheduled Tribe, the government looks at several criteria,
  - (i) indications of primitive traits,
  - (ii) distinctive culture,
  - (iii) geographical isolation,
  - (iv) shyness of contact with the community at large, and
  - (v) backwardness.
- According to **the Census 2011, about 705 ethnic groups are listed as Scheduled Tribes under Article 342.** Over 10 crore Indians are notified as STs, of which 1.04 crore live in urban areas. The STs constitute **8.6% of the population.**

Problems in the Identification Process

Government task force constituted in February 2014, headed by then-Tribal Affairs Secretary Hrusikesh Panda called the existing procedure "cumbersome" and "time-consuming", adding that it "defeats the Constitutional agenda for affirmative action and inclusion". The problems highlighted were,

- Several tribes **pronounced or spelt their community's name in different ways** leading to exclusion of one group or the other from the list;
- Some **communities were split when new States were created,** leaving them as ST in one State and not in the other; and
- Some **tribespeople were forcefully taken as indentured labour to other States** where they were left out of the ST list.

21. Revenue generation potential of ULBs

Context

- The health of municipal finances is a critical element of municipal governance which will determine whether India realises her economic and developmental promise.
- The 74th Constitution Amendment Act was passed in 1992 mandating the setting up and devolution of powers to urban local bodies (ULBs) as the lowest unit of governance in cities and towns.
- Constitutional provisions were made for ULBs' fiscal empowerment. However, three decades since, growing fiscal deficits, constraints in tax base expansion, and weakening of institutional mechanisms that enable resource mobilisation remain challenges.
- Revenue losses after implementation of the Goods and Services Tax (GST) and the pandemic have exacerbated the situation.

Sources of Revenue and Problems associated

- Recently, the Indian Institute for Human Settlements (IIHS) analysed data from 80 ULBs across 24 States between 2012-13 and 2016-17 to understand ULB finance and spending, and found some key trends.
- The first is that ULBs' own sources of revenue were less than half of their total revenue, with **large untapped potential.**
- **The ULBs' key revenue sources are taxes, fees, fines and charges, and transfers from Central and State governments, which are known as intergovernmental transfers (IGTs).**

- The share of own revenue (including revenue from taxes on property and advertisements, and non-tax revenue from user charges and fees from building permissions and trade licensing) to total revenue is an important indicator of ULBs' fiscal health and autonomy.
- This ratio reflects the ULBs' ability to use the sources they are entitled to tap, and their dependency on IGTs.
- Cities with a higher share of their own revenue are more financially self-sustaining.
- The study found that the ULBs' own revenue was 47% of their total revenue.
- Of this, tax revenue was the largest component: around 29% of the total.
- There was a 7% increase in own revenue from 2012-13 to 2016-17, **but ULBs still lacked revenue buoyancy as their share in GDP of own revenue was only 0.5% for the five-year period.**
- Property tax, the single largest contributor to ULBs' own revenue, accounted for only about 0.15% of the GDP.
- The corresponding figures for developing and developed countries were significantly higher (about 0.6% and 1%, respectively) indicating that this is not being harnessed to potential in India.
- Estimates suggest that Indian ULBs' can achieve these levels. It is essential that ULBs leverage their own revenue-raising powers to be fiscally sustainable and empowered and have better amenities and quality of service delivery.

High Dependence on IGT's

- Transfers from the Central government are as stipulated by the Central Finance Commissions and through grants towards specific reforms, while State government transfers are as grants-in-aid and devolution of State's collection of local taxes.
- Stable and predictable IGTs are particularly important since **ULBs' own revenue collection is inadequate.**
- **The scale of IGTs in India remained at around 0.5% of GDP, which is far lower than the international average of 2% to 5% of GDP.**
- This can be improved by increasing the revenue assigned to ULBs from the State governments, and by allocating a share of the State and Centre's GST proceeds to ULBs.
- IGTs can also incentivise ULBs to deliver better service quality and maintain fiscal discipline.
- **Operations and maintenance (O&M) expenses are on the increase but still inadequate.**
- O&M expenses are crucial for the upkeep of infrastructure and for maintaining quality of service delivery.
- **O&M expenses should ideally be covered through user charges**, but total non-tax revenues, of which user charges are a part, are insufficient to meet current O&M expenses.
- **Cost recovery for services** such as water supply, solid waste management, transportation and waste water management are thus **clearly inadequate.**
- The non-tax revenues were short of the O&M expenditure by around 20%, and this shortfall contributed to the increasing revenue deficit in ULBs.

Way Forward

- **Broadening the own revenue collection mechanism** of ULBs. Tapping into property taxes, other land-based resources and user charges are all ways to improve the revenue of a ULB.
- **Reduce leakages and address under recovery** from own revenue sources. Eg: Correct assessment for property tax collection.
- **Stable IGTs** should be ensured through **statutory backing** to match the global standards.
- **Reduce dependency on IGTs** through direct fund access processes like **Municipal bonds** for infrastructure creation.

- **Better cost recovery** levels through **improved user charge regimes** would not only improve quality and reach of services but also ensure proper maintenance of the infrastructure.

22. Water Use Associations and their effectiveness

Context

- Due to the growing demand for water on the one hand and depletion of water due to climate change or other reasons, efficient and sustainable use of scarce water resources is of utmost importance.
- Towards this goal, **participatory natural resource management** has emerged as a new paradigm, where **local institutions such as Panchayats and other village level user groups play a crucial role.**
- It is envisaged that it will create a sense of ownership of water resources and the irrigation system among the users, so as to promote economy in water use and preservation of the system.

Water Users Associations

- In **National Water Policy (2002),** a participatory approach to water resources management was emphasised, by involving not only various governmental agencies but also the users and other stakeholders in various aspects of planning, design, development, and management of the water resources schemes.
- **Water User Associations (WUAs) are farmer groups** created with the objective of **improving farmers' access to irrigation** water resources.
- In India, there is
    - **a diverse variety of WAUs in terms of registration**,
    - type of promoter,
    - legal backup, and
    - extent of powers and
    - functions vested by the state
- There are WUAs promoted by the State, Gram Panchayat or NGOs or groups formed by farmers themselves.
- WUAs provide farmers of different size categories a platform to come together and work as a group with the concerned irrigation authorities so that as a group they are able to serve individual farmers' needs better.

Functions

- There is a long mandate of activities and functions to be undertaken by WAUs.
- These functions include
    - Acquisition and distribution of water;
    - Maintenance and repairs;
    - Fixation and collection of water charges;
    - Punishing defaulters within the areas of the WUA; and
    - Resolving disputes among water users in the area of operation.
- In many states, WUAs have been created through separate and enabling laws.
- As per latest available statistics, there are **around 80,000 WUAs in India,** scattered over states.

Challenges

- Robust and efficient functioning of these WUAs is challenged by several constraints; such as,
    - **lack of legal back up,**
    - **uncertainty of water availability,**
    - **lack of financial viability,**
    - **technical knowledge and leadership,**
    - **inadequate training and capacity development,**
    - **diverse nature and characteristics of members,**
    - **lack of coordination between WUAs and**
    - **other local institutions and stakeholders.**
- However, the **key to efficient functioning of these WUAs is active involvement of all members** and work in close coordination with all other institutions, rising from self and vested interests.
- An assessment study of WUAs in Andhra Pradesh revealed that **political involvement** and **elite**

capture dominated the functioning of WUAs and importantly, **devolution of powers was not effective and many crucial functions** such as assessment, collection of water charges, sanctioning of works, etc, **continue to remain with the irrigation departments.**

Best Practices

- There are many success stories of WUAs documented by NITI Aayog in a report titled "Compendium of Best Practices of Water Management, 2021".
- For instance, **Tarapur Alpika Committee-WUA, Tarapur, Amethi, Uttar Pradesh** started managing the irrigation of agricultural fields after enforcement of the Uttar Pradesh Participatory Irrigation Management Act, 2009.
    - This WUA, after regular discussion with the farmers, managed to reduce the malpractices such as illegal water lifting and canal formation.
    - Further, in collaboration with the Uttar Pradesh groundwater department, canals were created to improve irrigation and under MGNREGA service road along canals were widened.
    - Farmers are now able to water the crops four times in a year as compared to two times in a year earlier.

Way Forward

- **Robust functioning of WUAs** and **convergence of schemes** with active beneficiary involvement and financial contribution will ensure inclusive and sustainable utilisation of water resources and it will also address the concerns of small and marginal farmers.
- The problems of water scarcity can be addressed through **participatory planning,** involvement of such user groups, village organisations and self-help groups in the **construction of small water harvesting structures** and in spreading awareness about different types of cropping systems.
- Small farmers may also be **encouraged to explore income generating activities s**uch as fisheries.
- Community led institutions such as WUAs could be important change agents in **inclusive and sustainable utilisation of water** resources.
- **Regular monitoring and evaluation of the performance** of the WUAs is also necessary. Both the success and failure stories should be analysed and lessons should be drawn so that appropriate corrective measures can be provided for robust functioning of WUAs.
- In addition, WUAs also have the potential for strengthening grassroots democracy, governance and accountability.
- However, **infusing the idea of 'responsible use of water' in the minds of all citizens** must be a development priority. Possibly a nation-wide **'water literacy programme' i**s the need of the hour.

23. PRAGATI

- **PRAGATI (Pro-Active Governance And Timely Implementation)** is a ICT based multi-purpose and multi-modal platform launched in 2015 by the Prime Minister's office (PMO).
- The system has been designed in house by the **PMO team** with the help of **National Informatics Center (NIC).**

Significance

- It is aimed at **addressing common man's grievances and simultaneously monitoring and reviewing important programmes and projects** of the Government of India as well as projects flagged by State Governments.
- It is also a robust system for bringing **e-transparency and e-accountability** with real- time presence and exchange among the key stakeholders.
- The platform uniquely brings together three latest technologies: **Digital data**

management, video-conferencing and geo-spatial technology.

- It is a **three-tier system** (PMO, Union Government Secretaries and Chief Secretaries of the States).
- It also **promotes cooperative federalism** as it brings on one platform the Secretaries of Government of India and the Chief Secretaries of the States.
- The Prime Minister will hold a monthly programme where he will interact with the Government of India Secretaries, and Chief Secretaries through video conferencing enabled by data and geo-informatics visuals.

Challenges

- **Data Accuracy and Completeness:** Inaccurate or incomplete data can hinder effective monitoring and decision-making.
- **Interdepartmental Coordination:** PRAGATI involves multiple government departments and agencies working together to address bottlenecks and resolve implementation issues.
- **Resistance to Change:** Implementing PRAGATI may require changes in existing processes, workflows, and reporting mechanisms within government departments. Resistance to change from officials or staff members accustomed to traditional methods can pose a significant challenge.
- **Technical Infrastructure and Connectivity:** PRAGATI heavily relies on robust technical infrastructure and reliable connectivity to facilitate real-time monitoring and communication between stakeholders. However, inadequate technological infrastructure, including internet connectivity issues, can hamper the smooth functioning of the platform.
- **Adoption and Usage:** Some officials may be resistant to using the platform due to a lack of awareness, training, or concerns about increased accountability.

Way Forward

- Establish **robust data collection and verification mechanisms**, enforce data quality standards, and train government officials on data entry and management best practices.
- Establish **clear communication channels, foster a collaborative environment,** and encourage regular meetings and discussions among the stakeholders involved.
- **Effective change management strategies,** including stakeholder engagement, training programs, and highlighting the benefits of PRAGATI in terms of improved efficiency and transparency.
- Investments in **upgrading technical infrastructure, improving connectivity** in remote areas, and providing necessary training and support to government officials are essential.
- **Comprehensive training programs, workshops, and awareness campaigns** can be conducted to highlight the benefits of PRAGATI and encourage widespread adoption.

ENVIRONMENT

1. Nature Based Solutions (NbS)

Introduction

- Nature-based solutions (NbS) refer to **sustainable approaches that utilize the power of nature** to address **environmental challenges and promote overall wellness**. The **International Union for Conservation of Nature (IUCN)** defines NbS as "actions to protect, sustainably manage and restore natural and modified ecosystems that address societal challenges effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits". NbS **creates harmony between people and nature**, enables ecological development, and represents a holistic, people-centered response to climate change.

Need for Nature Based Solutions (NbS)

- **Biodiversity Conservation:** Nature-based solutions help **conserve and restore ecosystems,** contributing to the **protection of biodiversity.** By safeguarding habitats and promoting ecological connectivity, **NbS supports the preservation of plant and animal** species, maintaining essential ecological processes, and ensuring the resilience of ecosystems.
- **Climate Change Mitigation and Adaptation:** NbS play a vital role in **both mitigating and adapting to climate change.** Forests, wetlands, and other natural ecosystems sequester carbon dioxide, helping reduce greenhouse gas emissions. Additionally, these ecosystems provide climate resilience by **regulating water flows,** protecting **against erosion** and coastal hazards, and mitigating the impacts of extreme weather events.
- **Soil Conservation and Restoration:** NbS techniques like agroforestry, cover cropping, and land restoration **help prevent soil erosion**, enhance soil fertility, and **promote sustainable agriculture.** By maintaining healthy soils, NbS **support food security**, water quality, and the preservation of vital ecosystem services.
- **Disaster Risk Reduction:** Natural ecosystems, such as mangroves, coral reefs, and forests, act as **natural buffers against natural disasters** like floods, storms, and landslides. These ecosystems **provide critical protection** by absorbing and dissipating the energy of such events, reducing the vulnerability of human populations and infrastructure.
- **Cultural and Spiritual Values:** Nature-based solutions recognize the cultural and spiritual significance of ecosystems. Many communities **have deep-rooted connections with natural environments**, which are essential for their **cultural heritage and identity**. Protecting and restoring these ecosystems **helps preserve traditional knowledge**, cultural practices, and spiritual values associated with nature.

Examples of NbS

- **Nature-Based Urban Design:** Incorporating **nature into urban planning and design** can enhance **environmental wellness in cities.** Examples include **incorporating green spaces,** creating urban forests, **establishing green corridors**, and promoting rooftop gardens. Nature-based urban design **improves** air quality, reduces noise pollution, and enhances the overall livability of cities.
- **Ecosystem-Based Disaster Risk Reduction:** Protecting and restoring ecosystems, such as mangroves, floodplains, and forests, **can reduce the impact of natural disasters** like floods and storms. Healthy ecosystems act as **natural buffers**, absorb and store water, and provide resilience against climate-related risks.
- **Coastal and Marine Conservation:** Protecting and restoring coastal and marine ecosystems, including coral reefs, seagrasses, and mangroves, is crucial for environmental wellness.

These ecosystems **provide coastal protection,** support fisheries, sequester carbon, and enhance water quality. They also **offer recreational opportunities**, tourism, and cultural value.

- **Wetland Restoration:** Restoring and conserving wetlands, such as marshes, swamps, and mangroves, can have numerous benefits. Wetlands **act as natural water filters**, control flooding, **provide habitat** for various species, and support biodiversity. They also contribute to **carbon sequestration** and provide recreational and educational opportunities.
- **Sustainable Agriculture and Agroforestry:** Promoting sustainable agricultural practices, such as organic farming, crop rotation, and agroforestry, **helps conserve soil health**, reduce water pollution, and **protect biodiversity**.

Way forward

- **Global standards** for NbS like those developed by IUCN is the key for its effective implementation.
- **Advocating policy changes** and incorporating **NbS in national climate targets**.
- **Developing necessary infrastructure and investing in** high-quality nature based solutions.
- **Globally investing in NbS** can be an effective way for reaping its benefits on a long-term basis in the future.

2. Nano Urea

About Nano Urea

- Nano urea is urea in the form of a nanoparticle containing nitrogen particles of 20–50 nanometres in size. It provides nitrogen to plants in liquid form as an alternative to conventional urea.
- A 500ml bottle of nano urea is equivalent to a 45kg bag of conventional urea.

Benefits of Nano urea

- Nano urea liquid will help in reducing the use of chemical fertilizers to save the environment because the imbalanced use of fertilizers is deteriorating the health of the soil. It is also causing air and water pollution.
- Nano Urea can be a game-changer as it will cut down the use of conventional urea by up to 50%.
- While conventional urea has an efficiency of about 25 percent, the efficiency of liquid nano urea can be as high as 85-90 percent.
- Conventional urea fails to have the desired impact on crops as it is often applied incorrectly, and the nitrogen in it is vaporized or lost as a gas. A lot of nitrogen is also washed away during irrigation.
- Thus, Nano fertilizer releases plant nutrients in a controlled manner contributing to higher nutrient use efficiency.
- It will also help in direct savings, reduce transportation costs, and make storage much easier.
- It will reduce import dependence on fuels

Concerns over using Nano fertilizers

- Lack of a nano fertilizer risk management system
- Lack of production and availability of nano fertilizers in required quantities. This limits the wider-scale adoption of nano fertilizers as a source of plant nutrients.
- The high cost of nano fertilizers
- Lack of standardization in the formulation process. This brings about different results of the same nanomaterial under various pedoclimatic conditions.

3. Community Reserves

About Community Reserves

- Under the Wild Life (Protection) Act (WLPA), 1972, protected areas include National Parks, Wildlife Sanctuaries, Community reserves, Conservation reserves, and Tiger reserves.
- Community and Conservation reserves, act as buffer zones between established national parks, wildlife

sanctuaries, and reserved and protected forests.
- While community reserves can be privately owned, either by an individual or the entire community, conservation reserves include reserves and restricted land occupied by the government to protect wild animals.

Importance of Community Reserves

- The creation of such a place attempts to preserve biodiversity while simultaneously enhancing the socioeconomic circumstances of the local population.
- The Reserve is managed by a community reserve management committee.
- The State Government may designate the area as community land by notification if a community or a single person has offered to volunteer to conserve wildlife and its habitat.
- Within the Community Reserve, no changes to the way land is used are permitted unless they are authorized by a resolution that has been approved by both the State Government and the Management Committee.

Issues

- After a forest has been made into a community reserve, people are not allowed to hunt there, collect non-timber forest produce, or use it for agricultural practices such as jhum cultivation.
- The benefits to communities, after the designation of community reserves, vary from place to place. In many places, people are not happy with the meager monetary benefits.
- Several communities are demanding de-notification of community reserves as they do not get their promised benefits and there is conflict between the forest department and local communities.

Conclusion

- Community Reserves illustrate a community-based co-management model, a first of its kind within the protected area (PA) network of India. Such reserves mark a shift towards an inclusive and decentralized approach within PAs in the country.

4. Heat waves

What are heat waves?

- A Heat Wave is defined as a period of abnormally high temperatures over a region.
- The heat wave is considered when the maximum temperature of the region reaches at least 40 degrees Celsius for plains and at least 30 degrees Celsius for hilly regions.
- Higher daily peak temperatures and longer, more intense heat waves are becoming increasingly frequent globally due to climate change.
- India too is feeling the impact of climate change in terms of increased instances of heat waves which are more intense in nature with each passing year.

Vulnerable Regions

- Heat waves are common over the Core Heatwave Zone (CHZ) — Rajasthan, Punjab, Haryana, Chandigarh, Delhi, West Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Orissa, Vidarbha in Maharashtra, parts of Gangetic West Bengal, Coastal Andhra Pradesh and Telangana, as categorized by India Meteorological Department.
- The regions in the extreme north, northeast, and southwestern India are less prone to heat waves

Causes for increasing heatwave events in the country

- According to the India Meteorological Department (IMD), the average temperature in India has increased by approximately 0.6°C over the last century. Thus global warming has resulted in increasing heat waves.
- Clear skies, low humidity, and lack of wind are favorable conditions for heatwaves formation as they result in an increase in temperature.
- The urban heat island effects can make ambient temperatures feel 3 to 4 degrees more than they are.
- More heat waves were expected as global temperatures had risen by an average of 0.8 degrees in the past 100

years. Night-time temperatures are rising too.

Impacts

- The health impacts of Heat Waves typically involve dehydration, heat cramps, heat exhaustion, and/or heat stroke.
- The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death.
- Heatwaves can also increase strain on water, energy, and transportation resulting in power shortages or even blackouts.
- Food and livelihood security may also be strained if people lose their crops or livestock due to extreme heat.
- Multiple areas of the economic sector experience reduced worker productivity during heatwaves, especially agriculture and construction.
- Heatwaves can lead to water shortages and increased stress for plants, particularly in arid regions. This has the effect of reducing plant growth, the basis of energy production and the food chain, with an overall drying-out of the landscape.

5. Millets

What are millets?

- Millets are a group of small-seeded grasses used as cereals.
- In India, millets can be clubbed into major, minor, and pseudo categories.
    - **Major Millets**: Sorghum (Jowar), Pearl Millet (Bajra), Finger Millet (Ragi/Mandua)
    - **Minor Millets**: Foxtail Millet (Kangani/Kakun), Proso Millet (Cheena), Kodo Millet, Barnyard Millet (Sawa/Sanwa/ Jhangora), Little Millet (Kutki)
    - **Pseudo Millets**: Buckwheat (Kuttu) and Amaranth (Chaulai)
- The top five states producing millet are Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, and Haryana.

Millets in India

- India is poised to become the global hub for millets with a production of more than 170 lakh tonnes which makes for more than 80% of the millets produced in Asia.

Importance of Millets

- In the current changing agroclimatic narrative across the world, it is essential that our agricultural policies see a shift from existing practices.
- According to a recent study, in the coming years, there will be a reduction in production rates of various cereal crops due to climate change. Millets have a double value in tackling climate change because they contribute to both adaptation and mitigation.
- Millets survive in much higher temperatures than most crops and can survive with much less water (1/4 of the water required by rice). Their overall resilience makes them climate-smart and a good adaptation strategy for farmers.
- Millets also are cultivated with minimal fertilizers and pesticides, so they have a lower carbon footprint.
- Millets are also highly nutritious and have the potential to be a solution to the nutrition crisis facing the country.
- A study by International Crops Research Institute for the SemiArid Tropics (ICRISAT) found that children grew up to 50% more in weight and height parameters on a millet-based diet.
- Millets are also being hailed as the solution for many lifestyle diseases like diabetes, high blood pressure, digestive disorders, gluten allergies and much more.

Millets and SDGs

- International Year of Millets 2023 aims to contribute to the UN 2030 Agenda for Sustainable Development, particularly SDG 2 (Zero Hunger), SDG 3 (Good health and well-being), SDG 8 (Decent work and economic growth), SDG 12 (Responsible consumption and production), SDG 13 (Climate action) and SDG 15 (Life on land).

- **Climate-resilient Agriculture-** SDG 13 (Climate Action) and SDG 15 (Life on Land):
    - Millets are often referred to as climate-resilient crops because they can grow on arid lands with minimal inputs and maintenance, are tolerant or resistant to diseases and pests and are more resilient to climate shocks than other cereals.
- **Fighting Hunger**- SDG 2 (End Hunger):
    - In arid areas, millets are very often the only crops that can be harvested in the dry season and are a crucial part of the household food basket.
    - Millets can help to overcome food scarcity in difficult periods, therefore contributing to the food security and nutrition of vulnerable populations.
    - Millets can grow in very poor and fertile soils in dryland conditions and do not heavily deplete soil nutrients.
- **Healthy Diet**- SDG 3 (Good Health and Well-Being):
    - Millets are good sources of minerals, dietary fibre, antioxidants and protein. With a low glycaemic index, they are a good option for people with highblood sugar.
    - Millets are also gluten-free and an excellent and cost-effective source of iron for iron-deficient diets.
    - With their high levels of fibre content, vitamins, minerals, phytochemicals, and antioxidants, they can help fight many modernday, lifestyle diseases like cancer, diabetes, and cardiovascular problems.
- **Opportunities to Smallholder Farmers**- SDG 8 (Decent Work and Economic Growth):
    - The production of millets and the demand for them has declined as other cereals such as wheat, maize or rice became a dietary preference.
    - By promoting millets and regaining market opportunities, additional sources of revenue can be created for smallholders.
- **Diversity of the Global Food System-** SDG 8 (Decent Work and Economic Growth) and SDG 12 (Sustainable Consumption and Production):
    - Millets account for less than 3% of the global grains trade. With the need to improve the resilience of global trade and its ability to respond to sudden changes in the foodgrain market, millets are a valuable option to increase output diversity and mitigate risks related to production shocks.

Way Forward

- Supporting farmers, creating an enabling environment for industry and startups, and increasing awareness among consumers is key to the future of millets.

6. Soil Degradation

About soil degradation

- Soil degradation is defined as a change in the soil health status resulting in a diminished capacity of the ecosystem to provide goods and services for its beneficiaries.
- Land degradation has a wider scope than both soil erosion and soil degradation in that it covers all negative changes in the capacity of the ecosystem to provide goods and services (including biological and water-related goods and services).

Types of Land degradation

- **Physical Degradation** - It refers to soil erosion , change in soil's physical structure , eg : compaction, waterlogging, etc
- **Chemical Degradation** - It refers to leaching, salanization , nutrient imbalances, etc
- **Biological Degradation** - It implies loss of vegetation, rangeland

degradation, and loss in biodiversity including soil organic matter.

Causes for soil degradation

- Deforestation
- Overgrazing
- Faulty Agricultural Practices- Much of the soil erosion in India is caused by faulty methods of agriculture. Excessive use of fertilizers, wrong ploughing, lack of crop rotation, and practice of shifting cultivation are the most adversely affecting methods of agriculture.
- Soil alkalization occurs due to irrigation with water containing sodium bicarbonate leading to poor soil structure and reduced crop yields.
- Anthropogenic causes include Industrialization, Urbanisation, mining, etc

International Efforts

1) United Nations Convention to Combat Desertification (UNCCD)

- Established in 1994, the United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking environment and development to sustainable land management.
- It addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.
- The Ministry of Environment, Forest and Climate Change is the nodal Ministry for the Convention.

Cop -14-Delhi Declaration

- The 14th Conference of Parties (COP14) of the UNCCD ended with 196 countries and the EU adopting the "New Delhi Declaration".
- The Delhi Declaration agreed to by the parties after the Conference raises ambitious targets with a people's first approach to land restoration.
- **Land Degradation Neutrality**: LDN can be defined as a situation where the quality of land to support the basic ecosystem remains stable or increases over time.During this session, India announced its intentions to restore 26 million hectares.
- **Drought toolbox:** It is an important knowledge product of the convention which gives a variety of information on monitoring and early initiative for drought, vulnerability, and risk assessment as well as risk mitigation measures.
- **The Peace Forest Initiative(PFI)** is an initiative of South Korea to use ecological restoration as a peace-building process. It aims at addressing the issue of land degradation in conflict-torn border areas and would go a long way in alleviating tensions and building trust between communities living there and between enemy countries in particular.

Cop- 15- Abidjan Declaration

- The 15th Conference of Parties (COP15) of the United Nations Convention to Combat Desertification (UNCCD) was recently held in Abidjan, Côte d'Ivoire, in West Africa.
- The COP15 theme, **'Land. Life. Legacy: From scarcity to prosperity**', is a call to action to ensure land, the lifeline on this planet, continues to benefit present and future generations.
- The Conference concluded with a global pledge to boost drought resilience and invest in land restoration for future prosperity.

Highlights of COP15

- The global leaders representing UN member states agreed to establish an Intergovernmental Working Group on Drought for 2022-2024 to look into possible options to support a shift from reactive to proactive drought management.
- The UN members also agreed and committed to accelerate the restoration of one billion hectares of degraded land by 2030.
- The UN member states will focus on improving data gathering and monitoring to track progress against the achievement of land restoration commitments.
- They committed to establishing a new partnership model for largescale

integrated landscape investment programmes.
- The leaders came on board and also committed to prioritise and ensure women's involvement in land management for effective land restoration.
- Other significant outcomes of the COP 15 included: the **Abidjan Call** issued by the Heads of State and Government to boost long-term environmental sustainability and the **Abidjan Declaration** on achieving gender equality for successful land restoration.

2) Bonn Challenge

- It is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030.

3) IDMP (The integrated drought management Programme)

- It contributes to the global coordination of drought-related efforts of existing organizations and agencies with regard to Better scientific understanding and inputs for
    - Drought management
    - Drought risk assessment, monitoring, prediction, and early warning
    - Policy and planning for drought preparedness and mitigation across sectors
    - Drought risk reduction and response

7. Marine protected areas

What are marine protected areas?

- **Marine Protected Areas (MPAs)** are specially designated regions of the ocean that are protected for the conservation and preservation of marine ecosystems and their diverse species of flora and fauna.
- These protected areas serve a crucial role in maintaining the health and balance of the marine environment and its inhabitants.
- To achieve their conservation objectives, MPAs can limit or prohibit certain human activities, such as fishing, oil and gas exploration, and construction, within their boundaries

Indian Context

- There are a total of 31 major Marine Protected Areas in India covering coastal areas that have been notified under the Wildlife Protection Act, 1972.
- MPAs occupy less than 4.01% of the total area of all Protected Areas in India.
- The Gulf of Kachchh Marine National Park (Gujarat), the Gulf of Mannar National Park (Tamil Nadu), and Sundarbans National Park (West Bengal) are some of the important MPAs of India.

Significance of MPAs

- MPAs serve a crucial role in conserving **marine biodiversity, regulating fishing practices, mitigating climate change, promoting research** and **education**, and providing **economic benefits.**
- Additionally, MPAs act as **carbon sinks**, absorbing and storing carbon dioxide from the atmosphere and mitigating the impacts of climate change on marine ecosystems.
- Further, they contribute to local economies through **sustainable tourism, recreation**, and supporting **local fishing communities**
- MPAs protect important marine ecosystems such as **coral reefs, mangroves**, and **seagrass beds.**

Challenges of MPAs

- The enforcement of regulations within MPAs can be challenging,
- There exists limited financial and institutional support for regulating and monitoring MPAs
- The existence of a porous boundary makes it difficult to prevent illegal fishing, poaching, and other activities that can have a significant impact on marine life and ecosystems.

Global efforts

- The **Convention on Biological Diversity (CBD)** is a global treaty signed by 196 countries, including India, with the aim of conserving

biodiversity, promoting sustainable use of its components, and ensuring the fair sharing of benefits from genetic resources.

- Previously, the **15th Conference of Parties (COP15)** to the CBD held in **Kunming, China** in 2021, emphasized the role of marine protected areas (MPAs) in conserving marine biodiversity and promoting sustainable use of marine resources.

Way Forward

- MPAs play a critical role in conserving India's rich marine heritage and sustaining its coastal communities. However, the effective functioning of MPAs is essential to ensure their success.
- There is a need for greater collaboration between government agencies, academic institutions, and local communities.

8. Wildlife (Protection) Amendment Act, 2022

About Wild Life (Protection) Act, 1972

- The Wild Life (Protection) Act, of 1972, provides for the protection of wild animals, birds, and plants.
- The Act created six schedules that gave varying degrees of protection to classes of flora and fauna.
- It contains provisions prohibiting the hunting of wild animals specified in the schedules unless the Chief Wildlife Warden believes that an animal has become dangerous to human life or is disabled or diseased beyond recovery.
- It also provides for the protection of specified plants, prohibiting picking or uprooting them, and allows governments to declare areas as sanctuaries.

Highlights of the 2022 Amendment

- The Wildlife (Protection) Amendment Act, 2022 has come into force since 1st April 2023.
- **Streamlining the Schedules**:
    - The amendment streamlines the Schedules of protected native wildlife to three Schedules (Schedule I and II for animals; Schedule III for plants).
    - The Act removes the present schedule for vermin species and inserts a new schedule (Schedule IV) for specimens listed for extinction under CITES.
    - There has been a significant addition of species to Schedule I.
- **Obligations under CITES:**
    - The fresh amendments intend to regulate wildlife trade and implement the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**, *which is an international agreement between governments to regulate international trade in species threatened with extinction.*
    - The latest amendments seek to increase the protected species listed in the appendices under CITES.
    - The Act provides for the designation of a management authority, which would be empowered to grant export or import permits for the trade of specimens.
    - The Act also provides for designating a scientific authority, which would monitor the export permits granted for the specimens listed in the schedule as well as the actual export of the specimens.
    - An export permit would not be granted for certain species unless the scientific authority advises that the export will not be detrimental to the survival of that species.
- **Regulating Invasive Species:**
    - For the first time, a regulatory mechanism to deal with 'invasive alien species' has been inserted in the Act.

    - It empowers the central government to regulate or entirely prohibit the import, trade, possession, or proliferation of invasive alien species.
- **Role of Gram Sabha:**
    - The amendment also makes it mandatory to consult the Gram Sabha in the management plan for all Wildlife Sanctuaries.
- **Protection of Elephants:**
    - The original act categorizes elephants as Schedule 1 animals, at par with tigers, but allows them to be held captive legally.
    - In other words, the law prohibits capturing any Schedule 1 animal, irrespective of its wild or captive nature, except in certain circumstances with the prior permission of the chief wildlife warden.
    - The amendment adds a clause, allowing the transfer or transport of a captive elephant for "religious or any purpose" by anybody having a valid certificate of ownership, subject to terms and conditions prescribed by the central government.
    - Many animal protection organizations have urged the government to remove this clause.
    - Experts have also argued that the provision enlarges the scope for the exploitation of captive elephants.
- **Increased Penalties:**
    - The Act also increased the penalties under the Act. For general violations, the amendment proposes an increase of the maximum fine to Rs 1 lakh from Rs 25,000 and for violating provisions related to specially protected animals, it increases the fine to at least Rs 25,000 from at least Rs 10,000.

Issues with the act

- The Bill seeks to amend **Section 43** of the principal Act to **permit the transfer** or **transport of a captive elephant** for a religious or any other purpose by a person having a valid certificate of ownership. This provision has raised concerns as it has the potential of encouraging the commercial trade of elephants, their **captivity,** and **brutality**.
- Issues relating to Human-Wildlife conflict, Eco-sensitive zone have not been addressed in the act.
- The protection of wild animals and birds is a subject under the Concurrent List of the Constitution. Here the proposed amendment bill renders the State Boards for Wildlife chaired by Chief Ministers defunct and provides for establishing a Standing Committee of Board for Wildlife to be headed by the Forest Minister with a maximum of ten nominated members, which injures the federal structure of India.

9. Mission LiFE (Lifestyle For Environment)

About the Initiative

- Mission LiFE is a global initiative by India to help the world in its fight against climate change and lead to a sustainable way of life to achieve the sustainable development goals set by the U.N.
- Mission LiFE will be India's signature initiative at the UN and other international platforms for showcasing climate action and early achievement of the Sustainable Development Goals.
- The idea of LiFE was introduced by India during the 26th United Nations Climate Change Conference of the Parties (COP26) in Glasgow in 2021.
- The idea promotes an environmentally conscious lifestyle that focuses on 'mindful and deliberate utilization' instead of 'mindless and wasteful consumption.
- On 5 June 2022, on World Environment Day, India furthered the vision of LiFE by launching the LiFE Global Movement, inviting

academicians, researchers, and start-ups across the world to think about specific and scientific ways in which the full potential of collective action can be harnessed to address the environmental crisis.

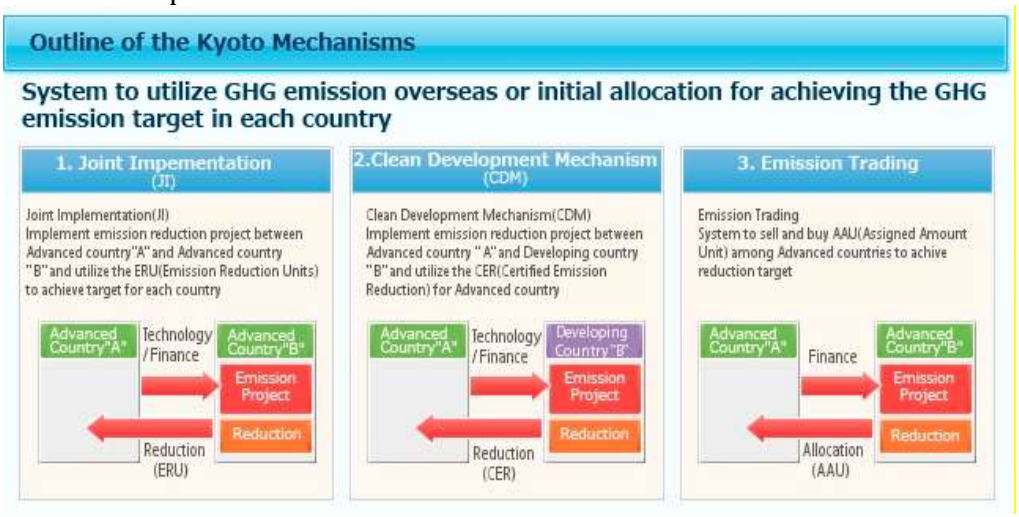
- It envisages a circular economy through people's participation. It also plans to nurture a global network of individuals, namely "pro-planet people" or P3, who will have a shared commitment to adopt and promote environment-friendly lifestyles.
- It aims at following a three-pronged strategy for changing people's collective approach toward sustainability.
    - This includes nudging individuals to practice simple yet effective environment-friendly actions in their daily lives (demand),
    - Enabling industries and markets to respond swiftly to the changing demand (supply), and influencing government and
    - Industrial policy to support both sustainable consumption and production

10. UNFCCC (The United Nations Framework Convention on Climate Change)

- UNFCCC is an international environmental convention that aims to lower atmospheric concentrations of greenhouse gases in order to prevent dangerous anthropogenic interference with the earth's climate system.
- The United Nations Framework Convention on Climate Change (UNFCCC) commonly known as the Earth Summit, the Rio Summit, or the Rio Conference, was ratified in 1992.
- As of 2022, there are 197 parties to the United Nations Framework Convention on Climate Change.

Kyoto Protocol

- On December 11th, 1997, the Kyoto Protocol was ratified in Kyoto, Japan. It took a long time for ratification, and on February 16th, 2005, it became effective.
- The Kyoto Protocol was an agreement among developed nations to reduce carbon dioxide (CO_2) emissions and greenhouse gases (GHG) to minimize the impacts of climate change.
- The Protocol applied to 6 greenhouse gases,
    - Carbon dioxide
    - Methane
    - Nitrous oxide
    - Hydrofluorocarbons
    - Perfluorocarbons
    - Sulphur hexafluoride..
- The Kyoto Flexible Market Protocol mechanisms include,
    - Clean Development Mechanism (CDM)
    - Emission Trading
    - Joint Implementation (JI)



Cop 21- Paris Climate Accord

- It is a legally binding international treaty on climate change that was adopted by 196 countries at the Conference of the Parties COP 21 in Paris in December 2015.
- The objective of the Paris Climate Accord was to achieve the long-term temperature goal. Countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate-neutral world by mid-century.
- The main goal of the Paris Climate Accord is to limit global warming to well below 2° Celsius and preferably limit it to 1.5° Celsius, compared to pre-industrial levels.

Salient features

- Nationally determined contributions (NDC)
    - Contribution cannot be enforced by law
    - No penalty if the target is not met
    - Name and encourage system.
- Climate finance
    - The developed countries to mobilize $100 billion a year in climate finance by 2020 and to continue mobilizing finance at the level of $100 billion a year until 2025.
    - Focus on climate change adaptation and mitigation

Cop - 26 Glasgow Summit

- COP26 was held in Glasgow, with the United Kingdom presiding over the conference.
- COP26 is significant because it informed member countries about the alarming situation of the Earth's rising temperature and the risks associated with this rise.
- The IRIS (Infrastructure for the Resilient Island States) initiative has been launched with the combined efforts of India, the U.K., and Australia, to develop the infrastructure of small island countries under existential threat because of climate change.
- A new initiative known as the Green Grid Initiative (GGI) was launched which is part of the One Sun, One World, One Grid program started by the International Solar Alliance.

India's enhanced NDCs

- India at the COP26 to the UNFCCC held in Glasgow in 2021 expressed to intensify its climate action by updating its NDCs and presented to the world five nectar elements (Panchamrit) of India's climate action.
- The updated NDCs is as follows:
    - India will increase its nonfossil fuel power capacity to 500 gigawatts (GW) by the end of the decade, up from 450GW.
    - Half of India's energy needs will be fulfilled by renewable sources by 2030.
    - India's 2030 carbon intensity goal measured as carbon dioxide emissions per unit of gross domestic product will be increased from 35% to 45%.
    - The country will also strive to cut carbon-dioxide emissions by 1 billion tonnes from business as usual by 2030.
    - By 2070, India will achieve the target of net-zero emissions.

COP- 27, Sharm-El-Sheik in Egypt.

Key Outcomes of the Summit

- **Special Loss and Damage Fund**
    - COP27 has agreed to establish the Special Loss and Damage Fund which will help to make up for the losses suffered by developing nations that are vulnerable to climate change.
- **UN's Early Warning System for All Initiative**
    - COP27 also agreed to the creation of UN's Early Warning System for All initiative, with an investment of $3.1 billion between 2023 and 2027, to improve understanding of climate-related risks in developing countries so that early warnings can be acted upon before disaster strikes.
    - The initiative could be particularly useful in Africa, where 60% of the the population has no early warning systems.

- **Santiago Network**
  - An additional positive move was made with the agreement on the institutional arrangements to operationalise the Santiago Network, which was established at COP25 in Madrid to help developing countries identify their technical needs and connect with providers of assistance to address them.
  - For example, in the case of flooding, improved systems to prepare and implement early warning systems and evacuation processes.

11. UNCBD

About UNCBD

- The CBD entered into force in 1993. It has 3 main objectives:
  - The conservation of biological diversity
  - The sustainable use of the components of biological diversity
  - The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
- Aichi Targets
  - The 'Aichi Targets' were adopted by the Convention on Biological Diversity at the tenth meeting of the Conference of the Parties to the CBD (COP10) which took place in Nagoya, Japan in 2010.
  - During the meeting, the parties agreed that previous biodiversity protection targets were not achieved, and therefore they needed to come up with new plansand targets.
  - The short-term plan provides a set of 20 time-bound, measurable targets to be met by the year 2020, collectively known as the Aichi Biodiversity Targets, grouped under five Strategic Goals.

Protocols to CBD

- Cartagena Protocol
- The Cartagena Protocol on Biosafety to the Convention on Biological Diversity is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.
- Nagoya Protocol

Nagoya Protocol

- The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity is an international agreement which aims at **sharing the benefits arising from the utilization of genetic resources in a fair and equitable way**.
- It entered into force in 2014. Number of Parties: more than 120 countries (including **India**).

Nagoya – Kuala Lumpur Supplementary Protocol

- Adopted as a **supplementary agreement to the Cartagena Protocol on Biosafety**, the Nagoya – Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety aims to contribute to the conservation and sustainable use of biodiversity by providing **international rules and procedures in the field of liability and redress relating to living modified organisms.**

COP 15

- The second part of the United Nations Biodiversity Conference(COP15) ended in Montreal, Canada with a landmark agreement to guide global action on nature through 2030.
- The first part took place in a virtual format, in October 2021.
- Chaired by China and hosted by Canada, COP 15 resulted in the adoption of the **Kunming-Montreal Global Biodiversity Framework (GBF).**

About Global Biodiversity Framework

- **Objectives:**
  - GBF aims to guide biodiversity policy through four overarching goals to be achieved by 2050 and a set of 23 targets to be reached by 2030, to achieve a vision of living in harmony with nature by 2050.
  - The most significant part of the framework is a commitment to protect 30% of land and water considered important for biodiversity by 2030, known as the 30×30 target.
  - Currently, 17% of terrestrial and 10% of marine areas are protected.
  - The GBF is aligned with UN Sustainable Development Goals, three of which directly deal with the environment and thus with biodiversity: Goal 13 on climate action, Goal 14 on life below water, and Goal 15 on life on land.
- **4 Overarching Goals:**
  - They include maintaining the ecosystem integrity and health to halt extinctions,
  - measuring and valuing ecosystem services provided by biodiversity, sharing monetary and non-monetary gains from genetic resources and digital sequencing of genetic resources with indigenous people and local communities, and
  - raising resources for all countries to close a biodiversity finance gap of an estimated $700 billion
- **Focus Areas:**
  - It sets out targets for 2030 on protection for degraded areas, resource mobilisation for conservation, compensation for countries that preserve biodiversity, halting human activity linked to species extinction, reducing by half the spread of invasive alien species, halving global food waste, cutting pollution to non-harmful levels and minimising climate change impact and ocean acidification, among others.
  - The GBF goals and targets do not prohibit the use of biodiversity, but call for sustainable use, and a sharing of benefits from genetic resources.
  - The GBF emphasises respect for the rights of indigenous communities that traditionally protect forests and biodiversity, and their involvement in conservation efforts. It advocates similar roles for women and local communities.
  - Besides emphasising sustainable practices in agriculture, aquaculture, fisheries and forestry, the agreement calls upon members to adopt biodiversity-supporting methods such as agroecology and sustainable intensification.
- **Implementing & Monitoring:**
  - Recognising the challenging nature of the goals and targets, the GBF has specific provisions on implementing and monitoring.
  - Member nations need to submit a revised and updated national biodiversity strategy and action plan in the conference to be held in 2024.
  - Further, the parties to the CBD should submit national reports in 2026 and 2029 to help prepare global reviews.
  - Countries would have to review existing laws relating to not just the environment, but areas such as industry, agriculture and land use, to ensure that the national strategy and action plan adequately protects biodiversity.

- **Funding Mechanisms:**
  - By 2030, the GBF hopes to see atleast $200 billion raised per year from all sources — domestic, international, public and private —towards biodiversity-related funding.
  - Developing countries should get at least $20 billion a year by 2025 and at least $30 billion by 2030 through contributions from developed countries.
  - The framework also aims to phasing out or reforming subsidies that harm biodiversity by at least $500 billion per year, while scaling up positive incentives for biodiversity conservation and sustainable use;
  - It was requested that the Global Environment Facility set up a Special Trust Fund – the GBF Fund – to support the implementation of the GBF, in order to ensure an adequate, predictable and timely flow of funds.

Conclusion

- The targets are ambitious, considering that biodiversity is in a poor state. In 2020, the world had failed to meet the last set of targets, the Aichi Targets. Countries would need to ensure success this time round.

12. Translocation of animals

What is translocation?

- Wildlife translocation is the intentional movement of animals for conservation purposes. It has been used as a technique to mitigate the loss and depletion of endangered species.
- Re-introduction is the deliberate or accidental translocation of a species into the wild in areas where it was indigenous at some point, but no longer at the present.

Benefits of Translocation

- It may decrease the risk of extinction by increasing the range of a species, augmenting the numbers in a critical population, or establishing new populations.
- Translocation may also improve the level of biodiversity in the ecosystem.
- Provide opportunities for in-depth scientific research.
- Establish a healthy, genetically diverse self-sustaining population.

Threats posed by translocation

- Increased spread of diseases
- Lack of uniqueness and local adaptability by reintroduced species
- Loss of genetic diversity and increased risk of extinction
- Loss of evolvability
- Translocation may be expensive and is often subject to public scrutiny

Cheetah translocation

- Asiatic cheetah (Acinonyx jubatus venaticus) is classified as a "critically endangered" species by the IUCN Red List and is believed to survive only in Iran.
- Asiatic cheetahs were once widespread across India but were eradicated in the country as they were hunted for sport.
- In 1952, Asiatic cheetah was declared extinct from India, after decades of human intervention hunting and habitat degradation.
- Over 70 years after they went extinct, eight African cheetahs from Namibia were released into quarantine enclosures in Kuno National Park in Madhya Pradesh as part of India's first inter-country big cat relocation project.
- The translocation of African Cheetah is a part of Government of India to reintroduce the fastest land animal in India after extinction of the Asiatic cheetah in the 1950s

Why do conservationists want to reintroduce cheetahs?

- A section of conservationists has long advocated the reintroduction of the species in the country.
- They argue that introductions of large carnivores have increasingly been recognised as a strategy to conserve threatened species and restore ecosystem functions.

- Cheetahs dwell on open plains and it is mainly a grassland species.
- Grassland is an essential habitat for biodiversity conservation in India, as many threatened species in India belong to this habitat.
- Conserving cheetahs will lead to the conservation of all grassland species.
- The cheetah is the only large carnivore to have gone extinct in India, mainly by over-hunting in India in historical times.

Concerns

- One of the major concerns of the reintroduction project is whether the arriving cheetahs would bring diseases that could threaten other feline species.
- Transmission of these to the endemic tiger population is a cause for concern.
- Another issue is the larger debate on coexistence. The Kuno National Park is already home to around 30 leopards. Tigers from the Ranthambore Tiger Reserve in Rajasthan, 140 km away from Kuno, are also believed to migrate to the park. The proximity of three predators in the same ecosystem is fraught with risks.
- More aggressive predators such as tigers and leopards will compete with the cheetahs. They may be driven to the outskirts of the park, where they could come into conflict with humans.

Indian Rhino Vision 2020 (IRV 2020)

- It was launched in 2015 and aims at increasing the number and range of rhinos in Assam through wild-to-wild translocations from Kaziranga National Park and Pobitora Wildlife Sanctuary to potential Protected Areas including Manas National Park, Burachapori Wildlife Sanctuary, Laokhowa Wildlife Sanctuary, and Dibru-Saikhowa National Park.
- The vision was to attain a population of 3000 wild rhinos in Assam, distributed over seven of it's Protected Areas by 2020.

13. Ramsar Sites in India

About Ramsar Convention

- The Ramsar Convention on Wetlands of International Importance signed in 1971, is an international treaty for the conservation and sustainable use of wetlands.
- It is the only global treaty to focus on a single ecosystem (wetlands).
- At present, more than 170 nations are signatories (including India) to the Ramsar Convention.
- Contracting Parties are committed to the Convention's three pillars:
    - Work towards the wise use of all their wetlands. Wise use means the maintenance of the ecological character of the wetland and allowance of sustainable use for the benefit of people and the environment.
    - Designate suitable wetlands for the list of Wetlands International Importance and ensure their effective management.
    - Cooperate internationally on transboundary wetlands, shared wetland systems and shared species.

What are Wetlands?

- A wetland is a land area that is saturated with water, either permanently or seasonally, and it takes on the characteristics of a distinct ecosystem
- The Ramsar Convention defines wetlands as "areas of marsh, fen, peatlands or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres".
- Five major wetland types are
    - marine (coastal wetlands including coastal lagoons, rocky shores, and coral reefs);
    - estuarine (including deltas, tidal marshes, and mangrove swamps);
    - lacustrine (wetlands associated with lakes);
    - riverine (wetlands along rivers and streams); and

    - palustrine (meaning "marshy" - marshes, swamps and bogs).
- The definition of wetlands is very broad and includes ponds, water storage areas, low-tide coastal zones and all human-made sites such as fish ponds, rice paddies, reservoirs and salt pans.

Significance of wetlands

- Wetlands are indispensable for the countless benefits or "ecosystem services" that they provide humanity, ranging from freshwater supply, food and building materials, and biodiversity, to flood control, groundwater recharge, and climate change mitigation.
- Wetlands are habitats to aquatic flora and fauna, and numerous species of native and migratory birds.
- They are an important resource for sustainable tourism.
- They carry out water purification, filtration of sediments and nutrients from surface water.
- They help in nutrient recycling, groundwater recharging and stabilization of local climate.
- Play an important role in flood mitigation by controlling the rate of runoff.
- They act as riparian buffer shorelines against erosion and pollutants.
- They act as a genetic reservoir for various species of plants (especially rice).

Threats

- Excessive pollutants (Industrial effluents, domestic waste, agricultural runoff etc.) are dumped into wetlands beyond the recycling capacity.
- Habitat destruction and deforestation create ecological imbalance by altering the population of wetland species.
- Conversion of wetlands for agriculture and encroachment of wetlands for construction and industrial activities
- Aquaculture is practiced in wetlands
- Overgrazing in marshy soils.
- Removal of sand from beds near seas makes the wetland vulnerable to wave action and tidal bore.

Way Forward

- Demarcation of wetlands using the latest technology, proper enforcement of laws, and stringent punishments for violators.
- Preventing unsustainable aquaculture and cultivation of shellfish.
- Treating industrial effluents and water from farmlands before discharging into wetlands.
- Utilizing wetlands on a sustainable basis by giving enough time for natural regeneration.
- Afforestation, weed control, and preventing invasive species is the key to wetland conservation.

14. Jal Jeevan Mission

About Jal Jeevan mission

- The Mission is envisioned to provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India.
- The program also focuses on:
    - recharge and reuse through grey water management
    - water conservation
    - rainwater harvesting
    - Community-based programme
- The Jal Jeevan Mission will be based on a community approach to water and will include extensive Information, Education and communication as a key component of the mission.
- It aims to create a Jan Andolan for water, thereby making it everyone's priority.
- JJM is a 'bottom-up' approach where the community plays a vital role from planning to implementation, management, operation and maintenance.
- To achieve this, Village Water & Sanitation Committee (VWSC)/ Pani Samiti are being constituted and strengthened; Village Action Plans are developed through community engagement; Implementation
- Support Agencies (ISAs) are engaged to support village communities in programme implementation and create awareness among people.

- Water quality monitoring & surveillance activities are given top priority under the Jal Jeevan Mission.
- Every water supply asset created under Jal Jeevan Mission is geotagged.
- The fund sharing pattern is 90:10 for Himalayan and North-Eastern States; 50:50 for other States and 100% for UTs

JJM Urban

- The project will focus on rejuvenation of water bodies to augment sustainable fresh water supply and creating green spaces and sponge cities to reduce floods and enhance amenity value through an Urban Aquifer Management plan.
- JJM(U) will promote circular economy of water through development of a city water balance plan for each city focusing on recycle/reuse of treated sewage, rejuvenation of water bodies and water conservation.
- Information, Education and Communication (IEC) campaign is proposed to spread awareness among masses about conservation of water.
- In order to promote Public private partnership, it has been mandated for cities having million plus population to take up PPP projects worth minimum of 10 percent of their total project fund allocation

15. Atal Bhujal Yojana

About ABY

- It is a Central Sector Scheme with focus on community participation and demand side interventions for sustainable groundwater management in identified water stressed areas of seven States in the country viz. Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh.
- The scheme, partly funded by the World Bank, was launched in 2019 and is being implemented for a period of 5 years.
- It envisages sustainable groundwater management, mainly through convergence among various on-going schemes, with emphasis on demand-side measures through active involvement of local communities and stakeholders.

The scheme aims at increasing the capacity of States to manage their ground water resources and for ensuring their long-term sustainability with active participation of the local communities through a mix of top-down and bottom-up approaches.

SOCIETY

1. Population Related

Introduction

- The **State of World Population (SWP) Report 2023** by UNFPA reveals that India has just surpassed China **as the most populous country**, with a population of 142.86 crores compared to China's 142.57 crores. According to the UN, it took the global population 12 years to grow from 7 billion to 8 billion, it will take approximately 15 years until 2037, for it to reach 9 billion.

Demographic dividend

- According to **United Nations Population Fund (UNFPA)**, demographic dividend means, "the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population (14 and younger, and 65 and older)".

Significance of demographic dividend:

- **Large Workforce:** India has a significant proportion of young people, with a sizable **working-age population**. This demographic advantage provides a large and productive workforce that can **contribute to economic growth and development**. A well-utilized workforce can **boost productivity, innovation, and entrepreneurship**.
- **Innovation and Entrepreneurship:** Younger individuals tend to be more adaptable, open to new ideas, and willing to take risks. The demographic dividend can foster an environment **conducive to innovation and entrepreneurial ventures,** which can spur economic growth and competitiveness.
- **Skill Development:** Harnessing the demographic dividend requires investing in education, skill development, and vocational training. By **providing quality education and training** opportunities to the youth, India can enhance the **employability of its workforce** and ensure a skilled labor pool that meets the demands of a rapidly evolving economy.
- **Potential for Savings and Investment:** With a significant working-age population, there is a higher potential for savings and investment. **Increased savings can help fund investments** in infrastructure, technology, and other sectors, contributing to long-term economic growth and development.
- **Demographic Transition:** The demographic dividend is a transient phase in a country's demographic transition. As the working-age population grows, it is **crucial to leverage this opportunity** by implementing effective policies and reforms to ensure sustained economic growth beyond the demographic dividend phase.

Challenges associated:

- The growth in the working-age ratio is **likely to be concentrated in some of India's poorest** states and the demographic dividend will be fully realized only if India is able to create gainful employment opportunities for this working-age population.
- **Lack of skill in the Indian workforce is a major challenge**. India may not be able to take advantage of the opportunities, due to a low human capital base and lack of skills.
- **Low human development parameters:** India ranks 130 out of 189 countries in UNDP's Human Development Index, which is alarming.Therefore, **health and education parameters** need to be improved substantially to make the Indian workforce efficient and skilled.
- **Informal nature of the economy in India** is another hurdle in reaping the benefits of demographic transition in India.
- There is mounting concern that f**uture growth could turn out to be jobless** due to de-industrialization, de-

globalization, the fourth industrial revolution, and technological progress.

Overpopulation in India

Overpopulation occurs when a species' population **exceeds the carrying capacity** of its ecological niche. It can result from an increase in births (fertility rate), a decline in the mortality rate, an increase in immigration, and depletion of resources.

Causes for overpopulation:

- A **decline in death rates** due to greater technological advancements and improvements in medical facilities.
- There is a **greater prevalence of child marriages** in the country.
- **Orthodox practices and belief systems** of certain religions are against family planning norms.
- **Illiteracy and lack of awareness of family planning** and the use of contraceptives have increased the population burden in the country.
- **Industrialization and the growth of opportunities** in urban areas have increased the urban population.
- The average **lifespan of people has increased** due to the control of epidemics by immunization programs.

Possible impact of overpopulation:

- A country with a fast-growing population has to face a **serious problem of scarcity** of necessary food, minimum clothing & proper housing facilities, which are basic needs of human life. Thus, it affects the lifestyle and results in slum areas, starvation, etc.
- Overpopulation **aggravates the unemployment** & **disguised unemployment** problem.
- Overpopulation **creates or gives rise to large families** with low income reducing the standard of persons living therein.
- Overpopulation affects the **environment due to increased pollution**, land degradation, etc. It can result in increased consumption of fossil fuels.
- Population explosion accompanied by rapid industrialization and urbanization has led to **greater demand for already deficient energy** (fuel wood, fossil fuel, and electricity).
- Overpopulation leads to a **shortage of food grains and other essential commodities** leading to price rises and inflation.

Population stabilization

Population stabilization is a stage where the size of the population remains unchanged. The situation is also called the stage of zero population growth. When the birth rate becomes equal to the death rate, the population stabilizes. The National Population Policy aims to achieve a stable population in India by 2045.

Reasons for population stabilization:

- **Increased awareness about family planning:** government initiatives, education and awareness campaigns have **played a crucial role in creating awareness** among the public about population explosion and its effects and to make an informed decision of their family size.
- **Educational opportunities among women:** as women have **access to higher education** and more participation in the workforce, they tend to opt for late marriages and delay their child bearing thus, leading to lower fertility rates.
- **Urbanization and changing potential norms:** urbanization **often favors smaller family** size in urban areas due to changing societal norms thereby contributing to lower fertility rates.

Benefits of population stability:

- **Demographic dividend:** a declining population **can lead to a shift in the age structure** thereby leading to a higher working age population which contributes to economic growth and appropriate skill development and employment opportunities.
- **Improved quality of life:** with a decrease in population growth, there can be a possibility for **increased access to education**, healthcare facilities, and reducing the pressure on infrastructure which can contribute to increased quality of lifestyle.

Challenges of population stability:

- **Shift towards aging population:** a **declining trend of population increases** the composition of the aging population in the country with potential implications for their social security, healthcare and pension systems. There is an urgent need to bring in reforms for the well-being of the elderly.
- **Regional disparities: while some states experience population explosion** and the other states experience population decline, this **gives rise to regional disparities**, thus making it difficult for the government to implement population related schemes in a uniform manner.
- **Balancing economic growth and dependency ratios:** While a demographic dividend is possible, it is contingent on **generating sufficient employment opportunities** to absorb the growing working-age population. Failure to address this could result in high unemployment rates and social instability.

Way forward

- States must first **develop medical facilities and focus on socioeconomic issues** if they wish to assure a reduced and steady fertility rate.
- The success of India's southern states in **regulating population increase** suggests that economic growth, as well as attention to education, health, and women's empowerment, work considerably better than punitive measures to disincentivize larger families.
- Instead of state-level population control programmes, India **requires a national policy** to best use its population.

2. Women in STEM

STEM

- The acronym "**STEM**" was coined by scientific administrators at the **U.S. National Science Foundation** in **2001.**
- "**STEM**" is a **curriculum** based on the idea of **educating students** in **science, technology ,engineering** and **mathematics.**
- A robust STEM education promotes **critical thinkers , problem solvers, innovators** , etc.
- It is important to address the **under representation** of **women** in **STEM**.

Global Scenario

- According to the **UN,** less than **30 percent** of **researchers globally** are **women**.
- Women are further provided with fewer **research funds in** comparison to their male counterparts.
- Out of **959** recipients of the **Nobel prizes** so far, only **61** have been **women.**
- Countries with a fairly good **ratio** in terms of an **equal number** of **female** and **male researchers** are: **South Africa** and **Egypt**, with **45 percent female researchers** each, and **Cuba**, at **49 percent.**

Indian Context

- According to the **Department of science and technology(DST)**, as of **2018**, women made up only **18.7 percent** of the country's researchers.
- In India, about **43 percent** of **women** constitute the **graduate population** in **STEM**, but only **14 percent** of women join **academic institutions** and **universities**.
- Further, only **21** of the **574 recipients** of the **Shanti Swarup Bhatnagar awards**, which **honours** work by **researchers** in **science and technology**, were **women**.

Factors which are hindering their participation:

- Despite significant policy measures aimed at promoting gender equality and encouraging women to pursue careers in science, technology, engineering, and mathematics (STEM), there are still various social and institutional hurdles that hinder their progress. These hurdles create barriers for women in the STEM fields, limiting their opportunities for career advancement and representation.

- **Gender Bias and Stereotypes:** One of the major challenges women encounter is persistent gender bias and stereotypes in the STEM fields. Deep-rooted societal perceptions that associate science and technology with masculinity can discourage young girls from pursuing STEM education and careers. Stereotypes may lead to lower expectations for women's abilities, limiting their access to resources and opportunities.
- **Work-Life Balance Challenges:** Balancing family responsibilities with demanding careers in science can be particularly challenging for women. The lack of support systems, such as affordable childcare and flexible work arrangements, can deter women from pursuing advanced degrees and career opportunities in STEM.
- **Unconscious Bias:** Unconscious bias, which refers to the subtle and automatic judgments individuals make based on stereotypes, can influence hiring decisions and career advancement opportunities in STEM fields.
- **Lack of role models:** Lack of role models for women from this field and also the pressures to conform to societal norms and trappings of domesticity are major obstacles.
- **Hostile Work Environment:** Women in STEM fields may face discrimination, harassment, or a hostile work environment, which can negatively impact their professional growth and mental well-being.

National Initiatives

- **Gender Advancement for Transforming Institutions (GATI)** is a pilot project under the **Department of Science and Technology** to promote **gender equity** in **science and technology**. In the first phase of GATI, **30 educational** and **research institutes** have been selected with a focus on **women's participation** in **leadership roles, faculty**, etc
- **Knowledge Involvement Research Advancement through Nurturing (KIRAN)**
  was launched in **2014-15,** with the aim of providing **career opportunities** to **unemployed women scientists** and **technologists**, especially those who had a break in their career.
- **Vigyan Jyoti Scheme** launched by the **Department of Science & Technology (DST) ,** is intended to **create a level-playing field** for **meritorious girls** in **high school** to pursue **Science, Technology, Engineering, and Mathematics (STEM)** in their **higher education.**
- **Women technology parks** act as a **single window hub** for convergence of diversified technologies, leading to socio-economic development of women through **capacity building** and **adoption** of **location-specific technologies**.

Way Forward

- There is a need to create a facilitative **gender-neutral culture** of **research** in **institutions** and **industries**.
- There is an **immediate need to invest in supporting infrastructure, incentivising institutions** to promote gender equity, transparency in decision making etc. to bridge the persisting gender imbalance in STEM majors.
- Further, more women in STEM would improve and create a meaningful impact on society and national needs.

3. Urban poverty in India:

Urban poverty

- Urban poverty in India is unique especially in the way it follows a certain pattern of growth.
- Despite taking measures to tackle urban poverty growth in major cities, the numbers are adding up to the existing reports which proves to be challenging for various schemes to control the growth of urban poor.
- Urban poverty in India is over 25% and these numbers are increasing

manifold due to changing socio-economic factors and social dynamics.

Reasons for growing urban poverty:

- **Rapid Urbanisation:** India has experienced rapid urbanisation, with millions of people migrating from rural to urban areas in search of better economic opportunities. However, the uncontrolled influx of people has resulted in the growth of slums and informal settlements, where living conditions are often substandard and lacking basic amenities.
- **Lack of affordable housing:** The high demand for housing in urban areas due to rapid urbanisation have led to soaring prices for housing thereby making it unaffordable for the poor to have access to housing facilities. Due to this factor, many people end up in slims where they do not have access to basic services and decent housing.
- **Informal Sector Employment:** A significant proportion of the urban poor in India work in the informal sector, such as street vending, domestic work, and construction labour. These jobs often offer low wages, lack social security benefits, and are vulnerable to economic fluctuations.
- **Inadequate Healthcare:** Urban areas may have better healthcare infrastructure, but the cost of medical services can be prohibitive for the urban poor. Access to quality healthcare remains a challenge, leading to health disparities.

Challenges associated in addressing urban poverty:

- **High Cost of Living:** Urban areas often have a higher cost of living, making it challenging for low-income individuals and families to afford basic necessities such as housing and healthcare.
- **Slum Rehabilitation:** Upgrading and rehabilitating slums to provide better living conditions while maintaining affordable housing options is a complex task.
- **Informal Sector Regulation:** Formalizing and providing better protections for workers in the informal sector is essential to improve their economic conditions.
- **Sustainable Urban Planning:** Urban planning should focus on creating inclusive and sustainable cities that provide equal access to basic services and opportunities for all residents.
- **Gender inequality:** Urban poverty exacerbates the problem of gender inequality. Women face job discrimination, social exclusion and unequal access to resources and services. Women in cities are more likely to face gender-based violence, harassment and societal biases which worsen their position in the society.

Potential solutions for addressing urban poverty:

- **Slum upgradation and affordable housing**: Governments and urban planners should prioritise the development of affordable housing schemes like PM Awas Yojana and various slum redevelopment projects through special purpose vehicles to ensure access to safe and adequate housing for the urban poor.
- **Skill development and job training:** Investing in skill development and vocational training programs like PM Kaushal Vikas Yojana and STRIVE can equip the urban poor with marketable skills, increasing their employability and income-earning potential.
- **Social Safety Nets:** Establishing social safety net programs, such as cash transfers, food subsidies, and healthcare support, can provide a buffer against economic shocks and enhance the overall well-being of the urban poor.
- **Empowering Women:** Empowering women through education, skill development, and financial inclusion can have a positive impact on reducing urban poverty, as women often face disproportionate levels of poverty and are crucial agents of change in families and communities.
- **Strengthening social support systems:** Through community based organisations, NGOs, local governments and setting up of migration centres for migrants from

rural-urban or vice versa can play a significant role in providing basic services to the needy and homeless.

Way Forward

- Addressing urban poverty requires a multi-faceted approach that considers the intertwined socio-economic factors at play.
- Sustainable and inclusive urban development, coupled with targeted social interventions, can create opportunities for the urban poor to escape the cycle of poverty and achieve improved living standards and social inclusion.

4. Urbanization

What is urbanisation

- **Urbanisation** refers to the population shift from rural to urban areas, the corresponding decrease in the proportion of people living in rural areas, and the ways in which societies adapt to this change.

Global Scenario

- **"Asian Development Outlook"** report by the **Asian Development Bank**, 2019, revealed that between **1970** to **2017**, the urban population in the Developing Asia group of countries grew from **375 million** to **1.84 billion**.
- Two-thirds of the nearly **1.5. billion** additional **city dwellers** in Developing Asia belong to **India** and **China.**
- The **world urbanization prospects report 2018**, revealed that **India, China and Nigeria** will account for **35%** of the **projected growth** of the world's urban population between **2018** and **2050.**

Indian Context

- More than 75% of the urban population of India is from 10 states which includes Maharashtra, Uttar Pradesh, Tamil Nadu, West Bengal, Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Rajasthan, and Kerala.
- Goa is the most urbanized State with a 62.2% urban population.
- Among the North-Eastern States, Mizoram is the most urbanized with 51.5% urban population.
- Bihar, Odisha, Assam, and Uttar Pradesh continue to be at a lower level of urbanization than the national average.

Causes of urbanization

- **Industrialization**: It is a major cause of urbanization. It has expanded employment opportunities. Rural people have migrated to cities on account of better employment opportunities.
- **Social factors**: Many social factors such as the attraction of cities, better standard of living, better educational facilities, and need for status also induce people to migrate to cities.
- **Employment opportunities**: In rural areas people have to depend mainly on agriculture for their livelihood. But Indian agriculture is dependent on the monsoon. In drought situations or natural calamities, rural people have to migrate to cities.
- **Modernization**: Urban areas are characterized by sophisticated technology, better infrastructure, communication, medical facilities, etc. People feel that they can lead a comfortable life in cities and migrate to cities.
- **Rural-urban transformation**: It is an interesting aspect that not only cities are growing in number but rural communities are adopting urban culture, no longer rural communities are retaining their unique rural culture. Rural people are following the material culture of urban people.

Impacts of Urbanisation

- **Urban sprawl**: It refers to the rapid expansion of the geographic extent of cities and towns, often characterized by low-density residential housing, single-use zoning, and increased reliance on the private automobile for transportation.
- **Slums**: The acute shortage of housing facilities compels the poor to live in **slums**. Slums have developed in almost all the Indian cities. Slums are

called by the names of Bustees in Calcutta, Jhuggis in Delhi, Chawl in Mumbai and Cheri in Chennai. Slums have been defined by the government of India's slum area (Improvement and Clearance) Act of 1954 as predominantly a residential area , where dwellings by reason of dilapidation, overcrowding, faulty arrangement, and lack of ventilation, light or sanitary facilities or any combination of these factors detrimental to safety, health and morals.

- **Urban solid waste** consists of building materials, plastic containers, hospital wastes, kitchen waste etc. The building materials and household solid wastes are dumped on the public places. In the last decade, garbage was produced at nearly twice the rate of population growth.
- **Environmental pollution** is a major cause of concern. Air pollution was responsible for 16.7 lakh deaths in India in 2019. This is the largest number of air-pollution-related deaths in any country, according to **a recent report** by The Lancet Planetary Health.
- **Crime:** Urbanization, rapid economic liberalization, growing mass political upheaval, violent conflict and inappropriate and inadequate policy are the basis of crime in urban areas. Moreover, poverty and inequality caused due to the rising expectations and a sense of moral outrage that some members of the society are growing rich have contributed to higher and growing levels of crime.
- **Unemployment**: Urbanization can lead to unemployment. People are drawn to urban areas in the false hope of a better standard of living, better healthcare and job opportunities. In fact, a high influx of people to the cities only exacerbates the situation and people find themselves in a world where they are worse off. Very few people make their fortunes, and the rest must still find ways to eat and sleep while they wait for their chance. This leads to one of the most obvious effects of urbanization—the growth of crime and slums.
- **Psychological impact:** The level of assimilation in the urban areas is concerned with the psychological aspects of adjustment acquiring the values, meanings, sentiments, prejudices or ideologies of that particular community. The problem of assimilation is more for migrants as they usually come from different backgrounds and struggle to settle down in the migrated cities.

National Initiatives

Smart cities mission

- Smart Cities Mission was launched in 2015. The main objective of the Mission is to promote cities that provide core infrastructure, clean and sustainable environment, and give a decent quality of life to their citizens through the application of 'smart solutions'.
- The focus is on sustainable and inclusive development through the creation of replicable models which act as lighthouses to other aspiring cities.

AMRUT 2.0

- AMRUT 2.0 was launched on October 1, 2021 for a period of five years starting from the financial year 2021-22 to 2025-26.
- AMRUT 2.0 aims to provide 100% coverage of water supply to all households in around 4,700 urban local bodies by providing about 2.68 crore tap connections and 100% coverage of sewerage and septage in 500 AMRUT cities by providing around 2.64 crore sewer/ septage connections.
- The scheme will adopt the principles of circular economy and promote the conservation and rejuvenation of surface and groundwater bodies.
- *A circular economy is an economic model designed to minimize resource input, as well as waste and emission production.*

Pradhan Mantri Awas Yojana (Urban) Programme

- It was launched by the Ministry of Housing and Urban Poverty Alleviation (MoHUPA), in Mission mode envisions the provision of Housing for All by 2022.

Swachh Bharat Mission – Urban

- SBM-U was launched in October, 2014 with the objectives of making entire urban areas of the country Open Defecation Free (ODF) and for scientific management of the entire Municipal Solid Waste (MSW) generated.
- In order to carry forward the progress made under SBM-U, the next phase i.e., SBM-U 2.0 has been launched. Under SBM – Urban 2.0, Central Share funds are released for the construction of Individual Household Latrines, Community Toilets/Public Toilets, Used Water Management, Solid Waste Management, Information, Education and Communication & Behaviour Change and Capacity Building, Skill Development & Knowledge Management components

Way forward:

- **Master Plan for every Indian city :** Every Indian city should ideally have a Master Plan, a strategic urban planning document that would be updated every decade or two that also considers poverty mitigation, affordable housing, and livability for urban migrants.
- **Better Land use pattern:** Urban land use needs to be better from being informal, and unplanned to planned one in order to provide urban services and infrastructure to keep up with growth. For instance, in Mumbai, almost 1/4th of the land is open public space — while over half of it is underutilized space around buildings. Such open spaces have to be utilized properly
- **Climate resilient infrastructure**: All ongoing and upcoming urban infrastructure projects must be reconsidered from a future climate resilience perspective.
- **Build up the institutional capacity:** Establishing a sense of cityhood by making a push for a city as a co-created space will also require building up institutional capacity.
- **Decentralized approach:** It is important to pay attention to the impact of urbanization at the micro level by going down to the districts as they shape up the larger economic spatiality of the country. India needs to focus on the districts lagging behind and push for a faster rate of planned urbanization.

5. NORTH EASTERN INDIA MILIEU

Introduction

- Tribal communities in India inhabit all parts of the country except the States of Punjab, Haryana and Delhi, and the Union Territories of Chandigarh and Puducherry.
- They constitute **8.6 per cent of India's total population** and are classified into about seven hundred communities which includes both 'major tribes' and 'sub-tribes'.
- Around **12 per cent of the total tribal population in India lives in the North Eastern Region (NER).**
- But unlike central Indian States, where the tribal population is a minority, tribal communities constitute more than **eighty percent of the State population in Mizoram, Meghalaya and Nagaland.**

Ecology and Inhabitants

- It is widely known that being disturbed by scuffled history and geo-politics, NER has remained a backward and less-developed region of the Indian subcontinent though it covers 7.9 percent geographical area of the country.
- Remarkably, it shares as much as 4200 km of international boundary with four nations— Bangladesh, Bhutan, China, and Myanmar.
- At the same time, it is joined with the rest of India by means of a narrow

route popularly known as the Siliguri corridor or the 'Chicken's Neck'.

- Agriculture being the main occupation and source of livelihood for the farmers, had been and used to be, induced for mono-cropping due to the colonial policy of plunders through encouragement of only plantation crops, the natural factor of high intensity of the rainfall and the socio-economic structures of tribal kinship.
- The intensive cultivation of crops and wide range of crop diversification in agriculture has not been the history in the region. Two distinct types of agricultural practice in NER may be observed (i) settled agriculture in the plains, valleys and gentler slopes and (ii) slash and burn cultivation (called jhum cultivation) elsewhere.
- Nowadays, agriculture in the form of plantation has been developed instead of jhum cultivation in certain States.

Culture and Tradition

- NER is often described as the Cultural Mosaic of India with diverse tribal communities, linguistic, and ethnic identities. The tribal communities of the North East have their own traditional system of governance.
- Among these, chieftainship is prevalent, while others prefer to be ruled by the village council. Each society has its own cultural tradition, social system, set of values, custom and different modes of festivities which are mostly related to agriculture.
- In the socio-political life of tribal communities, monarchy and democracy co-exist in principle. The members of the tribes are united by kinship and marriage, thus it becomes difficult to differentiate between the political and domestic matters.
- Lineage segmentation is the chief principle of the political structure of the tribal communities.

Recent changes

- However, the socio-cultural elements of the tribal communities are changing for various reasons. They are being exposed to a changing environment of varied nature.
- Globalisation has serious implications on the culture of the tribal communities. It imposes a homogeneous consumerist culture and value system on each society.
- The law of dynamics is universally applied to every society and tribal society is no exception. Thus, the tribal communities' exposure to the forces of change, both indigenous and exogenous, has serious implications on the lifestyle and culture of the tribal communities consequently.
- Though agriculture, shifting cultivation in particular, continues to be a prominent means of livelihood for many, their means of livelihood tends to change from subsistence agricultural income towards diversified modern market-oriented employment and economy.
- Sources of income have been diversified in terms of different occupations that happen to be made available as a result of various development initiatives.
- Modern education plays a vital role in changing the means of livelihood. This change is associated with an increase of per capita income and educational level systematically.

Improving Socio-Economic Conditions

- There is a significant improvements in socio-economic indicators like sex ratio, education, infant mortality rate and sanitation in the NER. As per 2011 Census, sex ratio is highest in Manipur (992), followed by Meghalaya (989) and Mizoram (976), and lowest in Sikkim (890). Figures for sanitation facilities in their dwellings also reflect better position than the overall country indicators.
- NITI Aayog has been publishing the Sustainable Development Goals (SDGs) India Index annually since 2018. The third edition of the NITI Aayog SDG India Index (2020- 21) computes goal-wise scores on the 16 SDGs for each State and UT, and a qualitative assessment on Goal 17, covering 17 parameters.
- States/UTs being categorised as Aspirant (score 0-49), Performer

(score 50-64), Front Runner (65- 99), and Achiever (score 100) based on their score. Two States from the North Eastern Region, namely Mizoram and Tripura secured their position in the Front Runner category in 2020-21.

- Special attention is being paid to achievement of SDGs in the North East, with a North Eastern Region District SDG Index 2021-22 developed by NITI Aayog. The Index is constructed from 84 indicators and covers 15 global goals, 50 SDG targets, and 103 districts in the eight States of NER.
- The index will facilitate in identifying crucial gaps and inform interventions to fasttrack progress towards achieving the SDGs in the region. There are 64 districts in the Front Runner category and 39 districts in the Performer category. All districts of Sikkim and Tripura fall in the Front Runner category.

Way forward

- In contemporary India, the tribal communities continue to outshine in various fields such as education, sports, various art forms (dance, music, painting, etc.), and add to the cultural presence of India. It is imperative that the policymakers continue to safeguard the tribal rights so as to ensure inclusive development of the society.

SCIENCE AND TECHNOLOGY

RENEWABLE ENERGY AND ALTERNATIVE ENERGY SOURCES

1) Hydrogen as a fuel

About hydrogen fuel

- Hydrogen is a **clean fuel** that, when consumed in a fuel cell, produces only water. Hydrogen can be produced from a variety of domestic resources, such as natural gas, nuclear power, biomass, and renewable power like solar and wind.
- Hydrogen is an **energy carrier that can be used to store, move, and deliver energy** produced from other sources.
- Today, hydrogen fuel can be produced through natural gas reforming (a thermal process), and electrolysis, solar-driven and biological processes.

Types of hydrogen

- **Grey Hydrogen:** It is produced via coal or lignite gasification (black or brown), or via a process called steam methane reformation (SMR) of natural gas or methane (grey). These tend to be mostly carbon-intensive processes.
- **Blue Hydrogen:** It is produced via natural gas or coal gasification combined with carbon capture storage (CCS) or carbon capture use (CCU) technologies to reduce carbon emissions.
- **Turquoise hydrogen:** It is made using a process called methane pyrolysis to produce hydrogen and solid carbon. As a result, there is no requirement for carbon capture and storage (CCS) and the carbon can even be used in other applications.
- **Green Hydrogen:** It is produced using the electrolysis of water with electricity generated by renewable energy.

Advantages of hydrogen fuel

- Hydrogen can be utilized for long-duration storage of renewable energy.
- It has huge potential in the transportation sector as a direct replacement to fossil fuels.
- It is also the lightest, simplest and most abundant member of the family of chemical elements in the universe.
- The stored hydrogen can be used to produce electricity using fuel cells.
- Hydrogen can act as an energy storage device and contribute to grid stability.
- Has high calorific value compared to natural gas. (2.5times energy per tonne)

Government initiatives

- **National Green Hydrogen Mission:** The Government has launched the National Hydrogen Mission **to make India a green hydrogen hub** which will help in meeting the target of production of 5 million tonnes of green hydrogen by 2030 and the related development of renewable energy capacity.
- **Mission Innovation Challenge for clean hydrogen**: To accelerate the development of a global hydrogen market by identifying and overcoming key technology barriers to the production, distribution, storage, and use of hydrogen at a gigawatt scale.
    - The Mission Innovation is a global initiative of 22 countries and the European Commission launched in 2015 catalyzing investment in research, development and demonstration to make clean energy affordable, attractive and accessible for all.

Why is India pursuing green hydrogen?

1. To **reduce India's average annual energy import bill** which is more than $100 billion.
2. To **achieve netzero by 2070**: Increased consumption of fossil fuel has made India a high carbon dioxide (CO_2) emitter, accounting for nearly 7% of the global CO_2 burden which necessitates looking for alternate fuels.
3. In order to become **energy independent by 2047,** the government stressed the need to introduce green hydrogen as an alternative fuel that can make India

not only become self-sufficient in green hydrogen but also produce green hydrogen for export markets.

4. Considering India's objective of **raising non-fossil energy capacity to 500 gigawatts by 2030,** it is imperative that our energy mix involves other green hydrogen like technologies on a medium-to-long term basis.

About National Green Hydrogen Mission

- The National Green Hydrogen Mission was approved by the Union Cabinet on 4 January 2022, with the **intended objectives** of:
  - Making India a leading producer and supplier of Green Hydrogen in the world
  - Creation of export opportunities for Green Hydrogen and its derivatives
  - Reduction in dependence on imported fossil fuels and feedstock
  - Development of indigenous manufacturing capabilities
  - Attracting investment and business opportunities for the industry
  - Creating opportunities for employment and economic development
  - Supporting R&D projects

Highlights of the mission

- The Mission will build capabilities to **produce at least 5 Million Metric Tonne (MMT)** of **Green Hydrogen per annum by 2030,** with potential to reach 10 MMT per annum with growth of
  export markets.
- Innovative models to source Green Hydrogen through use of **decentralized renewable energy generation** such as rooftop solar and small/micro hydel plants will also be explored.
- Under the **Strategic Interventions for Green Hydrogen Transition Programme (SIGHT),** two distinct financial incentive mechanisms – targeting domestic manufacturing of electrolysers and production of Green Hydrogen – will be provided under the Mission.
- Regions capable of **supporting large scale production** and/or utilization of Hydrogen will be identified and developed as Green Hydrogen Hubs.
- An **enabling policy framework** will be developed to support establishment of the Green Hydrogen ecosystem. A robust **Standards and Regulations framework** will also be developed.
- Further, a **public-private partnership framework** for R&D (**Strategic Hydrogen Innovation Partnership – SHIP**) will be facilitated under the Mission.
- A coordinated skill development programme will also be undertaken under the Mission

Expected outcomes

- The targets by 2030 are likely to bring in over Rs. 8 lakh crore investments and create over 6 lakh jobs.
- Nearly 50 MMT per annum of CO2 emissions are expected to be averted by 2030.
- This will contribute to India's aim to become Aatmanirbhar (self- reliant) through clean energy and achieve net-zero carbon emissions by 2070.

Challenges in Scaling up Green Hydrogen Market

- **Electrolyser** challenge: negligible number of projects to manufacture electrolysers and limited access to critical minerals.
- **Energy challenge**: Green hydrogen requires renewable energy as a source of electricity, however India has only achieved 119 GW of the 175 GW targeted capacity.
- **Resource challenge**: Production of one kg of hydrogen by electrolysis requires around nine liters of water.

Way forward

- India should set up **large scale electrolysis manufacturing,** secure **geo-political partnerships for procurement of critical minerals** and improve overall technical and economic viability of electrolysers.
- India should **add close to 100 GW of overall renewable energy capacity** per year over the next seven years.

- It is critical to **establish safety standards for storage and transportation** if green hydrogen has to be produced and stored in different forms for later use.
- The **proposed green hydrogen hubs have to strike a fine balance** between being renewable energy rich, water resource rich and being close to hydrogen demand (end-use) centers for them to be economically feasible.

2) Biofuels

About Biofuels

- Biofuels are **renewable transportation fuels** produced from **biomass**.
- **Renewable Hydrocarbon biofuels, also** known as **drop-in fuels**, can serve as petroleum substitutes in existing refineries, tanks, pipelines, pumps, vehicles, and smaller engines.
- The two most common types of biofuels in use today are bioethanol and biodiesel, both of which represent the first generation of biofuel technology.
- The liquid biofuels are biodiesel or bioethanol and gaseous biofuel is compressed biogas (CBG) or Bio-CNG.
- The **U.S. is the largest producer of bioethanol**, while the **EU is the largest producer of biodiesel**.
- **Bioethanol** is an **alcohol made by fermentation**, mostly from carbohydrates produced in sugar or starch crops such as maize, sugarcane, or sweet sorghum. Cellulosic biomass, derived from non-food sources, such as trees and grasses, is also being developed as a feedstock for ethanol production. Ethanol can be used as a fuel for vehicles in its pure form (E100), but it is usually used as a gasoline additive to increase octane ratings and improve vehicle emissions.
- **Biodiesel** is produced from oils or fats using transesterification. It can be used as a fuel for vehicles in its pure form, but it is usually used as a gasoline additive to increase octane ratings and improve vehicle emissions.

Generations:

- **First:** First-generation biofuels are fuels made **from food crops** grown on arable land. The crop's sugar, starch, or oil content is converted into biodiesel or ethanol, using **transesterification, or yeast fermentation**.
- **Second:** Second-generation biofuels are fuels made from **lignocellulosic or woody biomass, or agricultural residues/waste**. Second-generation feedstocks include straw, bagasse, perennial grasses, jatropha, waste vegetable oil, municipal solid waste and so forth
- **Third**: These are **produced from micro-organisms like algae.** Algae can be produced in ponds or tanks on land, and out at sea.
- **Fourth**: Fourth generation Biofuels use **genetically modified (GM) algae** to enhance biofuel production. Key to the process is the capture and sequestration of CO2, a process that renders fourth-generation biofuels a carbon negative source of fuel.

Benefits of Biofuels

- Energy security
- Reduction of import dependency
- Cleaner environment due to fewer emissions.
- Municipality Solid waste (MSW) management
- Health benefits
- Infrastructures investment in rural areas
- Employment generation
- Overall additional income to farmers

The current status and key challenges for biofuels in India

- According to projections by the **IEA** (International Energy Agency), India is expected to overtake China to become the **third largest producer of ethanol by 2023 after the USA and Brazil**.
- 12.83% of the total renewable energy generation is contributed by biofuels alone.
- In 2001, India started a modest 5% ethanol blending pilot programme.
- The **biofuel mission** was adopted in **2003** with the launch of the **National Mission on Biodiesel** which sought to

achieve **20% biodiesel blending in a diesel by 2011–12**.

Key Challenges

2G Bioethanol

- No policy mechanism incentivising farmers to collect and deliver biomass residues to a next-generation ethanol plant.
- Lack of government backing
- In order to reduce supply chain uncertainties and high market risk associated with the 2nd generation biofuel industry, a supply chain should be designed and operated to maximize economic potential and social benefit, and minimize environmental impact.
- Utilization of carbon dioxide generated from the plant is a major concern.

Biodiesel

- Biodiesel derived from edible oil requires suitable land for cultivation and also challenges food security.
- production from non-edible oil sources has disadvantages like diminishing performance in cold climates, possible contamination and impurities in animal fats and the lack of a centralized system for collecting such raw materials.

BioCNG

- Fluctuations in feedstock availability and quality might impede plant production efficiency, affecting plant profitability in the long term.
- Individual household biogas plants require financial investment, which yields only non-monetary benefits, such as biogas which is generally used as cooking fuel.
- Some challenges to biogas production in rural areas includes high up-front installation cost, delays in getting financial support, competition from other fuels, inadequate supply of feedstock, lack of social acceptance and awareness for biogas from substrates like night soil, human excreta, dead animal carcass, lack of proper training and capacity building programmes, and awareness regarding its environmental benefits.
- Proper segregation, collection, and transportation technologies/strategies are not implemented in cities for MSW, which is one of the primary reasons for the slow growth of the waste-to-energy sector.

Algal Biofuel

- The utilization of CO2 by algae could lead to uncontrolled pH rise after the conversion to carbonic acid, hence resulting in ionization in the algae production medium.
- **difficulty of sunlight radiation penetrating** the depth of large algae bloom.
- The information regarding interest and research into algae biofuel is still limited.
- **Requirement of high lipid content**
- **Complicated Process:** Production of algal biofuel takes many steps to become a usable fuel source. This process is complicated and takes time.
- **High Fertilizer Use**
- **Large Water Demand:** Sometimes, a high temperature evaporates water level and hampers growth.
- **Expensive to Produce:** The cost of algal biofuel production is still much higher than fossil fuels to date.
- **Land Use:** Regardless of the growth strategy employed and the efficiency of oil extraction, the scale of implementation that is required to replace a meaningful amount of fossil fuel is significant.
- **Nutrient Challenge:** Algae need light, nutrients, water and a carbon source, most often CO2, for efficient growth. The major nutrients required by most algae include nitrogen, iron, phosphorus and sulfur.

Government initiatives/efforts

National Policy on Biofuel (NPB) in 2009

- The objective of NPB 2009 was to facilitate the optimal development of domestic biomass feedstock for biofuel production.
- Optional **blending target of 20% for both ethanol and biodiesel by 2017**
- Laid down the vision, goals and strategy for the development of biofuels and proposed an enabling framework of financial, institutional and technological interventions.

National policy on Biofuels 2018

- Recommended an indicative target of E20 (20% Ethanol) blending in petrol and 5% biodiesel (B5) blending in diesel by 2030.
- Biofuels are categorized as Basic Biofuels (1G), Advanced Biofuels (2G), and 3rd Generation Biofuels (3G).
- Scope of raw materials from ethanol expands to include sugar and starch-containing materials unfit for human consumption.
- Allow the use of surplus food grains for ethanol production.
- Thrust on Advanced Biofuel (2G) with Viability Gap funding (VGF) of ₹5000 cr in 6 years.
- Setting up supply chain mechanisms for biodiesel production from non-edible oilseeds and used cooking oil.

Amendments to National Policy on Biofuels 2018

- To advance the ethanol blending target of 20% blending of ethanol in petrol to 2025-26 from 2030.
- Allowing more feedstocks for production of biofuels;
- Promoting the production of biofuels in the country, under the Make in India program, by units located in Special Economic Zones(SEZ)/ Export Oriented Units (EoUs);
- The amendments allows addition of new members to the National Biofuel Coordination Committee (NBCC);
    - NBCC was constituted under the Chairmanship of Minister, Petroleum & Natural Gas (P&NG) to provide overall coordination, effective end- to-end implementation and monitoring of India's biofuel programme.
- It also grants permission for export of biofuels in specific cases.

Sustainable Alternative Towards Affordable Transportation (SATAT)

- A **new revolution in Transportation fuel** - **Compressed Biogas** (CBG) - a **step towards a sustainable future**.
- Encourages entrepreneurs to set up CBG plants, produce & supply CBG to Oil Marketing Companies (OMCs) for sale as automotive and industrial fuels.
- **Developmental effort** to benefit vehicle users as well as farmers and entrepreneurs.
- **Efficient tackling of urban air pollution** due to farm stubble-burning and carbon emissions.
- **Reduce dependency on crude oil imports** and realise PM's vision of enhancing farmers' income, rural employment and entrepreneurship
- **Efficient treatment and disposal** of municipal solid waste
- **Promotion of organic farming** by using Fermented Organic Manure (FOM) produced from CBG plants.

Pradhan Mantri JI-VAN Yojana

- It provides Viability Gap Funding(VGF) to Second Generation ethanol manufacturing projects to increase availability of ethanol for ethanol blending programmes.

Way forward

- **New policies and strategies or modifications** in the existing strategies may help in eliminating some of the barriers
- To boost the biofuel industry in India, the need for **popularization of biofuel usage** by blending with conventional fuel should be made mandatory along with subsidized rates.
- While favorable government policies and active involvement from the local community and private enterprises can keep the programme running in the short term, it is critical to have a **solid long-term strategy** in place.
- A significant **research effort** on the development of second and third-generation feedstock is required to meet the country's future bio-energy demands.

SPACE SECTOR

1) India's mission to Venus- Shukrayaan-1

- **Shukrayaan-1** is a proposed orbiter to Venus by the **Indian Space Research Organisation (ISRO)** to study the surface and atmosphere of Venus using GSLV Mark III.

- The three broad research areas of interest for this mission include a) surface/subsurface features and re-surfacing processes; b) study the atmospheric chemistry, dynamics and compositional variations, and c) study the atmospheric interaction with solar radiation and solar wind.
- Shukrayaan-1 could confirm the **presence of active volcanoes on Venus.**
- It is a mission to investigate Venus's surface processes and shallow subsurface stratigraphy, as well as the interaction of solar wind with the Venusian ionosphere and the structure, composition, and dynamics of the atmosphere.
- ISRO has announced that the Shukrayaan mission is likely to be launched in December 2024.

Significance of India's mission

- Studying Venus can help scientists **understand climate change, the evolution of habitability** and what happens when a planet loses a long period of surface oceans.
- In 2020, a team of International Astronomers discovered the **presence of phosphine gas in the atmosphere of Venus.** Phosphine acts as a biosignature because it is known to be produced mainly through biological processes, and not through any naturally occurring chemical process.

Previous mission to venus

- So far, spacecraft from several nations have visited the planet. The first such spacecraft was the Soviet Union's Venera series. The spacecraft, however, could not survive for long because of the planet's harsh conditions.
- NASA's last dedicated mission to Venus, the Magellan spacecraft, reached the planet in 1990. After four years in orbit making the first global map of the Venusian surface and charting its gravity field, Magellan was sent plunging to the surface to gather atmospheric data before ceasing operations.
- Earlier in 2011, the European Space Agency's mission, Venus Express, found signs of ozone, a biomarker, in the upper atmosphere of Venus.
- As of now, Japan's Akatsuki mission is studying the planet from Orbit.

Other Missions

- **NASA** has announced plans to launch a pair of missions **(dubbed DAVINCI+ and VERITAS)** to Venus between 2028 and 2030, to study the atmosphere and geologic features of Venus and better understand why Earth and Venus emerged so differently.
- **DAVINCI+** will measure the composition of the dense, hothouse atmosphere of Venus to further understand how it evolved, while VERITAS will map the planet's surface from orbit to help determine its geologic history.
- The European Space Agency has announced that it has selected **EnVision** as its next orbiter that will visit Venus sometime in the 2030s.

2) India's mission to Mars- Mars Orbiter Mission

Why in the News?

- India's Mars Orbiter Mission (MOM) spacecraft has lost communication with the ground stations, bringing an end to its life after eight long years.

About Mars Orbiter Mission

- Mars Orbiter Mission (MOM), **India's first interplanetary mission to planet Mars** was launched onboard **PSLV-C25 on November 05, 2013.**
- ISRO has become the fourth space agency to successfully send a spacecraft to Mars orbit. Though the designed mission life is 6 months, MOM completed 8 years in its orbit.
- MOM carries five scientific payloads to study the Martian surface features, morphology, mineralogy and Martian atmosphere.

Mission Objectives

- To **develop the technologies** required for designing, planning, management and operations of an interplanetary mission.

- To **explore Mars' surface features,** morphology, mineralogy and Martian atmosphere using indigenous scientific instruments.
- To **study the constituents of Martian atmosphere** including methane and CO2 using remote sensing techniques
- To **study the dynamics of the upper atmosphere of Mars**, effects of solar wind and radiation and the escape of volatiles to outer space.

Scientific payloads

- Mars Color Camera (MCC)
- Thermal Infrared Imaging Spectrometer (TIS)
- Methane Sensor for Mars (MSM)
- Mars Exospheric Neutral Composition Analyser (MENCA)
- Lyman Alpha Photometer (LAP)

Uniqueness

- Highly elliptical orbit geometry of MOM enables its Camera (MCC) to take snapshots of **Full disc of Mars** at its farthest point and finer details from closest point.
- First time observation of the far side of **Deimos**, one of the moons of Mars.

Significant achievements

- **First interplanetary mission** realized by India and first Indian spacecraft to incorporate full scale on-board autonomy to overcome the long distances and the communication gaps due to non-visibility periods.
- First Indian spacecraft to successfully survive Van Allen belt crossing 39 times.
- First mission to use Ship Borne Terminals to track the launch vehicle and satellite over the Pacific Ocean by ISRO.
- First Indian spacecraft to escape the Sphere Of Influence of Earth and orbit the Sun.
- First Mars mission in the world to succeed Mars Orbit Insertion in first attempt.
- Most **economical interplanetary mission** in the world and paved way for cost-effective access to deep space. (Rs 450 Cr).
- Propelled **India's image as a credible space faring nation** to greater heights and this capability could pave the way for greater opportunities for Space Commerce including launch services and marketing of Satellite Imageries.
- Mars Orbiter Mission is a **mission of national pride** which has attracted the attention of students, general public, media and international science/ technical community.
- Importantly, Mars Orbiter Mission has created enthusiasm among the younger generation in the country, provoked their curiosity to understand and discuss space related techniques and is maintaining the tempo throughout the mission.
- **Indian Space Research Organization (ISRO) - Mars Orbiter Mission (MOM)** has been awarded **"Space Pioneer Award"** for science and engineering category for the year 2015 by the US based National Space Society.
- The **Indira Gandhi Prize for Peace, Disarmament and Development is awarded to ISRO** in recognition of its path-breaking achievement, culminating in Mars Orbiter Mission, its significant contribution in strengthening international cooperation in peaceful use of outer space.

3) India's mission to moon- Chandrayaan-3

Why in the news?

- Chandrayaan-3 was successfully launched from the Satish Dhawan Space Center (SDSC) in Sriharikota recently.

About Chandrayaan-3

- Chandrayaan-3 is a **follow-on mission to Chandrayaan-2** to demonstrate end-to-end capability in safe landing and roving on the lunar surface.
- The mission objectives of Chandrayaan-3 are:
  - To demonstrate **Safe and Soft Landing on Lunar Surface**
  - To demonstrate **Rover roving on the moon** and
  - To conduct **in-situ scientific experiments.**

- The spacecraft comprises a **lander and rover configuration**, which will be carried by a propulsion module until a 100 km lunar orbit.
- **Geosynchronous Satellite Launch Vehicle Mk III** will place the integrated module in an Elliptic Parking Orbit (EPO).
- Chandrayaan-3 consists of an indigenous **Lander module (LM), Propulsion module (PM) and a Rover** with an objective of developing and demonstrating new technologies required for Interplanetary missions.
    - The Lander will have the capability to soft land at a specified lunar site and deploy the Rover.
    - The propulsion module has Spectro-polarimetry of Habitable Planet Earth (SHAPE) payload to study the spectral and Polari metric measurements of Earth from the lunar orbit.
    - Rover will carry out in-situ chemical analysis of the lunar surface during the course of its mobility.
- After entering the orbit of the moon, Chandrayaan-3 is expected to reach the lunar orbit nearly a month after its launch. Its **lander (Vikram) and rover (Pragyaan)** are expected to land on the moon on August 23.
- **Landing site:** The landing site for the mission is near the south pole (around 300 kms from the south pole) of the moon at 70 degrees latitude.

Significance of the mission

- The successful landing of the spacecraft will make **India the first country in the world to soft-land near the lunar south pole** and the fourth country to have landed on the moon's surface.
- As Chandrayaan-3 scours the lunar surface, the rocks and soils of this region could provide invaluable clues about the **early solar system and the dynamic processes that shaped it**.
- The Chandrayaan-3 mission could open a whole **new avenue of international space cooperation** as it would provide crucial insights into an unexplored region of the Moon which would be studied keenly by all the space agencies, including the American NASA, the Russian Roscosmos, and the Japan Aerospace and Exploration Agency (JAXA).
- Since the Artemis-III human mission is also set to land there, the insights from Chandrayaan-3 could potentially help select a good landing site, avoid hazardous areas, and discover more of that place.

Why soft landing?

- Soft landings occur when the craft touches down at a safe, slow, and controlled speed. They are particularly **necessary on crewed missions** or missions in which the craft is expected to take scientific measurements or perform tests after landing, as is the case with the Chandrayaan-3 mission.

Why the south pole?

- Insights from previous orbiter missions have fuelled curiosity hinting at the potential sea of knowledge the south pole might hold.
    - The discovery of ice molecules with deep craters by India's Chandrayaan 1 mission set the stage for further exploration.
    - The south pole is of particular interest due to its **potential abundance of resources**, including water, which was unambiguously detected by SOFIA in 2020.
- The presence of water ice in permanently shadowed regions (PSRs) could be a game-changer for future explorers, providing vital resources for survival and potentially even rocket propellant.
- **Challenges**
    - The **terrain is treacherous**, with large craters stretching thousands of kilometers.
    - The **lighting conditions** make it difficult to discern the ground from a descending vehicle, even with advanced sensors.
    - The **extreme cold,** with temperatures dropping as low

as -230 degrees Celsius, poses a significant challenge to the functioning of electronic instruments.

Other missions to moon

- India- Chandrayaan 1 and Chandrayaan 2- Refer Mains Harvest
- USA- Artemis Mission
- Russia- Luna 25- aims to study the composition of the lunar polar regolith.

4) Artemis Mission

What is the Artemis mission?

- NASA's Artemis mission is touted as the **next generation of lunar exploration.**
- It is the **first in a series of ambitious missions** that are planned to take human beings back to the Moon, explore possibilities of extended stay there, and investigate the potential to use it as a launch pad for deep space explorations.
- **Artemis I** is the first of **NASA's deep space exploration systems**. It is an uncrewed space mission where the spacecraft will launch on Space Launch System (SLS) — the most powerful rocket currently operational in the world.
- The SLS rocket has been designed for space missions beyond low-earth orbit and can carry crew or cargo to the moon and beyond. With the Artemis programme, NASA aims to land humans on the moon by 2024, and it also plans to land the first woman and first person of color on the moon.
- NASA's Orion Spacecraft will carry astronauts from Earth to lunar orbit and back. The Orion spacecraft is going to remain in space without docking to a space station.
- NASA will establish an Artemis Base Camp on the surface and a gateway in lunar orbit to aid exploration by robots and astronauts.

Future missions in the Artemis programme

- **Artemis I** will be an uncrewed test flight of the Space Launch System and the Orion spacecraft around the Moon.
- **Artemis II**, the second flight under the programme, will have crew on board and will test Orion's critical systems with humans onboard. Eventually, the learnings from the Artemis programme will be utilized to send the first astronauts to Mars.
- **Artemis III** spacecraft will **land people on the Moon's South Pole.**

Significance

- NASA plans on using the lunar orbit to gain the necessary experience to extend human exploration of space farther into the solar system.
- **Water**, frozen at the bottom of eternally dark craters at the moon's poles, is a valuable resource. It can provide drinking water for future astronauts visiting the Moon, and water can be broken down into hydrogen and oxygen.
- The **oxygen** could provide breathable air; oxygen and hydrogen could be used as rocket propellant. Thus, the Moon, or a refueling station in orbit around the Moon, could serve as a stop for spacecraft to refill their tanks before heading into the solar system.
- The ices, if they were ancient accumulations over several billion years, could even provide a scientific history book of the solar system.

5) India's mission to Sun- Aditya-L1

About Aditya-L1

- Aditya L1 shall be the **first space based Indian mission to study the Sun.**
- The spacecraft shall be placed in a **halo orbit around the Lagrange point 1 (L1)** of the Sun-Earth system, which is about 1.5 million km from the Earth.
- The spacecraft carries seven payloads to observe the photosphere, chromosphere and the outermost layers of the Sun (the corona) using electromagnetic and particle and magnetic field detectors.
- From the special vantage point L1, four payloads would directly view the Sun. The other **three payloads are to**

carry out in-situ studies of particles and fields at the Lagrange point (L1), providing important scientific information of the propagational effect of solar dynamics in the interplanetary medium.

- The **Aditya L1 mission will be launched by Polar Satellite Launch Vehicle (PSLV),** which also launched Chandrayaan-1 in 2008 and the Mars Orbiter spacecraft in 2013.

Why L1 point?

- A satellite placed in the halo orbit around the L1 point has the major **advantage of continuously viewing the Sun** without any occultation/eclipses.
- This will provide a greater advantage of observing the solar activities and its effect on space weather in real time.

Objectives of Aditya-L1 mission

- Study of **Solar upper atmospheric** (chromosphere and corona) dynamics.
- Study of chromospheric and coronal heating, physics of the partially ionized plasma, initiation of the coronal mass ejections, and flares
- Observe the in-situ particle and plasma environment providing data for the study of particle dynamics from the Sun.
- Physics of solar corona and its heating mechanism.
- Diagnostics of the coronal and coronal loops plasma: Temperature, velocity and density.
- Identify the sequence of processes that occur at multiple layers (chromosphere, base and extended corona) which eventually leads to solar eruptive events.
- Magnetic field topology and magnetic field measurements in the solar corona .
- Drivers for space weather (origin, composition and dynamics of solar wind)

Significance of Aditya-L1

- Aditya L1's payloads are expected to provide **crucial information for understanding the problem of coronal heating, coronal mass ejection, pre-flare and flare activities** and their characteristics, the dynamics of space weather, and the propagation of particles and fields.
- Aditya-L1 would be the **first space-based Indian observatory to study the Sun.**

What's in the news?

- According to the ISRO, the spacecraft was assembled and integrated at the U.R. Rao Satellite Centre (URSC) in Bengaluru and delivered to the Satish Dhawan Space Centre in Sriharikota in august 2023. The launch is likely to take place in August-end or September 2023.

6) Gaganyaan

About Gaganyaan

- Gaganyaan is the **first manned space program of ISRO.**
- The module will take three astronauts including a woman to the space
- Under the mission, three flights will be sent.
    - The first two flights will be unmanned flights, with one flight carrying the humanoid Vyommitra.
    - The third flight is expected to be the manned spaceflight
- Gaganyaan project envisages demonstration of **human spaceflight** capability by launching a crew **of 3 members** to an orbit of **400 km for a 3 days mission** and bring them back safely to earth, by landing in Indian sea waters.
- **LVM3 rocket** - The well proven and reliable **heavy lift launcher of ISRO**, is identified as the launch vehicle for Gaganyaan mission.
- It consists of solid **stage, liquid stage and cryogenic stage.**
- HLVM3 will be capable of launching the Orbital Module to an intended **Low Earth Orbit of 400 km.**
- HLVM3 consists of **Crew Escape System (CES)** powered by a set of quick acting, high burn rate solid motors which ensures that **Crew Module** along with crew is taken to a safe distance in case of any emergency

either at launch pad or during ascent phase.
- Russian government owned Glavkosmos is providing training for the Indian Astronauts for their space mission
- Various precursor missions are planned for demonstrating the Technology Preparedness Levels before carrying out the actual **Human Space Flight mission.**
- Major milestones planned
    - Integrated Air Drop tests (IADT)
    - Test vehicle Mission (TVM)
    - Pad Abort Tests (PAT)

What's in the news?

- Indian Space Research Organisation (ISRO) successfully tested the Gaganyaan Service Module Propulsion System (SMPS).

Significance of Gaganyaan

- Mission will make India the 4th country to have human spaceflight capability after the US, Russia and China.
- It is also a testament to the capabilities of the ISRO and ability to undertake complex and ambitious space missions.

Challenges that Gaganyaan could face

- **Changing Gravity field:** Transitioning from one gravity field to another affects hand-eye and head-eye coordination, and without gravity bones would lose minerals that could increase the risk of osteoporosis-related fractures.
- **Isolation related behavioral issues:** Although well trained, due to isolation behavioral issues like depression, fatigue, sleep disorder and psychiatric disorders will crop up.
- **Increased Radiation exposure** : Increased radiation exposure in space stations in astronauts may increase the risk of cancer and can damage the central nervous system.
- **Hostile environment:** In addition to lack of gravity and danger of radiation, there is no atmosphere in space.

Way forward

- **Create a habitable environment:** The 'Gaganyaan' has to create an atmosphere like Earth inside a small volume and ensure that adequate supply of oxygen, removal of carbon-dioxide and comfortable temperature and humidity levels are maintained throughout the mission.
- **Adequate safety measures:** Many safety features have to be built into rocket systems to ensure the probability of loss of life is minimised.

7) Sustainability in outer space

New era in outer space

- **Exponential growth in the number of satellites** launched into orbit – from 210 in 2013 to 2,470 in 2022, largely driven by private sector actors.
- A **rapid increase in the number of private missions to space**, including the first commercial mission to the International Space Station in 2021, – a trend led predominantly by the US, but with increasing participation of China, India, and Japan.
- The **return of humans to deep space**, with the National Aeronautics and Space Administration (NASA) in the US planning a manned flight around the moon on its new Space Launch System rocket in 2024, while the US private company SpaceX "plans to launch a crew of artists to deep space on its experimental and fully reusable rocket system, Starship."

Issues with usage of outer space

- The earth's orbital environment has more than tripled in the past decade. As the cost of missions reduce and the number of players increase, the **complexity of missions and slot allotment issues** also increase.
- With the emergence of large constellations and complex satellites, there is a **risk of collisions and interference with radio frequencies.** One of the hot issues when it comes to space sustainability is **orbital crowding.** It poses a direct threat to the operations and safety of a mission.
- **Space debris** is another prominent issue. After the completion of a mission, an 'end-of-life protocol' requires space objects to be moved to

the graveyard orbit or to a low altitude. Neither of the options are sustainable in the long run. Other causes of concern are **solar and magnetic storms** which potentially damage communication systems. Such space weather threats need to be addressed along with the efforts to identify the terrestrial carbon footprint of outer space missions.

Need for governing outer space

- A **relative lack of space traffic coordination**, widens the gap for countries with less space capacity, making it harder for them to operate their limited space assets in an increasingly complex environment.
- The **lack of an international mechanism** or body to monitor or facilitate the removal of space debris – a challenge expected to be compounded by the large number of satellites in low Earth orbit;
- The **absence of an agreed international framework** or mechanism on resource activities, including space resource exploration, exploitation, and utilization; and
- The need for additional normative frameworks "**to prevent any extension of armed conflict into outer space** and to prevent the weaponization of outer space."
- **Sustainable practices in outer space** would directly help reduce orbital crowding and collision risk while nurturing future technologies.

Measures taken

- As outer space is considered a shared natural resource, the **United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)** in 2019 adopted a set of **21 voluntary, non-binding guidelines** to ensure the long-term sustainability of outer space activities. The guidelines cover a range of recommended behaviors and best practices in space, including safety of space operations and international cooperation.
- The U.K. recently hosted the **fourth summit for Space Sustainability** and announced a new 'Plan for satellites at every stage. This plan aims **to set a global commercial framework for the regulation of commercial satellites.** It also **aims to induce additional funding for active debris removal** and to emphasize international engagement on space sustainability.

Way forward

- **For All Humanity —The Future of Outer Space Governance"** policy brief released recently by United Nations recommends the following
  - Member State develop **international norms, rules, and principles to address the security of outer space,** with a view to launching talks on "a treaty to ensure peace, security and the prevention of an arms race in outer space";
  - Member States promote **inclusive approaches to outer space governance** by facilitating the participation of commercial actors, civil society, and others in the work of outer space-related intergovernmental processes; and
  - UN entities **increase their collaboration** and accelerate efforts to advance the equal participation of women in the aerospace sector.
- **Long-term sustainability of space** looks toward space research and development of technology to ensure the reuse and recycling of satellites at every stage.
- While most National Space Programs set sustainability standards, **a collective effort by all space players is needed** to set equitable standards for the ease of activities.

Scenario in India

- India's space sector is globally recognized for **cost-effective satellite building,** and it advocates for **peaceful and civilian use of outer space.**
- ISRO has an **exceptional success rate** and is the **6th largest space agency globally.**

- The headquarters of the **Indian National Space Promotion and Authorisation Centre (In-SPACe)** was formally inaugurated recently which can result in an increased role of the private sector in India's space activities.
- IN-SPACe is an **independent nodal agency under Department of Space (DOS)** for allowing space activities and usage of DOS owned facilities by Non-Government-Private-Entities.
- India hosts **promising start-ups like Agnikul and Skyroot,** which are developing launch vehicles for small payloads and Dhruva Space, which works on high-tech solar panels for satellites and satellite deployers. India is well on its way to create a subsystem that addresses global sustainability questions.
- The Indian Space Research Organisation (ISRO) has initiated **'Project NETRA'** to monitor space debris. The domestic surveillance system would provide first-hand information on the status of debris, which would aid further planning on protecting space assets.
- In 2022, India and the U.S. signed a new pact for monitoring space objects at the **2+2 dialogue.**
- To provide in-orbit servicing, ISRO is developing a docking experiment called **'SPADEX'.** It looks at **docking a satellite on an existing satellite,** offering support in re-fuelling and other in-orbit services while enhancing the capability of a satellite. This would not only ensure the longevity of a mission but would also provide a futuristic option to combine missions/experiments.
- ISRO also launched a **student outreach program** called **SAMVAD** to encourage space research among young minds.

8) India's space policy

Evolution and potential of India's space industry

- **Until the early 1990s:**
  - **First space age** where India's space industry and space economy were defined by ISRO.
  - Private sector involvement was limited to building to ISRO designs and specifications.
- **From the late 1990's:**
  - The **Second Space Age** began with the licensing of private TV channels, the explosive growth of the Internet, mobile telephony, and the emergence of the smartphone.
- **Current scenario**
  - **India's space economy is over $9.6 billion** with ISRO's budget of $1.6 billion.
  - Broadband, OTT and 5G promise a double-digit annual growth in satellite-based services.
  - The Indian space industry could **grow to $60 billion by 2030** with an enabling environment.

Various policies related to space sector

- The first **satellite communication policy** introduced in 1997, A **remote sensing data policy** introduced in 2001, which was replaced by a **National Geospatial Policy** in 2016, **A draft Space Activities Bill** brought out in 2017 have not yielded the much needed results.
- For instance,
  - Indian users spend nearly a billion dollars annually to **procure earth observation data and imagery from foreign sources.**
  - More than half the transponders beaming TV signals into Indian homes are **hosted on foreign satellites,** resulting in an annual outflow of over half a billion dollars

Why in the news?

- Union Minister of State (Independent Charge) Science & Technology Dr Jitendra Singh said, the Indian Space Policy – 2023 has been approved and released in the public domain.

- It aims to **increase India's share in the global space economy from less than 2% to 10%.**

Indian Space Policy 2023

- The Indian Space Policy 2023 is a comprehensive set of guidelines that outlines the roles and responsibilities of different entities in the Indian space sector.
- It aims to **encourage and institutionalize private sector participation** in India's space sector, with the **Indian Space Research Organisation (ISRO) primarily focusing on research and development** of advanced space technologies.
- It will provide the private sector with greater access to ISRO's infrastructure, technology and expertise to support their space-related activities.

Highlights of the Policy

- The Space Policy creates **four distinct**, but **related entities**, that will facilitate greater **private sector participation in activities** that have usually been the traditional domain of ISRO.
- **InSPACe:**
    - **Indian National Space Promotion and Authorisation Centre (InSPACe)** will be a **"single window" clearance and authorisation agency** for space launches, establishing launch pads, buying and selling satellites, and disseminating high-resolution data among other things.
    - It will also develop space industry standards, promote identified space activities and work with academia to widen the space ecosystem and enable industry-academia linkages.
- **ISRO:**
    - ISRO, as the **National Space Agency**, will **focus primarily on research and development of new space technologies and applications**, and for **expanding the human understanding of outer space.**
    - It will also **share technologies, products, processes and best practices with NGEs** (non-government entities) and government companies.
- **New Space India Limited:**
    - NSIL, as the **Public Sector Undertaking** under **Department of Space (DOS),** will be responsible for **commercializing space technologies and platforms** created through public expenditure.
    - NSIL will also be responsible for manufacture, lease, or procure space components, technologies, platforms and other assets from the private or public sector, on sound commercial principles.
- **Department of Space:**
    - Finally, the **Department of Space** will provide **overall policy guidelines** and be the "**nodal" department for implementation of the Indian Space Policy-2023.**
    - It will also be responsible for **international cooperation and coordination** in the area of **global space governance and programmes** in **consultation with the Ministry of External Affairs.**
    - It will also create an appropriate mechanism to resolve disputes arising out of space activity.

Other Key Features

- **Private Sector Participation**
    - Another key feature of the Indian Space Policy 2023 is the **entry of the private sector into end-to-end space activities.**
    - Private companies will be allowed to **build satellites, rockets, and launch vehicles, and engage in data collection and dissemination.**

- It encourages private companies to **invest in creating new infrastructure** for the space sector and use ISRO facilities for a small charge.

How different is Indian Space Policy 2023 from the previous efforts?

- It recognises the **private sector as a critical stakeholder** in the entire value chain of the space economy.
- It clearly emphasizes its focus on **civilian and peaceful exploration of outer space**, stimulation of public awareness and scientific quest.
- **Defined Roles and responsibilities:** The policy lays out a strategy and then spells out the roles of the **Department of Space, ISRO,** The **Indian National Space Promotion and Authorisation Centre** (IN-SPACe), **NewSpace India Limited** (NSIL)

Gaps in the Policy

- **Lack of time frame:** There is no timeline for ISRO's transitioning out of its current practices (manufacturing of operational space systems) or a schedule for IN-SPACe to create the regulatory framework.
- **Lack of statutory authority for IN-SPACe:** The position of IN-SPACe is ambiguous as it functions under the purview of the Department of Space.
- The policy also lacks clear rules and regulations pertaining to many.

Way forward

- The policy framework envisaged will need clear rules and regulations pertaining to FDI and licensing, government procurement to sustain the new space start-ups, liability in case of violations and an appellate framework for dispute settlement.
- A statutory body for **IN-SPACe has to be created.**

9) Hanle Space Observatory & Dark Sky Reserve

What's in the news?

- In December 2022, the Ladakh UT Administration **notified the proposed Dark Sky Reserve at Hanle village in Eastern Ladakh.**

About Hanle Dark Sky Reserve

- The Hanle Dark Sky Reserve (HDSR) will come up within the **Changthang Wildlife Sanctuary** and adjacent to the Indian Astronomical Observatory, the second-highest optical telescope in the world, of Indian Institute of Astrophysics at Hanle at an **elevation of 4500 meters.**
- The Department of Science and Technology and experts from the Indian Institute of Astrophysics (IIA) are providing scientific and technological support in developing this first-of-its-kind facility.
- The IIA already manages the Indian Astronomical Observatory (IAO) complex at Hanle, Ladakh.

What is a Dark Sky Reserve?

- A Dark Sky Reserve is public or private land with a **distinguished nocturnal environment and starry nights** that has been **developed responsibly to prevent light pollution.**
- These reserves consist of a core area meeting minimum criteria for sky quality and natural darkness, and a peripheral area that supports dark sky preservation in the core.

How does a site become a 'Dark Sky Reserve'?

- Individuals or groups can nominate a site for certification to the **International Dark Sky Association (IDSA).** There are **five designated categories**, namely International Dark Sky parks, communities, reserves, sanctuaries and Urban Night Sky Places.
- The certification process is similar to that of a site being awarded the UNESCO World Heritage Site tag or getting recognised as a Biosphere Reserve. Between 2001 and January 2022, there have been **195 sites** recognised as International Dark Sky Places globally.
- The IDSA considers a piece of land suitable for dark sky place only if:
  - it is either publicly or privately owned;

- is accessible to the public partially or entirely during the year;
- the land is legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes;
- the core area of the land provides an exceptional dark sky resource relative to the communities and cities that surround it and
- The land offers prescribed night sky brightness either for a reserve, park or sanctuary.

Significance

- The Night Sky Reserve aims to **promote Livelihood through eco-friendly activities of Astro tourism.**
- It **spreads awareness about astronomy and boosts scientific research** with reduced artificial light and wildlife conservation.

Hanle Space Observatory

- The **Indian Astronomical Observatory (IAO) located at Hanle near Leh in Ladakh** is becoming one of the most promising observatory sites globally. This is due to its advantages of **more clear nights, minimal light pollution, background aerosol concentration, extremely dry atmospheric conditions, uninterrupted by rains**.
- To be able to detect stars or traces of cosmic phenomena, such as supernovae or nebulae from light years away, astronomers must be able to catch the **faintest slivers of their radiation that often lie outside the range of visible light.**
- Such radiation is, however, **easily absorbed by water vapor** and so it helps to have a telescope **high above ground where the atmosphere is drier.**

About the Observatory

- Situated at 14,000 ft above sea level, IAO is laid out on the mountain called **Digpa-Ratsa Ri, aka Mt Saraswati**.
- IAO houses the **Major Atmospheric Cherenkov Experiment Telescope (MACE)** built by a consortium of the Bhabha Atomic Research Centre, the Tata Institute of Fundamental Research, the Electronics Corporation of India Ltd. and the Indian Institute of Astrophysics (IIA).
- Its goal is to **detect Cherenkov radiation** from space. This is a special kind of light from **gamma rays**, or the most energetic sources of radiation, that can **result from dying stars or several galactic events.**
- IAO consists of a **seven-telescope contingent**, called **HAGAR (High Altitude Gamma Ray),** which also looks at **Cherenkov radiation**, although at a lower range of energies.
- An **optical-infrared telescope** with a **2-meter lens** is designed to **detect light from the visible range of the electromagnetic spectrum as well as that just below it, or the infra-red spectrum.**
- The second capsule is the **GROWTH-India telescope**, a 70-cm telescope that is equipped to **track cosmic events** that unfurl over time, such as **afterglows of a gamma ray burst or tracking the path of asteroids.**
- Because of the wide span of frequencies covered collectively, the IAO provides **multiple vantage points to observe a range of cosmic phenomena and investigate the mysteries of the universe**.
- Telescopes with small diameters generally can track a greater swath of sky but those with larger diameters

can peer deeper when trained towards desired locations.

10) International Liquid-Mirror Telescope (ILMT)

What's in the news?

- The **International Liquid-Mirror Telescope (ILMT)** has been set up at the **Devasthal Observatory** campus owned by Aryabhatta Research Institute of Observational Sciences (ARIES), **Nainital in Uttarakhand.**

What is a liquid-mirror telescope?

- The International Liquid-Mirror Telescope (ILMT) has been set up at the Devasthal Observatory campus owned by Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital in Uttarakhand.
- Located at **2,450 meters** above mean sea level.
- It's the only one to have been developed for **astronomy research** and is also the **only one of its kind** to be **operational anywhere** in the world.
- The handful of liquid-telescopes that were previously built either **tracked satellites or were deployed for military purposes.**
- ILMT will be the third telescope facility to come up at Devasthal — one of the world's pristine sites for obtaining astronomical observations.
- **Components**:There are primarily **three components in a liquid mirror telescope**: i) A bowl containing a reflecting liquid metal (essentially mercury), ii) an air bearing (or motor) on which the liquid mirror sits, and iii) a drive system.

Working of the telescope

- While scanning the strip of the sky every night, the telescope will generate nearly 10-15 Gigabytes of data and the wealth of ILMT generated data will permit the application of Big Data and Artificial Intelligence/Machine Learning (AI/ML) algorithms that will be implemented for classifying the objects observed with the ILMT.
- The data will be analyzed quickly to discover and discern variable and transient stellar sources. With the availability of sophisticated back-end instruments, rapid follow-up observations of the newly-detected transient sources are made.
- The data collected from the ILMT, over an **operational time of 5 years**, will be ideally suited to **perform a deep photometric and astrometric variability survey**.

How is it different from a conventional telescope?

Conventional Telescopes	Liquid Mirror Telescopes
• They are **steered to point towards the celestial source** of interest in the sky for observations.	• They are **stationary telescopes** that image a strip of the sky which is at the zenith at a given point of time in the night. • A liquid-mirror telescope will survey and capture any and **all possible celestial objects** — from stars, galaxies, supernovae explosions, asteroids to space debris.
• They have **highly polished glass mirrors** — either single or a combination of curved ones — that are steered in a controlled fashion to focus onto the targeted celestial object on specific nights. The light is then reflected to create images.	• They are made up of mirrors with a reflective liquid, mercury.

• More expensive compared to liquid mirror telescopes.	• **Less expensive** alternative to conventional telescopes.
• They observe specific stellar sources for **fixed hours** as per the study requirement.	• ILMT will capture the sky's images on **all nights between two successive twilights** for the next five years

Which countries are involved in its development?

- **India, Belgium, Canada, Poland and Uzbekistan** are the main countries who have collaborated to set up the ILMT. The telescope was designed and built at the Advanced Mechanical and Optical Systems Corporation and the Centre Spatial de Liège in Belgium.

Significance of LMT

- It will detect transient or variable celestial objects such as **supernovae, gravitational lenses, space debris, and asteroids.**
- It is the **first liquid mirror telescope** designed exclusively for **astronomical observations.**
- It is the **largest aperture telescope** available in the country at present and is also the **first optical survey telescope** in India.

11) Small Satellite Launch Vehicle (SSLV)

What's in the news?

- India's space programme received a major boost recently when the ISRO's **Small Satellite Vehicle (SSLV-D2)** which lifted off from the Satish Dhawan Space Centre at Sriharikota **placed three satellites** in its precise orbit

About SSLV

- SSLV is the new small satellite launch vehicle developed by ISRO to cater the **launch of small satellites up to 500 kg to Low Earth Orbits.**
- It is configured with **three solid stages** and **a liquid propulsion**-based Velocity Trimming Module (VTM) which helps achieve desired velocity for the insertion of the satellites into the intended orbit.
- SSLV is capable of launching **Mini, Micro, or Nanosatellites (10 to 500 kg mass)** to a 500 km orbit.

Advantages of SSLV

- Provides **low-cost access to Space.**
- **Offers low turn-around time.**
- Facilitates flexibility in accommodating multiple satellites.
- **Demands minimal launch infrastructure.**

Significance of SSLV

- SSLV-D2 launch aims to **commercialize the small satellite launches** through industry on demand basis. It caters to the increasing global need of launching small satellites into Space.
- Small satellites have **utility in fields as diverse as education, defense, earth sciences,** emergency-related data services and smart power grids.
- India's **share** in the small satellite-driven space economy **is about 2 per cent and by making SSLV available for private players, India could become a significant contributor.**

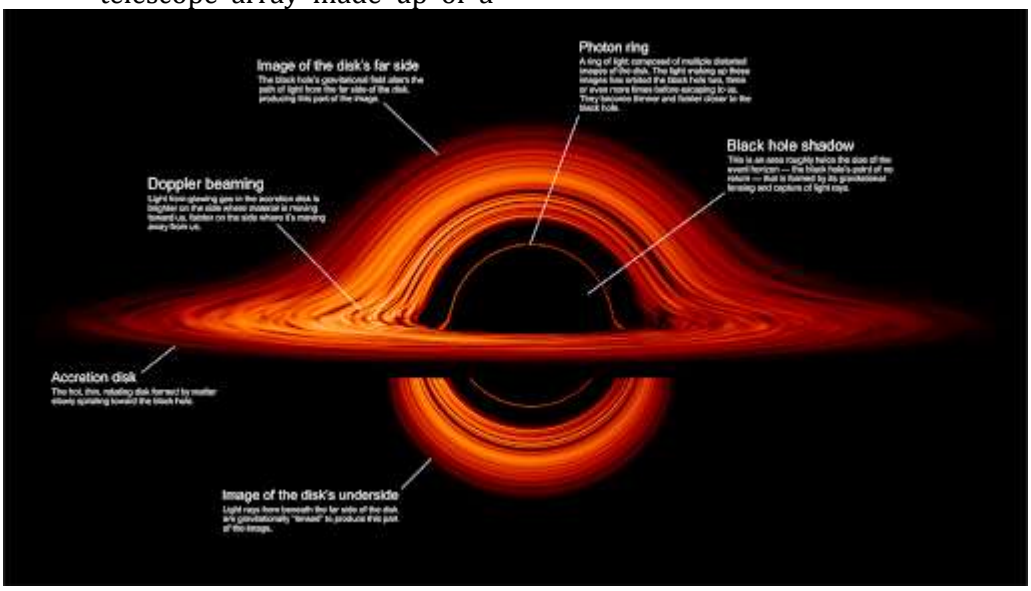
12) Black Hole

What's in the News?

- Scientists from the **Event Horizon Telescope (EHT) facility**, a collaboration of over 300 researchers, revealed the first image of the black hole at the center of the Milky Way.
- This image of the black hole referred to as **Sagittarius A* (SgrA*)** gave further support to the idea that the compact object at the center of our galaxy is indeed a black hole. This strengthens **Einstein's general theory of relativity.**
- The image is the first visual confirmation that a black hole indeed exists at the center of our galaxy.

- In 2019, the Event Horizon Telescope made history by releasing the first ever image of a black hole M87* – the black hole at the center of a galaxy Messier 87, which is a supergiant elliptical galaxy.
- The EHT project is a massive telescope array made up of a worldwide network of radio telescopes.
- It integrates data from a combined array of multiple very-long-baseline interferometry (VLBI) sites throughout the world.

What is a Black Hole?



- A black hole is a **place in space where gravity pulls so much** that even **light can not get out.** The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying.
- Because no light can get out, people can't see black holes.
- **Albert Einstein** first predicted the existence of black holes in 1916, with his general theory of relativity. The term "black hole" was coined many years later in 1967 by American astronomer **John Wheeler.**

How are they formed?

- Black holes form when massive stars die and their cores collapse. The most common way of black hole formation is when a star runs out of fuel and collapses into its gravitational pull.
- Stellar black holes are made when the center of a very big star falls in upon itself, or collapses. When this happens, it causes a **supernova**. A supernova is an exploding star that blasts part of the star into space.

Other features

- Because no light can get out, people can't see black holes. They are **invisible.**
- Space telescopes with special tools can help find black holes.
- There are **four different types of black holes** – stellar, intermediate, supermassive, and miniature.
- All of a black hole's mass is condensed into a small point of infinite density at its centre. This point os called singularity

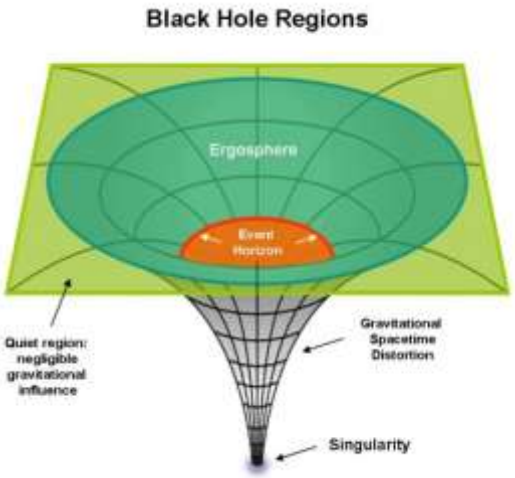
How do we identify blackholes?

- A way in which the universe showcases a black hole is **when the black hole interacts with its surroundings.**
- When the dust particles and matter from the surroundings fall onto a supermassive black hole, it engulfs a part of the surroundings but some of the matter is converted into energy and **emitted as electromagnetic radiation** that makes the black hole appear very luminous.
- This luminosity can be detected on earth thus, giving more insights into these occurrences.

- A supermassive black hole is the largest type of black hole, with mass on the order of millions to billions of times the mass of the Sun.

Other terms related to Black holes

What is an event Horizon?



- The 'event horizon' is the boundary defining the **region of space around a black hole from which nothing (not even light) can escape.** In other words, the escape velocity for an object within the event horizon exceeds the speed of light.

What is a neutron star?

- Neutron stars are **stellar objects with a mass about 1.4 times that of the sun**. Neutron stars are formed when a massive star runs out of fuel and collapses.
- When stars four to eight times as massive as the sun explode in a violent supernova, their outer layers can blow off in an often-spectacular display, leaving behind a small, dense core that continues to collapse.
- Gravity presses the material in on itself so tightly that protons and electrons combine to make neutrons, yielding the name "neutron star."

13) Gravitational waves and LIGO

About gravitational waves

- Gravitational waves are **'ripples' in space-time** caused by some of the most violent and energetic processes in the Universe.
- **Albert Einstein** predicted the existence of gravitational waves in 1916 in his **general theory of relativity.**
- Einstein's mathematics showed that massive accelerating objects (such as neutron stars or black holes orbiting each other) would disrupt space-time in such a way that 'waves' of undulating space-time would propagate in all directions away from the source.
- These cosmic ripples would travel at the speed of light, carrying with them information about their origins, as well as clues to the nature of gravity itself.
- The **strongest gravitational waves are produced by cataclysmic events such as colliding black holes, supernovae** (massive stars exploding at the end of their lifetimes), and **colliding neutron stars.**
- Other waves are predicted to be caused by the **rotation of neutron stars** that are not perfect spheres and possibly even the remnants of gravitational radiation created by the Big Bang.

What's in the news?

- The **United States National Science Foundation** is partnering with top U.S. universities and India's Raja Ramanna Centre for Advanced Technology, or **RRCAT (a unit of Department of Atomic Energy,** Government of India) to launch LIGO-India, a ground-breaking collaboration, fuelled by a **$320 million investment from India**, that will accelerate discovery and innovation in India and around the world.

About LIGO

- LIGO stands for "**Laser Interferometer Gravitational-wave Observatory**", the **world's largest gravitational wave observatory.**
- LIGO is a scientific collaboration of **two widely-separated interferometers** within the United States—one in Hanford, Washington and the other in Livingston, Louisiana—operated in unison to detect gravitational waves.
- LIGO exploits the physical properties of light and of space itself to **detect**

and understand the origins of gravitational waves (GW) predicted by Einstein's General Theory of Relativity.

- LIGO uses **lasers to detect ripples** in space-time through a method called **interferometry**: as gravitational waves pass by, they cause space itself to stretch and squeeze, which scientists can measure through changes in the beams of the LIGO lasers.
- LIGO's interferometers can amplify the smallest conceivable vibrations enough that they are detectable and measurable.

Significance of LIGO

- The data LIGO collects have far-reaching implications in many areas of physics.
- LIGO has provided **new clues about merging black holes**, the **existence of neutron stars and the origin of the universe.**
- It has opened an entirely new way of observing the universe.

Detection of gravitational waves

- Colossal events in the distant universe such as merging of black holes, explosion of supernovae and collision of neutron stars create cosmic ripples in space-time called **gravitational waves.**
- LIGO made its first detection of gravitational waves (in **2015**), generated by a pair of colliding black holes some 1.3 billion light years away.
- Following the 2015 detection, which later won the Physics Nobel (2017), the two LIGO detectors detected seven such binary black hole merger events before they were joined by the **European Virgo detector** in 2017. The two facilities have now detected 10 events.
- The **Japanese detector, KAGRA**, or **Kamioka Gravitational-wave Detector**, is expected to join the international network soon.

About LIGO-India Project

- LIGO-India is a **scientific collaboration with LIGO and lead institutes** to set up a **gravitational wave detector** in Maharashtra's Hingoli district in India.
- LIGO-India is a collaboration between the LIGO Laboratory — operated by Caltech and MIT and funded by the National Science Foundation (NSF) — and India's RRCAT, the Institute for Plasma Research (IPR), the Inter-University Centre for Astronomy and Astrophysics (IUCAA), and the Department of Atomic Energy Directorate of Construction, Services and Estate Management (DCSEM).

Significance of LIGO-India Project

- **LIGO-India** will create new opportunities by being a resource for students, researchers, and educators throughout local communities
- It can create **jobs across the technical workforce**, unleash **new avenues for scientific talent** and inspire the next generation of science, technology, engineering, and mathematics **(STEM) leaders.**
- By **joining the global network,** i.e., the two LIGO detectors in the U.S., Virgo in Italy, and the Kamioka Gravitational-wave Detector (KAGRA) in Japan, LIGO-India will push forward the boundaries of what science and technology can achieve and help unlock some of the universe's greatest mysteries.
- The construction of LIGO-India is a **major milestone for gravitational wave science.**
- The observatory will help to answer some of the most fundamental questions about the cosmos.

14) Dark Matter and Dark Energy

What's in the news?

- Astronomers have made the most **detailed map of dark matter**.
- Researchers from the National Science Foundation's (NSF) used the Atacama Cosmology Telescope to create this new map of dark matter.
- The new map uses light from the cosmic microwave background (CMB) essentially as a backlight to silhouette all the matter between us and the Big Bang.
- The recent research results showed both the 'lumpiness' of the universe and the rate at which the universe is growing.

About Dark matter

- Dark Matter refers to the hypothetical matter that scientists have not been able to locate in the universe - either through telescopes or using any other technological method.
- Dark matter works like an **attractive force** — a kind of cosmic cement that holds our universe together.
- Unlike normal matter, **dark matter does not interact with the electromagnetic force.** This means it **does not absorb, reflect or emit light, making it extremely hard to spot**.
- In fact, researchers have been able to infer the existence of dark matter only from the gravitational effect it seems to have on visible matter.
- In the 1930s, astronomer **Fritz Zwicky** speculated about the presence of "dark matter" for the first time.

Dark energy

- Dark energy is a **repulsive force** — a sort of anti-gravity — **hypothesised to be responsible for the accelerated expansion of the Universe.**
- Like Dark Matter, Dark Energy is **not directly observed**, but rather inferred from observations of gravitational interactions between astronomical objects.
- It is **distributed evenly throughout the universe, not only in space but also in time** – in other words, its effect is not diluted as the universe expands.
- The even distribution means that dark energy **does not have any local gravitational effects, but rather a global effect on the universe as a whole**. This leads to a **repulsive force**, which tends to **accelerate the expansion of the universe.**
- Dark energy is the far more dominant force of the two, accounting for roughly **68 percent of the universe's total mass and energy. Dark matter makes up 27 percent.** And the rest — a measly 5 percent — is all the regular matter we see and interact with every day.
- Current hypotheses propose dark energy might emerge from the bubbling of empty space, a small effect that is also widespread, making it powerful enough to drag apart clusters of galaxies without ripping them apart from within.

HEALTH

1) Priorities of the Health Sector

- The **Primary Health Care services** should be built around the people, where it is not just the treatment of disease but attention is on preventive and promotive services as well.
- **Sufficient investment** should be made in programmatic interventions, vaccines and medicine research and focus on public health interventions to tackle the so-called **neglected tropical diseases.**
- Improve the **health data quality and availability** that will be useful for health decision making and for dispelling the myths and rumors.
- Assuming the Presidency of the G20 for the year 2023, India needs to play leadership in bringing and sustaining attention to the challenge of **Antimicrobial Resistance, the coordinated global response to epidemics and pandemics, neglected tropical diseases and focus on 'one health'** (health of humans, animals and the environment is related to each other).
- It is time to move towards **stronger health systems,** building upon the Ayushman Bharat Programme, and health and wellness centers initiatives.
- It is time to deliberate in what ways **cooperative federalism** can be strengthened in the matter of public health.
- In the post-pandemic period **health workforce availability and equitable distribution** has to be the priority.
- The **disease surveillance systems** and public health measures need to be sustained.
- **Malnutrition and anemia** in women and children must be reduced.
- The National Mental Health Survey 2015-16 reported that one in every eight persons in India needed one or other form of **mental health services** and hence that has to be paid attention by the government especially through primary healthcare systems.
- India being a pharmacy to the world needs to assume responsibility and the government has to **step-up investment in research and development on vaccines and therapeutics**.

2) Mental health policy

Mental Health Status in India

- **Suicidal rates:** Suicides rates in India are amongst the **highest** when compared to other countries at the same socio-economic level.
- According to WHO, **India's suicide rate in 2019**, at 12.9/1,00,000, was **higher than the regional average** of 10.2 and the global average of 9.0.
- Suicide has become the **leading cause of death** among those aged 15–29 in India.

Prevalence

- Across the world, the prevalence of some mental health disorders is consistently **higher among women** as compared to men.
- **People living in poverty** are at greater risk of experiencing mental health conditions.
- Countries with **greater income inequalities and social polarization** have been found to have a higher prevalence of mental ill-health.
- **COVID- an exacerbating factor:**
    - The pandemic has increased the prevalence of depression by 28 percent and anxiety by 26 percent in just one year between 2020 and 2021.
    - The large increases have been noted among younger age groups, stemming from uncertainty and fear about the virus, financial and job losses, grief, increased childcare burdens, in addition to school closures and social isolation.
- **Media creates an impact on mental health:**
    - Increased use of certain kinds of social media is also

exacerbating stress and mental ill health for young people.
    - Social media detracts from face-to-face relationships, which are healthier and reduces investment in meaningful activities.
    - It erodes self-esteem through unfavorable social comparison.

Socio-economic implications:

- People experiencing severe mental health conditions are more likely to fall into poverty through loss of employment and i**ncreased health expenditure.**
- **Stigma and discrimination** often further undermine their social support structures. This reinforces the vicious cycle of poverty and mental ill- health.

Issues surrounding treatment of mental health

- Currently, **only 20-30 percent** of people with mental illnesses **receive adequate treatment.**
- Less than **two per cent of the government health budget** in India is devoted to mental health issues, which itself is the lowest among all G20 countries.
- There is a severe **shortage of mental health professionals.**
- Most private health insurance covers only a restricted number of mental health conditions.

Measures to Address the Issue

- The deep stigma surrounding mental health issues which prevents patients from seeking timely treatment and makes them feel shameful, isolated and weak should be done away.
- Mental health has to be made an **integral part of the public health programme** to reduce stress, promote a healthy lifestyle, screen and identify high-risk groups and strengthen mental health interventions like counseling services.
- **Special emphasis** will need to be given to schools and highly vulnerable groups to mental health issues such as victims of domestic or sexual violence, unemployed youth, marginal farmers, armed forces personnel and personnel working under difficult conditions.
- A **strong infrastructure** has to be created for mental health care and treatment.
- **Substantial investments** will be needed to address the gaps in the mental health infrastructure and human resources.
- Mental health services should be made **affordable** for all.
- All government **health assurance schemes**, including Ayushman Bharat, should cover the widest possible range of mental health conditions.

Conclusion

- As we strive to provide universal health coverage to our population, we should ensure that mental health is an integral part of our approach.

3) National Policy for Rare Diseases 2021

What is a rare disease?

- A rare disease is a health condition of **low prevalence that affects a small number of people** compared with other prevalent diseases in the general population.
- Rare diseases include genetic diseases, rare cancers, infectious tropical diseases and degenerative diseases.
- **80% of rare diseases are genetic in origin** and hence disproportionately impact children.

Definition of a rare disease

- There is **no universally accepted definition** of rare disease.
- These diseases have **differing definitions** in various countries and range from those that are prevalent in 1 in 10,000 of the population to 6 per 10,000.
- According to the **Indian Council of Medical Research (ICMR)** registry definition, "A disease or disorder is defined as Rare in India when it **affects fewer than 1 in 2500 individuals".**
- So far about 450 rare diseases have been recorded in India and it is estimated that about 6-8% of the country's population is affected by a rare disease.

Challenges associated with rare diseases

- There are 7,000-8,000 classified rare diseases, but **less than 5% have therapies available to treat them.** About 95% rare diseases have no approved treatment and less than 1 in 10 patients receive disease-specific treatment.
- The field of rare diseases is very complex and heterogeneous and prevention, treatment and management of rare diseases have multiple challenges. **Early diagnosis** of rare diseases is a major challenge owing to a variety of factors that include **lack of awareness among primary care physicians, lack of adequate screening and diagnostic facilities etc.**
- There are also fundamental challenges in the **research and development** for the majority of rare diseases as relatively little is known about the pathophysiology or the natural history of these diseases particularly in the Indian context.
- Rare diseases are also **difficult to research upon** as the patients pool is very small and it often results in inadequate clinical experience. **Availability and accessibility to medicines** are also important to reduce morbidity and mortality associated with rare disease.
- The **cost of treatment of rare diseases is prohibitively expensive.** Various High Courts and the Supreme Court have also expressed concern about lack of a national policy for rare diseases.

National Policy for Rare Diseases 2021

- To address all these challenges, the Union Health & Family Welfare Ministry approved the "National Policy for Rare Diseases 2021" in 2021.

Highlights of the Policy

- In the new policy, rare diseases have **not been defined but classified into three groups.**
    - **Group 1** has disorders amenable to **one-time curative treatment**, including osteopetrosis and Fanconi anaemia.
    - **Group 2** has diseases **requiring long-term or lifelong treatment with relatively lower cost of treatment** and benefit has been documented in literature, including galactosemia, severe food protein allergy, and homocystinuria.
    - **Group 3** has diseases for which definitive treatment is available, but **challenges are to make optimal patient selection for benefit, and very high cost and lifelong therapy,** covering diseases such as spinal muscular atrophy (SMA), Pompe disease, and Hunter syndrome.

Lowering the Cost of Treatment

- The Rare Diseases Policy aims to lower the high cost of treatment for rare diseases with **increased focus on indigenous research** with the help of a **National Consortium** to be set up with the Department of Health Research, Ministry of Health & Family Welfare as convenor.
- Increased focus of research and development and local production of medicines will lower the cost of treatment for rare diseases.

National Hospital Based Registry

- The policy also envisages creation of a **national hospital based registry of rare diseases** so that adequate data is available for definition of rare diseases and for research and development related to rare diseases within the country.

Screening, Prevention & Treatment

- The Policy also focuses on **early screening and prevention through primary and secondary health care infrastructure** such as Health and Wellness Centres and District Early Intervention Centres (DEICs) and through counselling for the high-risk parents.
- Screening will also be supported by **Nidan Kendras** set up by the Department of Biotechnology.
    - *Nidan Kendras provide counselling, prenatal testing*

and diagnosis, management, and multidisciplinary care in Government Hospitals wherein the influx of patients is more.

- Policy also aims to **strengthen tertiary health care facilities** for prevention and treatment of rare diseases through **designating 8 health facilities as Centre of Excellence (CoEs)** and these CoEs will also be provided one-time financial support of up to Rs 5 crores for upgradation of diagnostics facilities.

Crowd Funding Mechanism

- Besides, the Policy also envisages a **crowd funding mechanism** in which corporates and individuals will be encouraged to extend financial support through a robust IT platform for treatment of rare diseases.
- Funds collected will be utilized by Centres of Excellence for treatment of all three categories of rare diseases as first charge and then the balance financial resources could also be used for research.

Financial Assistance

- **Financial support up to Rs 50 lakh** shall be provided to the patients suffering from **any category of rare diseases.** The financial support will be provided to the patients for the treatment in any of the **Centre of Excellence** mentioned in NPRD-2021.

4) Ayushman Bharat Digital Mission

About Ayushman Bharat Digital Mission

- The Ayushman Bharat Digital Mission (ABDM) was launched by the Government in 2020
- **Aim**: To **promote digitization of healthcare** and create an **open interoperable digital health ecosystem** for the country.
- It enables various digital health systems to interact with each other by enabling seamless sharing of data across various healthcare providers who may be using different digital health systems.

Working of the mission

- ABDM will create certain core building blocks or modules such as registries of individuals/citizens/patients (**Health ID registry**), registry of healthcare professionals (**Healthcare Professionals Registry**) and registry of healthcare facilities including hospitals, laboratories, pharmacies, etc (**Health Facility Registry**).
- In these registries, each of these entities is provided with a **unique identifier** across the ecosystem.
- Any individual can enroll in ABDM to generate a Health ID
- Healthcare professionals recognized by Indian authorities can register on the Healthcare Professionals Registry (HPR)
- Health facilities can register themselves on the Health Facility Registry (HFR)
- Participation in ABDM is **voluntary** including for citizens.
- Participation of a healthcare facility or an institution is also **voluntary** and shall be taken by the respective management (government or private management).
- **Implementing agency:** The **National Health Authority (NHA)**, the apex agency responsible for the implementation of Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY), has been given the mandate by the government to design, build, roll-out and implement the ABDM in the country.

Significance of ABDM

- The implementation of ABDM is expected to significantly improve the efficiency, effectiveness, and transparency of health service delivery overall. Patients will be able to **securely store and access their medical records** and share them with health care providers to ensure appropriate treatment and follow-up.
- They will also have **access to more accurate information on health facilities and service providers.** Further, they will have the **option to access health services remotely** through tele-consultation and e-pharmacy.

- ABDM will empower individuals with accurate information to enable informed decision making and **increase accountability of healthcare providers.**
- Similarly, health care professionals across disciplines will have better access to a patient's medical history (with the necessary informed consent) for prescribing more appropriate and effective health interventions.

What's in the News?

- NHA announced **HCX as a new initiative under the Ayushman Bharat Digital Mission (ABDM)** recently and subsequently worked with various groups to come up with Health Insurance Exchange specifications.

Issues with current insurance claims

- The current health insurance claims settlement process in the country is mostly **manual, non-digital and laborious** in nature posing challenges at every stage.
- The current process of exchanging claims **lacks standardization across the ecosystem** with most data exchange occurring through PDF/manual methods.
- The claim settlement processes vary significantly among Insurers, TPAs, and Providers leading to **high cost of processing each claim.**

About National Health Claims Exchange (HCX)

- NHA has developed a national Health Claims Exchange (HCX) to **enable interoperability of health claims.**
- The HCX serves as a protocol for exchanging claims-related information among various actors, including payers, providers, beneficiaries, regulators, and observers.
- It is designed to be **interoperable, machine-readable, auditable, and verifiable** which helps ensure that the information being exchanged is accurate and trustworthy.
- HCX will act as a gateway for the ecosystem wherein the Insurers/ TPAs shall send responses for each FHIR based e-claim submitted by providers via the HCX through **standard protocols (APIs).**

5) Other initiatives related to health

i) Ayushman Bharat Health Infrastructure Mission

About the Mission

- The Ayushman Bharat Health Infrastructure Mission is aimed at **ensuring a robust public health infrastructure in both urban and rural areas, capable of responding to public health emergencies or disease outbreaks.**
- In a bid to **increase accessibility**, the Ayushman Bharat Health Infrastructure Mission will provide **support to 17,788 rural Health and Wellness Centres in 10 'high focus' states and establish 11,024 urban Health and Wellness Centres** across the country.
- **Objective**: To **fill critical gaps in public health infrastructure,** especially in critical care facilities and primary care in both the urban and rural areas.
- This will ensure access to critical care services in all districts of the country with over five lakh population through **'Exclusive Critical Care Hospital Blocks'.** The remaining districts will be covered through referral services.
- **Integrated public health labs that** will be connected through the **Integrated Health Information Portal** will also be set up in all districts, giving people access to a full range of diagnostic services through a network of laboratories across the country.
- The Ayushman Bharat Health Infrastructure Mission also aims to establish an **IT-enabled disease surveillance system** through a network of surveillance laboratories at block, district, regional and national levels.
- The mission aims at ensuring a robust system for **detecting, investigating, preventing, and combating public health emergencies and disease**

outbreaks. For this, 17 new public health units will be set up, while the 33 existing public health units will be strengthened. It will also train frontline and healthcare workers to respond to public health emergencies effectively.

- The mission will set up other **infrastructure**, including a national institution for one health, four national institutes for virology, a regional research platform for WHO's South East Asia region, nine biosafety level-III laboratories, and five regional centres for disease control.

ii) E-sanjeevani

About 'eSanjeevani'

- Launched in 2009 by the **Ministry of Health & Family Welfare** 'eSanjeevani' is a **web-based comprehensive telemedicine solution.**
- It aims to provide healthcare services to patients in their homes.
- It is being implemented under the **Ayushman Bharat Health and Wellness Centre (AB-HWC).**
- The portal was designed & developed by the **Centre for Development of Advanced Computing (C-DAC)**, a premier R&D organization of the Ministry of Electronics and Information Technology (MeitY).
- eSanjeevani platform has enabled two types of telemedicine services viz.
    - **Doctor-to-Doctor (eSanjeevani)**
        - It aims to implement Doctor-to-Doctor teleconsultation in all the 1.5 lakh Health and Wellness Centres in conjunction with identified Medical College hospitals in a 'Hub and Spoke' model.
        - States have identified and set up dedicated 'Hubs' in Medical Colleges and District hospitals to provide teleconsultation services to 'Spokes', i.e SHCs, PHCs and HWCs.
    - **Patient-to-Doctor (eSanjeevani OPD) Tele-consultations**
        - Owing to the ongoing COVID-19 pandemic, the Health Ministry launched the second tele-consultation service enabling patient-to-doctor telemedicine through 'eSanjeevaniOPD'.
        - This service is available as an Android mobile application as well. This has made it convenient for the people to avail of the health services without having to travel.
        - This e-health service is offered free of cost and has proved a boon in containing the spread of COVID while simultaneously enabling provisions for non-COVID essential healthcare.

Significance

- **Enhances the quality of medical services**
- Addresses issues about uneven distribution and shortage of infrastructural as well as human resources.
- Makes healthcare services equitable by **bridging the digital divide** that exists between the urban vs. rural, rich vs. poor etc.
- Used to provide **medical education** to interns, people across Various Common Service Centers (CSCs), etc.

6) Genome sequencing and Genome India Project

Genome sequencing

- The **human genome** is the **entire set of deoxyribonucleic acid (DNA)** residing in the nucleus of every cell of each human body.

- It carries the **complete genetic information** responsible for the development and functioning of the organism.
- The DNA consists of a **double-stranded molecule built up by four bases – adenine (A), cytosine (C), guanine (G) and thymine (T).** Every base on one strand pairs with a complementary base on the other strand (A with T and C with G). In all, the genome is made up of approximately **3.05 billion such base pairs.**
- While the **sequence or order of base pairs is identical in all humans**, compared to that of a mouse or another species, there are **differences in the genome of every human being** that makes them **unique**.
- The **process of deciphering the order of base pairs, to decode the genetic fingerprint of a human is called genome sequencing.**

Whole-genome sequencing

- There are **several approaches** to genome sequencing — including **whole genome sequencing or next generation sequencing** — that have different advantages.
- The process of **whole-genome sequencing**, made possible by the Human Genome Project, now facilitates the **reading of a person's individual genome to identify differences from the average human genome.**
- These differences or mutations can tell us about **each human's susceptibility or future vulnerability** to a disease, their **reaction or sensitivity** to a particular stimulus, and so on.

Applications of genome sequencing

- To **evaluate rare disorders, preconditions for disorders, even cancer from the viewpoint of genetics**.
- As a tool for **prenatal screening**, to investigate whether the fetus has genetic disorders or anomalies.
- To **repair disease-causing mutations in human genomes. Eg: CRISPR technology relies on sequencing.**
- To **read the codes of viruses in public health. Eg;** In 2014, scientists sequenced samples of **Ebola** from infected African patients to show how genomic data of viruses could reveal hidden pathways of transmission, which might then be halted, thus slowing or even preventing the infection's spread.
- Helps to **better understand personal molecular biology and health.**
- To monitor antibiotic resistance in foodborne bacteria.
- **Pharmacogenomics**: Tailoring disease treatments to an individual's genetic makeup is made possible through genome sequencing.
- Genome sequencing can be used to identify genetic markers for disease resistance and drought tolerance in various crop plants.

Human Genome Project

- In **1990**, a group of scientists began to work on determining the **whole sequence of the human genome** under the **Human Genome Project.** The first results of the complete human genome sequence were given in **2003**. However, **some percentage of repetitive parts were yet to be sequenced.**
- The Human Genome Project released the **latest version** of the complete human genome in **2023,** with a **0.3% error margin.**
- All human beings are 99.9 percent identical in their genetic makeup. Differences in the remaining 0.1 percent hold important clues about the causes of diseases.

Significance of the Genome India project?

- India's 1.3 billion-strong population consists of over **4,600 population groups,** many of which are **endogamous**. Thus, the Indian population harbors **distinct variations**, with disease-causing mutations often amplified within some of these groups.
- Findings from population-based or disease-based human genetics research from other populations of the world **cannot be extrapolated to Indians**.

- But despite being a large population with diverse ethnic groups, **India lacks a comprehensive catalogue of genetic variations.**
- Creating a database of Indian genomes allows researchers to **learn about genetic variants unique to India's population groups** and **use that to customise drugs and therapies**.

What's in the news?

- The Department of Biotechnology (DBT) recently said that the exercise to **sequence 10,000 Indian human genomes** and create a **database** under the Centre-backed **Genome India Project** is about **two-thirds complete.**
- About 7,000 Indian genomes have already been sequenced of which, 3,000 are available for public access by researchers.
- The proponents of the project say it would enable researchers anywhere in the world to **learn about genetic variants unique to the Indian population.**
- Countries including the United Kingdom, China, and the United States have launched similar programmes to sequence at least 1,00,000 of their population's genomes.

7) Neglected tropical diseases

What are NTDs?

- Neglected tropical diseases (NTDs) are a **diverse group of communicable diseases** that prevail in **tropical and subtropical conditions** in more than 140 countries.
- NTDs are caused by a **variety of pathogens** including viruses, bacteria, parasites, fungi and toxins.
- NTDs affect **one in five people worldwide** and are a key impediment to economic development. In addition to causing unbearable suffering and death, NTDs **lead to other conditions** like anemia and malnutrition, stunting growth and causing lifelong health and cognitive problems.
- They are called "neglected" because they generally afflict the world's poor and historically have not received as much attention as other diseases.
- More than 70% of countries and territories that report the presence of neglected tropical diseases are low-income or lower middle-income economies.
- NTD includes Dengue, Blinding trachoma, Human dog-mediated rabies, Leprosy (Hansen disease), Endemic treponematoses (yaws), Human African trypanosomiasis (sleeping sickness), Leishmaniasis, Lymphatic filariasis, etc.
- As per **Global Report on NTD 2023 16 countries account for 80% of global NTD burden** and 47 countries eliminated at least one NTD.
- India has the world's largest absolute burden of at least 10 major NTDs.

Causes

- The epidemiology of NTDs is complex and often related to **environmental conditions.** Many of them are **vector-borne**, have **animal reservoirs** and are associated with **complex life cycles**. All these factors make their public-health control challenging.
- NTDs are **prevalent mainly in rural areas, in conflict zones and hard-to reach-regions.** They thrive in areas where access to clean water and sanitation is scarce – worsened by climate change.
- Addressing these diseases requires **cross-sectoral approaches** and tackling associated mental health and other issues such as stigma and discrimination.

Challenges in tacking NTDs

- Poor targeting of interventions
- Low treatment coverage among specific sub-groups
- Lack of surveillance systems that can meet the sensitivity and specificity requirements for the endgame of disease elimination.
- Covid-19 pandemic has caused a serious setback in implementation of NTD elimination steps.

Control of NTDs

- Most can be controlled or even eliminated through **mass administration of safe and effective**

medicines or other effective interventions.

- **Controlling the vectors** (e.g., mosquitoes, black flies) that transmit these diseases and improving basic water, sanitation, and hygiene are highly effective strategies against these NTDs
- The **World Health Organization** has **recommended five interventions** to overcome Neglected Tropical Diseases. These are: preventive chemotherapy; innovative and intensified disease management; vector ecology and management; veterinary public health services; and provision of safe water, sanitation and hygiene.

INFORMATION TECHNOLOGY

1. Decoding modern tech terms

i) Metaverse

- Metaverse is currently in the evolutionary phase, so it has **no clear-cut definition** and is interpreted by different people depending on its different enforcement worldwide.
- However, broadly it can be defined as a **digital reality that combines aspects of social media, online gaming, augmented reality (AR) and virtual reality (VR) to allow users to interact virtually.**
    - **Augmented Reality** involves overlaying visual elements, sound, and other sensory stimuli into a real-world setting to enhance the user experience. AR can be accessed with a smartphone, and users can control their presence in the real world.
    - In comparison, **virtual reality** is completely virtual and enhances fictional realities. VR requires a headset device, and users are controlled by the system.
- In the metaverse, these technologies are combined to create a sense of **"virtual presence."**
- As the metaverse grows, it may likely create online spaces where user interactions are more multidimensional than current technology supports.
- In simple terms, the metaverse will **allow users to go beyond just viewing digital content,** users in the metaverse will be able to immerse themselves in a space where the digital and physical worlds converge.
- The Interpol has recently unveiled the first-ever 'metaverse' specifically designed for law enforcement worldwide.

ii) Quantum Computing

- Quantum computing harnesses the **phenomena of quantum mechanics** to deliver a huge leap forward in computation to solve certain problems.
- One of the basic elements that make up this quantum computer is that where the classical one uses **bits** to compute this one uses "**qubits**".
- Classical bits can take the value 0 or 1, allowing for a binary system to be set up and the lowest level of computer language is done manipulating these bits. A qubit on the other hand can exist as a **superposition of two states 0 and 1** (a state known as **quantum superposition**). So if one has an n-qubit number, it can exist as a superposition of 2n states. This also allows for an **immense amount of parallel processing.**

Uses of Quantum Computing

- **Artificial Intelligence & Machine Learning**: As the number of applications increases, it becomes a challenging task for traditional computers, to match up the accuracy and speed. And, that's where quantum computing can help in processing through complex problems in very less time.
- **Computational Chemistry**: The ability for quantum computers to focus on the existence of both 1 and 0 simultaneously could provide immense power to the machine to successfully map the molecules which, in turn, potentially opens opportunities for pharmaceutical research.
- **Cybersecurity & Cryptography**: Quantum computing with the help of machine learning can help in developing various techniques to combat these cybersecurity threats. Additionally, quantum computing can help in creating encryption methods, also known as quantum cryptography.
- **Financial Modeling:** By applying quantum technology to perform these massive and complex calculations, companies can not only improve the quality of the solutions but also reduce the time to develop them.

- **Weather Forecasting**: Application of quantum machine learning can help in improving pattern recognition, which, in turn, will make it easier for scientists to predict extreme weather events and potentially save thousands of lives a year. With quantum computers, meteorologists will also be able to generate and analyse more detailed climate models, which will provide greater insight into climate change and ways to mitigate it.

Challenges associated with quantum computing

- Superpositions (where a qubit is both on and off) can collapse quickly.
- The software programming is different, and requires excellent error control and management.
- Researchers have found it hard to maintain physically stable configurations.
- They are huge installations which must be housed in super-cold, seismically stable places since even passing trucks can cause errors through imperceptible tremors.
- Special materials and rare helium isotopes are used to manage cooling and shielding, quite apart from specialized semiconductors.

National Mission on Quantum Technologies & Applications (NM-QTA)

- The Union Budget 2020-21 announced the **National Mission on Quantum Technologies & Applications (NM-QTA)** which will be able address the ever increasing technological requirements of the society, and take into account the international technology trends and road maps of leading countries for development of next generation technologies.
- Implementation of the mission would help **develop and bring quantum computers, secured communications through fiber and free space, quantum encryption and crypt-analysis and associated technologies** within reach in the country and help address India specific national and regional issues.
- The mission will help **prepare next generation skilled manpower, boost translational research and also encourage entrepreneurship and start-up ecosystem development**. By promoting advanced research in quantum science and technology, technology development and higher education in science, technology and engineering disciplines India can be brought at par with other advanced countries and can derive several direct and indirect benefit

iii) Artificial Intelligence

- Artificial intelligence (AI) refers to the **ability of machines (or technology) to learn, analyze, think, understand, solve problems, and make decisions, etc., similar to a human being.**
- Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind
- It also encompasses sub-fields of **machine learning and deep learning**, which are frequently mentioned in conjunction with artificial intelligence.
- AI is used in features like **machine translation, voice-to-text conversion,** etc.

Generative AI

- Generative AI is a type of **artificial intelligence that involves creating new, original content** or data using machine learning algorithms. It can be used to generate text, images, music, or other types of media. ChatGPT, DALL-E 2, and Bing AI are some of the popular examples of Generative AI tools.
- Generative AI works by training a model on a large dataset and then using that model to generate new, previously unseen content that is similar to the training data.
- This can be done through techniques such as neural machine translation, image generation, and music generation.

Significance of generative AI

- Generative AI has the **potential to revolutionize many industries** by

automating the creation of content and enabling the generation of new ideas and concepts.
- It has the potential to **enable efficiency and productivity** across multiple industries and applications at scale.

Concerns around AI use

- It raises **ethical concerns** about the potential for biased or inaccurate content to be generated and disseminated.
- If not designed and developed responsibly with appropriate safeguards, Generative AI can **create harm and adversely impact society** through misuse, perpetuating biases, exclusion, and discrimination.
- Generative AI systems can create **content for malicious purposes**, such as deep fakes, disinformation, and propaganda. It can also generate offensive or inappropriate content.
- **Nefarious actors may use AI-generated media** to manipulate people and influence public opinion. These systems can potentially access sensitive information, raising concerns about data privacy and security.
- It may also **produce low-quality and less accurate information,** specifically in the context of complex engineering and medical diagnosis.
- It can be challenging to determine **who is responsible** for the content generated by a generative AI system — the acquisition and consent model around the training data and intellectual property issues make it difficult to hold anyone accountable for any harm resulting from its use.

Way Forward

- We must add rigor and responsibility to developing AI technology, enforce ethical guidelines, conduct regular audits for fairness, identify and address biases, and protect privacy and security.
- It is essential to carefully consider the potential harms, threats, and concerns of Generative AI systems and ensure that they are used responsibly and ethically.
- We must add adequate policy, regulation, awareness, and education guardrails to develop and use Generative AI services ethically and responsibly.

What is ChatGPT?

- ChatGPT is a **conversational chatbot. It is a type of artificial intelligence (AI) that is designed to carry out conversation with humans.**
- It is based on a technology called **natural language processing (NLP),** which allows it to understand and generate human-like text.
- In practical terms, this means that one can have a conversation with ChatGPT as if it were a real person.
- One way that ChatGPT can be used is as a **chatbot**, which is a computer program that simulates conversation with human users, especially over the Internet.

How Does ChatGPT Work?

- To carry out a conversation, ChatGPT uses a process called **machine learning**. This involves feeding the AI a large amount of data, such as transcripts of human conversations or written texts, and using algorithms to analyze this data and learn from it.
- These algorithms are designed to identify patterns and relationships in the data, and to use this information to make predictions or generate responses.
- As a result, ChatGPT is able to generate responses that are **more human-like and sophisticated** than those of some other chatbots.
- ChatGPT can answer follow-up questions, and can also admit its mistakes, challenge incorrect premises, and reject inappropriate requests.
- The reason ChatGPT has generated so much discussion is because of the kind of answers it gives. 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, solve math equations, and spot errors in code.**

Limitations of ChatGPT

- ChatGPT sometimes writes **plausible-sounding but incorrect or nonsensical answers.**
- The model is often **excessively verbose and overuses certain phrases.**
- Also, the chatbot is **sensitive to how the input is phrased.** For example, it may have an answer to a query phrased in one style, but the model may not know the answer if given a slightly different phrase.

About GPAI

- Global Partnership on Artificial Intelligence (GPAI) is an international initiative to **support responsible and human-centric development and use of Artificial Intelligence (AI).**
- As per the official website, GPAI is a congregation of **29 member countries**, including Argentina, Australia, Belgium, Brazil, Canada, Czech Republic, Denmark, France, Germany, India, Ireland, Israel, Italy, Japan, Mexico, the Netherlands, New Zealand, Poland, the Republic of Korea, Senegal, Serbia, Singapore, Slovenia, Spain, Sweden, Türkiye, the United Kingdom, the United States and the European Union.
- India had joined the GPAI in **2020** as a **founding member.**
- GPAI brings together engaged minds and expertise from science, industry, civil society, governments, international organizations and academia to **foster international cooperation.**

2. Web 3.0

- The concept of **Web3,** also called **Web 3.0**, is used to describe a potential **next phase of the internet**.
- The model, a **decentralised internet** to be **run on blockchain technology,** would be different from the versions in use, Web 1.0 and Web 2.0.
- In web3, **users will have ownership stakes in platforms and applications** unlike now where tech giants control the platforms.

What is the difference between Web1 and 2?

- **Web 1.0 is the world wide web or the internet** that was invented in **1989**.
- The internet in the Web 1.0 days was **mostly static web pages** where users would go to a website and then read and interact with the static information. Even though there were e-commerce websites in the initial days it was still a closed environment and the users themselves could not create any content or post reviews on the internet.
- Web 2.0 started in the late 1990s itself though 2004 was when most of its features were fully available. It is still the age of Web 2.0 now.
- The differentiating characteristic of Web 2.0 compared to Web1.0 is that **users can create content**. They **can interact and contribute in the form of comments,** registering **likes, sharing and uploading** their photos or videos and perform other such activities.
- Primarily, a **social media kind of interaction** is the **differentiating trait** of Web 2.0.

Need for Web3

- In Web 2.0, most of the data in the internet and the internet traffic are **owned or handled by very few companies.** This has created **issues related to data privacy, data security and abuse of such data**.
- There is a sense of disappointment that the original purpose of the internet has been distorted. It is in this context that Web3 is significant.

How does it function?

- Web3 will deliver a **decentralized and fair internet where users control their own data.**
- Currently if a seller has to make a business to the buyer, both the buyer and seller need to be registered on a "shop" or "platform" like Amazon or ebay or any such e-commerce portal. What this "platform" currently does is that it authenticates that the buyer and seller are genuine parties for the transaction.

- Web3 **tries to remove the role of the "platform"**. For the buyer to be authenticated, the usual proofs aided by block chain technology will be used. The same goes for the seller. With **block chain, the time and place of transaction are recorded permanently.** Thus, Web3 **enables peer to peer (seller to buyer) transactions by eliminating the role of the intermediary.** This concept can be extended to other transactions also.
- The spirit of Web3 is **Decentralized Autonomous Organization (DAO)** which is that all the business rules and governing rules in any transaction are transparently available for anyone to see and software will be written conforming to these rules. **Crypto-currency and block chain** are technologies that follow the DAO principle. With DAO, there is no need for a central authority to authenticate or validate.

Concerns

- From a technology perspective, Web3 will require **deviation from the current digital architecture.**
- Another concern is that web3 is built on blockchain, which can sometimes be **very energy-intensive**, contributing to carbon emissions and climate change.

What's in the News?

- As per a recent survey released by NASSCOM (non-governmental trade association and advocacy group), Web3 is potentially growing in terms of providing jobs to almost 11 percent of the world's web3 talent.
- This makes **India** the **third largest in the workforce segment in web3**.
- India's rapid adoption of new-age technologies, its growing startup ecosystem, and large-scale digitally skilled talent potential is cementing the country's position in the global Web3 landscape.

INDIA'S DEFENSE SECTOR

1) Chief of Defence staff

- In 2019, the Union Cabinet had given approval to create the post of Chief of Defence Staff (CDS) in the rank of a four-star General with salary and perquisites equivalent to a Service Chief .
- The CDS is the Principal Military Adviser to the Defence Minister and Permanent Chairman Chiefs of Staff Committee (CoSC). In addition, the Department of Military Affairs was created as the fifth department in the Ministry of Defence (MoD) with the CDS functioning as its Secretary.

Advantages in having a CDS

- It creates better coordination and jointness among the tri-services. So their operation becomes stronger.
- Early decision making which is crucial in military operations. The intention behind creating CDS was to "reconcile possible differences" in service-specific opinions to enable the government to arrive at considered military decisions.
- The post is aimed at ensuring better coordination between the three services.
- The role the CDS would play in fostering inter-services jointness in terms of budgeting, equipment purchases, training, joint doctrines and planning of military operations-an imperative of modern warfare.
- The CDS is also seen as being vital to the creation of "theater commands", integrating tri-service assets and personnel like in the US military.

2) Integrated Theater Command

- The concept of Integrated Theatre Command in India refers to the restructuring and reorganization of the country's military forces into unified commands that integrate multiple services (Army, Navy, and Air Force) under a single operational commander.
- The objective is to enhance jointness, coordination, and synergy among the three services, thereby improving the overall effectiveness and efficiency of military operations.
- The Integrated Theatre Command system aims to replace the existing siloed command structure, where each service operates independently, with a more integrated and collaborative approach.
- The concept envisions the establishment of integrated commands based on geographical regions or functional responsibilities.

Key aspects of the integrated theater commands:

1. **Chief of Defence Staff (CDS)**: The appointment of a Chief of Defence Staff, a four-star general, acts as the principal military advisor to the government and serves as the single-point military advisor to the President. The CDS is responsible for fostering jointness among the three services and facilitating the establishment of Integrated Theatre Commands.
2. **Formation of Integrated Theatre Commands**: The Indian government has announced plans to establish Integrated Theatre Commands to optimize the operational readiness and capabilities of the armed forces. The first Integrated Theatre Command is expected to be formed by merging the resources and assets of different services in a specific geographical region.
3. **Air Defence Command**: The Indian Air Force is in the process of establishing an Air Defence Command, which will be responsible for protecting the country's airspace and coordinating air defense operations. This command will integrate the air defense capabilities of the Army, Navy, and Air Force under a unified command structure.
4. **Maritime Theatre Command:** The Indian Navy is also working towards establishing a Maritime Theatre Command, which will focus on maritime operations and security. This

command will integrate the naval assets, including ships, submarines, aircraft, and marine forces, to enhance joint operations and efficiency in the maritime domain.

5. **Land and Integrated Theatre Commands:** Alongside the Air Defence Command and Maritime Theatre Command, the establishment of Land-based Integrated Theatre Commands is also being considered. These commands will bring together the resources and capabilities of the Army, Air Force, and other specialized forces to ensure seamless coordination and synergy in land-based operations.
6. **Joint Training and Exercises**: The push for Integrated Theatre Commands is accompanied by an emphasis on joint training and exercises to enhance inter-service coordination, interoperability, and joint operational planning. Regular joint exercises and training programs involving all three services are being conducted to develop joint warfighting capabilities and foster a collaborative approach.

Currently, India has only two tri-service commands, the Andaman and Nicobar Command (ANC) and the Strategic Forces Command to handle India's nuclear assets and 17 individual service commands.

3) Defence Indigenisation

- Defense indigenisation is the **capability of developing and producing any defense equipment within the country for the dual purpose of achieving self-reliance and reducing the burden of imports.**
- The Self-Reliance Index (SRI) which may be defined as the ratio of indigenous content of defense procurements to the total expenditure on defense procurements in a financial year is at an abysmal 0.3
- The Stockholm International Peace Research Institute (SIPRI) reported that India was the world's second-largest importer of major arms in 2014-18 and accounted for 9.5% of the global total and India's military expenditure rose by 3.1%.

Need for indigenisation of defense industry

- Safeguarding the national security
- Preventing fiscal deficit from importing defense equipment
- Huge unemployment can be overcome from establishing defense industries and use of human resources
- Defense export is much lower in India, with more indigenisation defense exports can be increased

Defence Industry SWOT analysis

Strengths

- Large domestic market
- Existing manufacturing infrastructure of DPSUs contributing approximately 63% of manufacturing output
- Strong R&D set-up for the Defence Research and Development Organisation (DRDO)
- Large pool of talented scientists, engineers and skilled manpower

Weaknesses

- High dependence on import of capital equipment
- Low absorption and transfer of technology (ToT) by DPSUs and ordnance factories
- Limited indigenous machine tool building capability
- Talent attraction and retention
- Restrictive and contradictory policy regime

Opportunities for growth

- Shrinking defense budgets in the US and Europe
- The offset policy can stimulate creation of a domestic value chain
- Allowing private participation in maintenance of transfer of technology (MToT) will create domestic industry in maintenance repair and overhaul(MRO)

Threats

- Lack of a level playing field due to unfavourable policies for domestic private players has thwarted their development.

- Competition from emerging economies for OEM investments and ToT
- Adversaries also investing in acquisition and development of a defence industrial base while turning self-sufficient in production and technology

Challenges:

1. **Technological Gap:** India's defense industry often struggles with a technological gap compared to developed nations. Developing cutting-edge defense technologies requires significant investment in research and development (R&D), which can be a challenge for Indian defense manufacturers. Bridging this technological gap and acquiring advanced capabilities requires collaboration with foreign partners or substantial investment in R&D.
2. **Lack of Infrastructure:** The defense industry requires robust infrastructure, including specialized manufacturing facilities, testing laboratories, and research institutions. India faces challenges in terms of inadequate infrastructure, particularly in the defense manufacturing sector. The lack of modern infrastructure hampers the production and development of advanced defense systems.
3. **Dependency on Imports:** India has traditionally been heavily reliant on imports for its defense equipment and technology. This dependency limits the growth of the domestic defense industry and hinders indigenization efforts. To reduce import dependency, India needs to focus on developing its own defense manufacturing capabilities, which requires substantial investment and a long-term strategic approach.
4. **Complex Procurement Procedures:** The defense procurement procedures in India are often complex and time-consuming. Lengthy bureaucratic processes, multiple layers of approval, and cumbersome decision-making can delay the acquisition of defense equipment and discourage private sector participation. Simplifying and streamlining procurement procedures would facilitate faster indigenization and encourage greater private sector involvement.
5. **Limited Private Sector Participation:** Historically, India's defense industry has been dominated by public sector enterprises. The involvement of the private sector has been limited due to various reasons, including bureaucratic hurdles, lack of a level playing field, and limited access to defense contracts. Encouraging greater participation of the private sector, including small and medium-sized enterprises (SMEs), can bring in innovation, investment, and efficiency to the defense industry.
6. **Skilled Workforce:** Developing a skilled workforce with expertise in advanced defense technologies is crucial for indigenization. However, India faces challenges in terms of a shortage of skilled professionals in areas such as engineering, research, and development. Addressing this gap requires a focus on education and training programs to develop a skilled workforce capable of supporting indigenization efforts.
7. **Financial Constraints:** Indigenization of the defense industry requires substantial financial resources for R&D, infrastructure development, and production. However, the defense budget in India is often limited, and competing demands for resources make it challenging to allocate sufficient funds for indigenization. Increasing budgetary allocations and exploring innovative financing mechanisms would be necessary to overcome these financial constraints.

Steps taken by government of india to promote indigenisation of defense industry:

1. **Make in India:** The Make in India campaign, launched in 2014, aims to promote domestic manufacturing across various sectors, including defense. It encourages foreign defense companies to establish manufacturing units in India through joint ventures and technology transfer agreements.

The campaign seeks to enhance the indigenous production of defense equipment and reduce import dependency.

2. **Strategic Partnership Model:** The government has introduced the Strategic Partnership (SP) model, which aims to enhance private sector participation in defense manufacturing. Under this model, Indian private sector companies are selected as strategic partners for the production of major defense platforms, such as submarines, fighter aircraft, helicopters, and armored vehicles. This initiative aims to boost indigenous manufacturing capabilities and create a robust defense industrial base.
3. **Defense Procurement Procedure (DPP):** The Defense Procurement Procedure has been revised multiple times to simplify and streamline the procurement process. The DPP encourages the procurement of indigenously designed, developed, and manufactured defense equipment. It provides preference to Indian vendors and promotes the use of indigenous content in defense projects.
4. **Technology Development Fund (TDF):** The government has established the Technology Development Fund to provide financial support for research and development projects in the defense sector. The fund aims to encourage academia, research institutions, and the industry to collaborate and develop cutting-edge technologies for defense applications.
5. **Defense Research and Development Organization (DRDO):** The DRDO is the primary organization responsible for defense R&D in India. The government has increased the budgetary allocation for DRDO and encouraged collaboration between DRDO and private sector companies. This collaboration promotes technology transfer, joint development, and production of defense systems.
6. **Liberalization of Foreign Direct Investment (FDI):** The government has liberalized the FDI policy in the defense sector, allowing higher levels of foreign investment. This relaxation encourages foreign defense companies to set up manufacturing units in India, transfer technology, and collaborate with Indian partners. It promotes the development of indigenous capabilities and enhances the overall defense manufacturing ecosystem.
7. **Defense Industrial Corridors:** The government has identified two defense industrial corridors in India, one in Tamil Nadu and another in Uttar Pradesh. These corridors aim to promote defense manufacturing by providing necessary infrastructure, connectivity, and a conducive ecosystem for defense industries. They facilitate collaboration between defense manufacturers, research institutions, and academia.
8. **Skill Development:** The government has emphasized skill development programs to address the shortage of skilled workforce in the defense industry. Various initiatives, such as the Skill India Mission, have been launched to provide training and enhance the employability of individuals in defense-related sectors.

Present scenario:

"With exports reaching more than 85 countries, India's defence industry has shown its capability of design and development to the world, with 100 firms exporting defence products at present.**With 23-Fold Increase, India's Defence Exports At All Time High In 9 Years.**

- The India-Russia joint venture, BrahMos Aerospace, inked its first export deal worth $375 million earlier this year to export BrahMos supersonic cruise missiles with the Philippines.
- India will export indigenously-manufactured Pinaka rocket launchers. Manufactured by Solar Industries, the weapons system will be exported to Armenia.
- Hindustan Aeronautics Limited (HAL) entered into a contract with the

Government of Mauritius to export one Advanced Light Helicopter-MkIII for the Mauritius Police Force.

- Vietnam received 12 high-speed guard boats this year built under the $100 million credit line announced by India.
- A report by the Swedish think tank Stockholm International Peace Research Institute (SIPRI) revealed that three Indian companies — Hindustan Aeronautics Limited (HAL), Ordnance Factory Board and Bharat Electronics Ltd (BEL) – were among the top 100 defense companies in the 2020 rankings. The report said their aggregated arms sales stood at $6.5 billion in 2020

Facts and figures from different reports and indices

1) Climate Change:

- The **"Drought in Numbers, 2022"** report was recently presented by the **United Nations Convention to Combat Desertification (UNCCD)**
  - The number and duration of droughts around the world has increased by an alarming 29% since 2000.
  - The report reveals that many parts of India fall under the list of regions that are vulnerable to drought globally.
  - India's Gross Domestic Product (GDP) reduced by 2 to 5% between 1998 and 2017 due to severe droughts in the country
- **Living Planet Report- WWF**
  - There has been a **69 per cent decline in the wildlife populations of mammals, birds**, amphibians, reptiles and fish, across the globe in the **last 50 years.**
- **Climate Change Performance Index 2023**
  - India jumps 2 spots higher, and is now **ranked 8th a**s per latest CCPI Report.
  - India's rank is the **best amongst all large economies** and India is the **only G-20** country among the top 10.
- **Glacier study by *Science* Journal**
  - **Half the Earth's glaciers** are destined to **vanish by 2100, even if we adhere** to the **Paris Climate Agreement** goal of limiting global temperature rise to 1.5 degrees Celsius above pre-industrial levels.
  - Losses would be more severe, with 68 percent of glaciers vanishing, if global warming continues at the current rate of 2.7°C.
- **Gross Domestic Climate Risk Report-Cross Dependency Institute**
  - **Nine out of 50 regions** in the world **facing high climate risk** to a fragile physical infrastructure fall in **India.**
  - Overall, **India, China and the U.S.** are home to **80% of the most vulnerable cities** and centres of economic activity around the world.
  - The most damage posed to built infrastructure globally is caused by **riverine and surface flooding or flooding combined with coastal inundation.**
- **Synthesis Report of IPCC**
  - The **report highlights that the world is on track to breach the 1.5°C global warming limit by the 2030s,** which would cause irrevocable damage to the planet's ecosystem and severely impact humans and other living beings.
  - **Despite the IPCC's warnings in 2018, the increase in greenhouse gas emissions continued** so much so that the **global surface temperature has already warmed by 1.1°C over pre industrial levels,** leading to extreme and/or unpredictable weather events that are risking human health, fortunes, and ecosystems.

2) Education

- **National Achievement Survey(NAS-2021)**
  - The survey shows that between 2017 and 2021, the literacy and numeracy skills of school students in India worsened considerably across subjects and grades.
  - The survey further highlighted that the average performance of schools in rural areas remained significantly below those urban areas in same states and union territories (UTs).
  - In gender-wise performance, the average performance of girls remained better than the boys in almost all subjects across the classes.
- **AISHE report- Ministry of Education**

- The Ministry of Education has released the All India Survey on Higher Education (AISHE) 2020-2021.
- The **total enrollment in higher education has increased to nearly 4.14 crore in 2020-21 from 3.85 crore in 2019-20.**
- The Female enrolment has increased to 2.01 crore from 1.88 crore in 2019-20.
- The **percentage of female enrolment to total enrolment has increased from 45% in 2014-15 to around 49% in 2020-21.**

3) Health

National Family Health Survey-5(NFHS-5)

- The Total Fertility Rate (TFR), an average number of children per woman, has declined to 2.0 at the national level.
- For the first time since the NFHS began in 1992, the proportion of women exceeded men: there were 1,020 women for 1,000 men. In the last edition of the survey in 2015-16, there were 991 women for every 1,000 men.
- However, sex ratio at birth for children born in the last five years only improved from 919 per 1,000 males in 2015-16 to 929 per 1,000, underscoring that boys, on average, continued to have better odds of survival than girls.
- The share of women aged 20-24 who married before turning 18 has declined from 27% to 23% in the last five years.
- Around 54% of women have their own mobile phones and about one in three women have used the Internet.
- The prevalence of anaemia has risen across age groups.
- As many as 57% women aged 15-49 were anaemic in 2019-21, compared to 53% in 2015-16, while the same for men rose from 22.7% to 25%.
- The share of under-five children who were stunted (too short for age), wasted (low weight for height), or underweight has declined. However, every third child still suffers from chronic undernourishment, and every fifth child.

State of World Population Report- United Nations Population Fund(UNFPA)

- The report says that contrary to the alarm bells about exploding numbers, **population trends everywhere point to slower growth and ageing societies.**
- The report noted that with close to **50% of its population below the age of 25, India has a time-bound opportunity to benefit from the demographic dividend** and that it must convert this into "economic benefits through additional investments in health, education, and quality jobs for young people — including targeted investments in women and girls.

National Health Account Estimates for India- Ministry of Health and Family Welfare

- The share of **Out-of-Pocket Expenditure (OOPE)** in Total Health Expenditure (THE) **declined from 62.6% to 47.1%.**
- The Government Health Expenditure (GHE), as a share of the total health expenditure,increased from 29 per cent in 2014-15 to 41.4 per cent in 2019-20.
- A **majority of the government spend is concentrated on the primary care centres** —investment in the primary sector i**ncreased from 51 per cent of the total government spend on health in 2014-15 to 56 per cent in 2019-20.**
- According to the report, 29.6 percent of the government's total health spend for 2019-20 went to secondary care, and 6.4 per cent to tertiary care.

4) Employment

Periodic Labour Force Survey

- The PLFS data shows that the **share of the labour force engaged in agriculture continued to show a rise in 2020-21,** increasing to 46.5 percent from 45.6 percent in 2019-20 and 42.5 per cent in 2018-19 — a reversal of the decades-long decline in the labour force participation in Agriculture.

- This suggests that the **movement of labour out of agriculture,** which had gathered pace post 2004-05, seems to have been **stymied by the economic slowdown and the pandemic**.
- The reverse migration of labour from cities to villages would have only **increased the pressure on agriculture** to absorb the workers.

India Innovation Index- NITI

- Pointing out that India's average innovation score is arguably insufficient, the report has recommended measures, such as,
  - increasing Gross Domestic Expenditure on R&D (GDERD),
  - promoting private sector participation in R&D and
  - closing the gap between industry demand and what the country produces through its education systems.
- The report went on to state **that countries that spend less on GDERD fail to retain their human capital in the long run and the ability to innovate** is dependent on the quality of human capital; **India's GDERD as a percentage of GDP stood at about 0.7%.**
- The report recommends **GDERD for improvement and should touch at least 2%.**

Global Gender Gap report- WEF

- The Report says it will now take **132 years to reach gender parity**, with the gap reducing only by four years from 2021 and the gender gap closed by 68.1%. **South Asia will take the longest to reach gender parity, which is estimated to be likely in 197 years.**
- India ranks 135 among a total of 146 countries in the Index.
- When it comes to Economic Participation and Opportunity, the Periodic Labour Force Survey's 2020-21 annual report says that **labour force participation rate among Indian women is just 23.15 per cent, in contrast to 57.75 per cent in men**.

Human Development Index- UNDP

- The United Nations Development Programme (UNDP) has published its Human Development Index (HDI) report for 2021-22, **noting that for the first time in 32 years that the UN agency has been calculating HDI, the index declined globally for two straight years.**
- The report also stated that **more than 90% countries saw a decline in their HDI score in either 2020 or 2021**, while over 40% nations declined in both the years.
- India is also **bridging the human development gap between men and women faster** than the world.
- The intergovernmental organisation lauded India's investment in health and education, helping it come closer to the global human development average since 1990.
- **India's HDI falls by 25% when adjusted for inequality**. That's Because the share of income held by the richest 1% of the population is more than the income held by the poorest 40%.

Migration and Development Brief- WB

- India is expected to receive a **record $100 billion in remittance in 2022, the top recipient this Year.**
- In the case of India, the **largest sources of remittances have been from Indians working in the Gulf Cooperation Council (GCC) countries, the U.S. and the U.K.**
- However, the report has noted, despite reaching a historic milestone at $100 billion and retaining its position as the top recipient of remittances globally, India's remittance flows are expected to account for only 3 percent of its GDP in 2022.

Diseases and government efforts

1) Tuberculosis (TB)

- **Target**: Eradication of TB by 2025.
- **Nikshay Portal:** Online portal to track the notified TB cases.
- **Nikshay Poshan Yojana:** NPY aims to support every TB Patient by providing a Direct Benefit Transfer (DBT) per month for nutritional needs
- Improved access to the more accurate **molecular diagnostic tests** like CB-NAAT and TureNat.
- **Universal drug susceptibility test:** Antibiotic susceptibility of the mycobacterium is determined for all newly diagnosed cases and appropriate antibiotics are prescribed.
- Newer drugs such as **Bedaquiline and Delamanid** for the treatment of drug-resistant TB have also been included in the new National List of Essential Medicines that gives the government power to regulate their market price as well.

2) Malaria

- **Target: National Framework for Malaria Elimination (NFME) 2016-2030** outlines India's strategy for elimination of the disease by 2030..
- According to the **WHO's World Malaria Report, 2020,** India is one among the highest malaria burden countries.
- **National Anti-Malaria Programme under National Vector Borne Disease Control Programme** : To bring down malaria transmission to a level at which it would cease to be a major public health problem.

3) Kala-azar

- **Target**: India is committed to eliminating Kala Azar from the country by **2023** by its National Kala-Azar Elimination Programme.

4) Measles

- **Target**: India has a target of eliminating measles by 2023.
- Measles vaccination is given under the **Universal Immunization Programme** at 9-12 months of age and the second dose at 16-24 months of age.
- **Mission Indradhanush** to ramp up vaccinating the unvaccinated population.

5) Filariasis

- **Target**: India is committed to eliminating Lymphatic Filariasis by 2027.
- Global Programme to Eliminate Lymphatic Filariasis by the WHO.
- **Mass Drug Administration (MDA)** was launched by Union Ministry of Health and Family Welfare recently to eliminate LF by 2027.

MISCELLANEOUS

1) Samudrayaan Mission

About Samudrayaan Mission

- Samudrayaan mission launched under the **Deep Ocean Mission**, is aimed at sending **three personnel to 6000-meter depth** in a vehicle called 'MATSYA 6000' for the exploration of deep sea resources like minerals.
- **'MATSYA 6000'** is being designed and developed by **National Institute of Ocean Technology (NIOT)**, an autonomous Institute under the **Ministry of Earth Sciences**.
- It has an endurance of 12 hours under normal operation and 96 hours in case of emergency for human safety.

Significance of the mission

- Manned Submersible facilitates **direct observation by the human in deep ocean** in **exploring mineral resources** rich in Nickel, Cobalt, Rare Earths, Manganese etc. and collection of samples, which can be used for analysis.
- Apart from the **scientific research and technological empowerment** as the benefits, this mission has immediate spin-offs in the form of **underwater engineering innovations in asset inspection, tourism and promotion of ocean literacy.**
- Helps explore deep sea resources and biodiversity assessment.

About Deep Ocean Mission

- It is an initiative spearheaded by the **Ministry of Earth Sciences (MoES)** in collaboration with ISRO, DRDO, Department of Atomic Energy (DAE), Council of Scientific and Industrial Research (CSIR), Department of Biotechnology (DBT) and the Indian Navy.
- The Indian government wants to understand the oceans better, both as a resource and for the conservation of marine biodiversity.
- One of the main aspects of the mission will be **design, development and demonstration of human submersibles** (in the image below).
- Another aspect is **exploring the possibility of deep sea mining and developing necessary technologies.**
- Under the mission, studies are planned at depths close to 6,000 metres under six major components —
  1. Mineral exploration on the sea-bed;
  2. Study and mapping of biodiversity;
  3. Study of climate change;
  4. Exploration of marine biology and developing allied courses,
  5. Training; development and demonstration of ocean exploration
  6. Off-shore technologies for future.

Significance of the mission

- The mission forms a part of the **Blue Economy** envisioned to be developed by 2030, which will place India among select countries — US, France, Japan, Russia and China — to have special missions dedicated for ocean studies.
- It is a **strategic and geo-political move** in order to further strengthen India's position in the Indian Ocean region.
- Globally, **only 11 percent of marine species have been identified.** The deep ocean species are even less explored. Hence it will be helpful in identifying the species and knowing more about **climate change.**
- It will enable India to develop capabilities to **exploit resources in the Central Indian Ocean Basin (CIOB).**
  - CIOB reserves contain deposits of metals like iron, manganese, nickel and cobalt. It is envisaged that **10% of recovery of that large reserve can meet the energy requirement of India for the next 100 years.**
  - India has also been allotted 75,000 square kilometers in the CIOB by the **UN International Sea Bed Authority (ISA)** for

exploration of **poly-metallic nodules**.

2) Project-75

- In 1999, the Cabinet Committee on Security had approved a plan for the Indian Navy to **indigenously build and induct submarines by 2030.** It was broken down in two phases — the P-75 and P-75I.

About Project 75

- Under the first phase of Project 75 (P75), signed in 2005, India and France signed a $3.75 billion technology transfer deal for building **six Scorpene class submarines** (diesel-electric attack submarines).
- The executing company on the Indian side was Mazgaon Docks Ltd, and on the French side, it was DCNS, which is now called Naval Group.
- The **first** one, **INS Kalvari**, was commissioned in 2017; the **second, INS Khanderi,** in 2019; the **third, INS Karanj,** in March 2021; and the **fourth** one, **INS Vela**, joined service in November 2021. The **5th** one, INS **Vagir**, was launched in November 2020 and is undergoing sea trials.
- The sixth and last of the Scorpène-class submarines, **Vagsheer**, was launched into water in April 2022 and is expected to be delivered to the Navy by end 2023.

What are Scorpene-class submarines?

- The Scorpene-class submarines are the most **advanced conventional submarines with superior stealth features,** such as advanced acoustic silencing techniques, low radiated noise levels and ability to attack with precision-guided weapons on board.
- They are designed to **operate in all theaters,** with enhanced interoperability with other components of a naval task force.
- Scorpene class submarines can undertake **multifarious missions** such as anti-surface warfare, anti-submarine warfare, intelligence gathering, mine-laying and area surveillance.
- With 350 meters diving depth, it can travel upto 20 knots speed (37.04 kmph) and submerged upto 21 days.

Project 75(I)

- In 2021, the Defence Acquisition Council (DAC), chaired by the Defence Minister formally cleared the project for construction of six conventional submarines with better sensors and weapons and the **Air Independent Propulsion System (AIP).**
- AIP will enable them to stay underwater for longer periods of time, enhancing their combat capabilities and providing the Navy with added underwater firepower.

Significance

- Aimed at **India's capability to progressively build indigenous capabilities in the private sector** to design, develop and manufacture complex weapon systems for the future needs of the Armed Forces.
- India has been focusing on shoring up its maritime capability with a focus on the Indian Ocean and this project sets to **bolster the Indian Navy's combat capability.**

3) India's semiconductor Industry

- Semiconductors are the thumbnail-sized building blocks of almost every modern electronic device from **smartphones to connected devices in the Internet of Things (IoT).** They help give **computational power to devices.**
- The global semiconductor industry is currently valued at **$500-$600 billion** and caters to the global electronics industry currently valued at about $3 trillion.
- The basic component of a semiconductor chip is a **sliver of silicon**, which is etched with **billions of microscopic transistors** and projected to **specific minerals and gases**, forming patterns to control the flow of current while following different computational instructions.
- The most-advanced semiconductor technology nodes available today are the 3 nanometre (nm) and the 5nm

ones. Semiconductors having higher nanometre value are applied in **automobiles, consumer electronics and so on**, while those with lower values are used in **devices such as smartphones and laptops.**

- The chip-making process is **complex and highly exact**, having multiple other steps in the supply chain such as chip-designing done by companies to develop new circuitry for use in appliances, designing software for chips and patenting them through core Intellectual Property (IP) rights.
- It also involves making chip-fabrication machines; setting up fabs or factories; and ATMP (assembly, testing, marking and packaging).

Global Distribution

- The chip-making industry is a **highly-concentrated one,** with the big players being **Taiwan, South Korea and the U.S. among others.**
- In fact, 90% of 5nm (nanometre) chips are mass-produced in Taiwan, by the Taiwan Semiconductor Manufacturing Company (TSMC). Therefore, the **global chip shortage, U.S.-China tensions over Taiwan, and the supply chain blockages owing to the Russia-Ukraine conflict** have led major economies to enter the chip-making sector with a renewed push.

Potential of India's Semiconductor Industry

- India's semiconductor industry is expected to touch **$300 billion by 2026**, growing at a compounded annual growth rate of 19%.
- This will place the country alongside other major semiconductor-making countries including Taiwan, Korea and the US.
- India has a **strong background and plenty of skills and experience** in semiconductor chip design.
- Domestic semiconductor production could also provide a boost to the burgeoning **aerospace-defense sectors** and enable **local mobile handset manufacturing** to move up the value chain.

Challenges of semiconductor industry in general

- The semiconductor manufacturing industry requires **massive scale to make it economically sustainable.**
    - It is a **highly concentrated industry** with only about 15 companies possessing the skills and scale to be significant global players.
    - The policy commitment of $10 billion and assurances of support **may not be enough.**
- **Infrastructure lacunae** can retard production.
    - Chip manufacturers require **massive amounts of absolutely pure water, and rock-steady, totally reliable power supply.**
    - India is **water-deficient**, and the **water quality is poor** in most places.
    - Any semiconductor foundry will need **captive power generation capacity,** and **large-scale in-house water purification systems,** which may be a criterion that narrows down choice of possible locations.
- **Delays in land acquisition** for all sorts of projects is another major challenge.
- **Delays in environmental and other statutory clearances** also affect India's competitiveness.

Recent changes to India's chip-making scheme

- In December 2021, India announced its roughly $10 billion dollar **production-linked incentive (PLI) scheme to encourage semiconductor and display manufacturing** in the country.
- It also announced **fiscal support for a design-linked initiative (DLI) scheme** which aims to offer financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design over a period of 5 years.

- The new changes announced recently seek to **harmonise government incentives for all technology nodes of semiconductors**.
- In the previous version of the scheme, the Centre was offering to fund 30% of the project cost for 45nm to 65nm chip production, 40% for 28nm to 45nm, and 50% or half of the funding for chips 28nm or below. The modified scheme provides **uniform 50% fiscal support for all nodes.** Besides, it will provide **50% of capital expenditure for other steps of the process as well** (chip design and ATMP).
- The new scheme has been brought in so that all areas of chip-making are encouraged to create an **integrated ecosystem in India**, rather than manufacturing here and having to package and test chips elsewhere.

Challenges ahead

- While the scheme is an encouraging move, chip production is a **resource-intensive and expensive process.** While the new scheme provides equal funding for all steps of the process, the outlay of the scheme remains **$10 billion.**
- Notably, just the setting up of one semiconductor fab requires an investment of anywhere between $3 and $7 billion. Analysts, while positive, are concerned that **not much of the current scheme outlay could be allocated to supporting other elements** including display fabs, packaging and testing facilities, and chip design centres.
- They also argue that the **initial funding should focus on areas like design and R&D,** for which India already has an established talent pool.
- In addition to these, **creating global demand** may be difficult as giants like Taiwan offer viable cutting-edge chip-tech worldwide. Thus, **attracting global players to set up here** would be beneficial as they come with their customer base.
- Chip-making also requires **gallons of ultrapure water** in a single day, which could be a task for the government to provide to factories, compounded also by the drought conditions which often prevail in large parts of the country.
- Besides, an **uninterrupted supply of power** is central to the process, with just seconds of fluctuations or spikes causing millions in losses.
- Another task for the government is to **drive up consumer demand** in the semiconductor industry to not end up in a situation where these ventures remain successful only till taxpayers are forced to fund required subsidies.

Way Forward

Fab clustering

- Fab clustering, where key semiconductor supply chains and related businesses are in one place to create backward and forward linkages, would play a key role in creating an ecosystem for the semiconductor industry.
- Such a site should be chosen based on
  - Ability of the location to act as a force multiplier
  - High-quality infrastructure along with uninterrupted power availability
  - Availability of semiconductor grade Ultra Pure Water to the extent of 10 MLD per fab is also a key requirement.

Focus on Research and Development

- We need to focus on encouraging Indian manufacturers and start-ups to enter and master complex R&D and manufacturing verticals.
  - Indian engineers must be encouraged to set up their design start-ups with handsome government grants and tax incentives.
  - Premier research institutions such as the Indian Institute of Science should also be asked to work aggressively on R&D in chip designing and manufacturing.

4) Semicon India Programme

About the Programme

- In order to **widen and deepen electronic manufacturing and ensure development of a robust and**

sustainable Semiconductor and Display ecosystem in the country, the Government of India has launched the Semicon India Programme in 2021.

- The initiative will position the country as a global hub for electronic system design and manufacturing.
- Through the program's scope, the government hopes to attract large global chip makers to make India their production base. India wants to achieve technological leadership in these areas of strategic importance – also **key to the security of the country's critical information infrastructure.**
- The programme has been approved with an outlay of 76 thousand crore rupees.

Implementation

- **India Semiconductor Mission (ISM)** has been set up as a dedicated institution for the Semicon India Programme.
- ISM will coordinate with the applicant companies who have also reached out to states to provide access to world class infrastructure.

Significance

- Semiconductors are the building blocks of electronic devices ranging from smartphones and cloud servers to modern cars, industrial automation, critical infrastructure and defense systems. They are at the **core of fourth industrial revolution technologies.**
- India, like other countries across the world, **imports most of its chips from Taiwan, Singapore, Hong Kong, Thailand, and Vietnam.**
- If a country is looking to be self-sufficient or self-reliant, it cannot do without a vibrant semiconductor industry.
- The Semicon India Programme will not only boost semiconductor manufacturing but will also help India achieve **self-sufficiency, improve data security, and gain digital independence.**
- Developing domestic semiconductor manufacturing capabilities will have a **multiplier effect** across different sectors of the economy and will contribute significantly to achieving a **USD 1 trillion digital economy and a USD 5 trillion GDP by 2025.**

5) Critical Minerals

- There is **no global definition** of critical minerals, but essentially, they are **mineral deposits with high economic vulnerability and high global supply chain risk.**
- There is an immense range of these and many countries already have their own specific lists of what they currently consider critical minerals – depending on their industrial production requirements.
- But globally, there is a gap between projected supply and projected demand for many critical minerals by the end of this decade, especially in cobalt and lithium.
- They are used for making **EV batteries** and are also critical for making **semiconductors and high-end electronics manufacturing.**
- These minerals are also used in **manufacturing fighter jets, drones, radio sets and other critical equipment, hence it is critical for aerospace, communications and defense industries.**

Who are the top producers of critical minerals?

- According to a report released by the **International Energy Agency** in 2021 and subsequently updated in 2022, the major producers of critical minerals globally are **Chile, Indonesia, Congo, China, Australia and South Africa. China** dominates in terms of processing.
- Notably, none of these countries, except Japan and Australia, are represented in the MSP.

What are rare earth elements?

- The rare earth elements (REE) are a set of **seventeen metallic elements**. They are called 'rare earth' because earlier it was difficult to extract them from their oxides forms technologically. They are an essential part of many **high-tech devices.**

- REEs are classified as **light RE elements (LREE)** and **heavy RE elements (HREE).**

Significance of critical minerals for India

- Critical minerals such as copper, lithium, nickel, cobalt and rare earth elements are essential components of **clean energy technologies** – from wind turbines and electricity networks to electric vehicles.
- Self-sufficiency in Critical Minerals ensures self-reliance and **addresses the vulnerability in its supply chain.**

Scenario in India

- Some of the rare earth elements available in India are: **Lanthanum, Cerium, Neodymium, Praseodymium and Samarium.** While others classified as heavy RE elements such as **Dysprosium, Terbium, Europium** are not available in extractable quantities.
- **India relies heavily on China for HREE,** which is one of the leading producers with an estimated 70 per cent of the global production.

What's in the news?

Report on critical minerals

- The **Ministry of Mines** has constituted a committee for the **identification of critical and strategic minerals and released the first ever report on critical minerals.**
- The list comprises 30 critical minerals, including 17 Rare Earth Elements (REEs) and 6 Platinum-Group Elements (PGE).
- The criticality of minerals is judged mainly by two parameters- **economic importance and supply risk.**

Minerals Security Partnership

- **The US** and 10 partners — **Australia, Canada, Finland, France, Germany, Japan, the Republic of Korea (South Korea), Sweden, the United Kingdom, and the European Commission** — have come together to form the Minerals Security Partnership (MSP).
- Minerals Security Partnership is an ambitious new alliance to **secure supply chains of critical minerals**. It comes in the backdrop of recorded demand for critical minerals, which are essential for clean energy and other technologies.
- The goal of the alliance is to ensure that critical minerals are produced, processed, and recycled in a manner that supports the ability of countries to realise the full economic development benefit of their geological endowments.
- The focus would be on the supply chains of minerals such as **Cobalt, Nickel, Lithium and also the 17 "rare earth" minerals.**
- The alliance is seen as primarily focused on **evolving an alternative to China**, which has created processing infrastructure in rare earth minerals and has acquired mines in Africa for elements such as Cobalt.
- **Till now, India is not part of this MSP arrangement.**

India and Australia reach Critical Minerals Investment Partnership

- India and Australia have reached a major milestone in working towards **investment in critical minerals projects to develop supply chains** between the two countries. The Partnership has identified five target projects (two lithium and three cobalt).
- Under the agreement, India's Khanij Bidesh India Ltd (KABIL) will make a significant investment in Australia's critical minerals to build new supply chains that will help India's plans to lower emissions from its electricity network and become a global manufacturing hub.
- Australia produces almost half of the world's lithium, is the second-largest producer of cobalt and the fourth-largest producer of rare earths.
- With the expected increase in global demand for low-emissions technologies over the next three decades, this partnership will go a **long way towards securing mutually beneficial critical mineral supply chains.**
- Khanij Bidesh India Ltd. is a joint venture company of three Central Public Sector Enterprises under Ministry of Mines namely, National

Aluminium Company Ltd. (NALCO), Hindustan Copper Ltd. (HCL) and Mineral Exploration and Consultancy Ltd.

- The company was set up in 2019 with an **objective to identify and acquire overseas mineral assets of critical and strategic nature.**

6) Antimicrobial Resistance

Antimicrobial Resistance

- **Antimicrobial resistance**, also known as **drug resistance**, is the resistance acquired by **microorganisms** such as **bacteria, viruses, fungi,** and **parasites** against **antimicrobial drugs** that are used to treat infections.
- When the microorganisms become resistant to most antimicrobials they are often referred to as "**superbugs**"
- According to **WHO**, **AMR** is responsible for **1.27 million deaths** in a year.

Causes of AMR

- **Genetic Mutations** endow microbes with genes that enable them to resist anti-microbial agents.
- Access to antibiotics **without prescription**, **improper administration,** and **overconsumption** can cause **AMR** in humans.
- Antibiotics are commonly used for **growth promotion** in **poultry**. Here, **drug-resistant bacteria** found in meat have exposure to **contaminated water** and in this way, **diseases** that affect animals can pass to humans.
- **Untreated disposal of sewage** in waterbodies can lead to contamination of rivers with **antimicrobial residues.**

Impact of AMR

- **AMR** increases the **health burden** of **nations** leading to **higher medical costs, prolonged hospital stays, and increased mortality**.
- **Organ transplantations, chemotherapy, diabetes management,** and **surgeries** become more **dangerous** without effective antibiotics for treatment of infections.
- The economic impact of increasing AMR includes **the loss of a productive workforce**, leading to **lowered national outputs**.
- It also **endangers** the achievement of **Sustainable development goals (SDGs)**

Global Efforts to Combat AMR

- **World Antimicrobial Awareness Week** held annually is a global campaign that aims to increase **awareness** of **antimicrobial resistance** worldwide and to encourage best practices among the public, health workers, and policymakers to avoid the further emergence and spread of drug-resistant infections.
- **The Global Antimicrobial Resistance Surveillance System (GLASS),** under the **WHO** supports a **standardized approach** to **the collection, analysis,** and **sharing of data** related to **antimicrobial resistance** at a global level to promote informed decision-making.
- The **AWaRe** tool was developed by the **WHO , classifies antibiotics into: Access**— antibiotics used to treat the most common and serious infection, **Watch—** antibiotics available at all times in the healthcare system, **Reserve—** antibiotics to be used, sparingly and used only as a last resort.
- The **"One Health" approach** brings together multiple sectors and stakeholders engaged in human, terrestrial and aquatic animal and plant health, food and feed production and the environment to communicate and work together in the design and implementation of programmes, policies, legislation and research to

attain better public health outcomes

National Initiatives

- **The National Action Plan on Antimicrobial Resistance (NAP-AMR**) focusing on **One Health** approach was launched in 2017 with the aim of promoting **AMR containment**.
- **AMR Surveillance Network** aims to generate **evidence** and **capture trends** of drug-resistant infections in the country.
- **The Red Line campaign** is aimed at **discouraging over-the-counter sales** of antibiotics causing drug resistance for diseases including TB, malaria, HIV, etc.

7) Zoonoses

About Zoonoses

- According to **WHO, Zoonoses** are **diseases** and **infections** which are **naturally transmitted** between **vertebrate animals** and **man.**
- They may be **bacterial, viral, or parasitic,** or may involve **unconventional agents** for the **transmission** of diseases.

Causes of Zoonotic Diseases

- **Deforestation, Habitat loss and Fragmentation** has increased the contact between humans and wild animals.
- **Zoonoses** can occur due to **direct contact** with **body fluids** such as **blood, saliva**, of an **infected** animal.
- It can also spread due to **consumption** of **contaminated food**.
- **Overuse** of **anti-microbials** and **climate change** are other causative factors

Recent findings

- A **UN report** revealed that in the last **170 years, nine epidemics** among **livestock** have **spilled** over to people. Frequent **outbreaks** in recent decades are due to **intensification** of **agriculture**.
- Nearly **77 percent** of **livestock pathogens** are capable of **infecting multiple host species**, including **wildlife** and **humans**.
- Most of the increase in **human** and **livestock densities** are expected to occur in **developing countries** where **disease surveillance, pest control, sanitation, medical and veterinary care** are **limited.**

The emergence of various Zoonotic diseases at Animal-Human Interface

Indian Scenario

- **India** suffers from the highest **zoonotic disease burden** along with **Ethiopia, Nigeria, and Tanzania.**
- In **India** out of the **13 livestock diseases** monitored by the **National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI)**, four are **zoonotic**, namely, **anthrax, babesiosis, fasciolosis,** and **trypanosomiasis.**
- To prevent potential disease outbreaks, **NIVEDI** issues forewarning every month which has above **90 percent** accuracy and has helped stakeholders take **preventive measures** in time.

National Initiatives

- **Rashtriya Gokul Mission** was launched for the **development** and **conservation of indigenous breeds** through selective breeding in bovine population.
- **The National Animal Disease Control Programme** was

launched to control **Foot & Mouth Disease** and **Brucellosis.**
- **Livestock Health & Disease Control (LH&DC) Scheme** aims to reduce risk to animal health by **vaccination** against **diseases**, **capacity building of Veterinary services, disease surveillance,** and **strengthening veterinary infrastructure**.

Way Forward
- An effective response to emerging zoonotic diseases relies heavily on efficient surveillance and reporting systems.
- Cross-sectoral collaboration is key to understanding and managing public health risks at the human-animal-environment interface and to improving national health security.
- The establishment of effective laboratory systems is critical for surveillance of zoonotic diseases.

8) Antifungal Resistance
About Antifungal Resistance
- Antifungal resistance occurs when an antifungal medication no longer works to treat a fungal infection. This problem is a type of antimicrobial resistance.

Emerging Threats
- More than 300 million people are affected by serious fungal infections, with nearly two million deaths every year. This is higher than the mortality caused by either tuberculosis (TB) or malaria.
- Medical interventions that include immunosuppressants, persistent HIV infection and diabetes are helping growth of harmful fungi. Eg: The outbreak of mucormycosis (referred to as black fungus) in India, in 2021.
- Fungi in nature have begun adapting to higher temperatures and non-disease causing fungi are turning into disease causing fungi.
- There are only four classes of antifungals and fungus have started showing resistance to some of them.

Fungal Priority Pathogen List (FPPL)
- The World Health Organisation released the first ever FPPL which includes 19 fungi that can be a threat to public health.
- The major objective of the FPPL is to further research and policy interventions to strengthen the global response to fungal infections and antifungal resistance.
- The WHO FPPL list is divided into three categories: critical, high, and medium priority based on the pathogen's public health impact as well as emerging antifungal resistance risk.

Way forward
- There is a need to improve global coordination in addressing fungal diseases, update infection, prevention and control measures and training public health professionals to appropriately treat fungal diseases.
- It is important to strengthen laboratory capacity and surveillance of diseases
- It is essential to promote sustainable investments in research, development, and innovation to counter the risk of rising fungal infections.

9) Plastics
What are Single use Plastics?
- India has defined single-use plastic as disposable plastics that are commonly used for packaging and include items intended to be used only once before they are thrown away or recycled.
- These include items such as carry bags, food packaging, bottles, straws, containers, cups, and cutlery.
- According to a fact sheet released by The Energy and Resources Institute (TERI) and the environment ministry in 2018, around 43% of manufactured plastics are used for packaging purposes, and most are of single-use.

Issues with Single use Plastics
- Unlike thicker and denser plastic material, single-use plastic objects being light and flexible are less amenable to being recycled.
- While 99% of plastic is recycled, they constitute heavier plastics that are

likely to be collected by ragpickers and plastic waste recyclers.
- Single use plastics do not provide an incentive enough for the effort needed to collect them and hence they lie around, leach their toxins into the soil and cause environmental damage in both land and sea.
- Single-use plastic contaminates soil and water; choke waterways and exacerbate natural disasters.
- Plastics also block sewage systems and provide breeding grounds for mosquitoes; release toxic chemicals and emissions when burned.

Plastic Waste (Management and Handling) Rules, 2011

- It was notified in 2011 by the Ministry of Environment, Forest and Climate Change (MoEFCC) which included plastic waste management.
- The Government has notified the Plastic Waste Management Rules, 2016, in suppression of the earlier Plastic Waste (Management and Handling) Rules, 2011.

Plastic Waste Management Rules, 2016

- The Plastic Waste Management Rules, 2016 aims to Expand the jurisdiction of applicability of plastic waste management rules from the municipal area to rural areas.
- To bring in the responsibilities of producers and generators, both in the plastic waste management system and to introduce a collect back system of plastic waste by the producers/brand owners, as per Extended Producers responsibility (EPR).
- To introduce collection of plastic waste management fee through pre-registration of the producers, importers of plastic carry bags/multilayered packaging and vendors selling the same for establishing the waste management system.
- Phasing out of manufacture and use of non- recyclable multilayered plastic.

Plastic Waste Management Amendment Rules, 2021

- It aims at prohibiting identified single-use plastic items by 2022.
- The manufacture, import, stocking, distribution, sale and use of notified single-use plastic, including polystyrene and expanded polystyrene commodities shall be prohibited with effect from the 1st July, 2022.
- In order to stop littering due to light weight plastic carry bags, the permitted thickness of plastic carry bags has been increasedfrom 50 microns to 75 microns with effect from 30th September, 2021 and to 120 microns with effect from the 31st December, 2022.
- The plastic packaging waste, which is not covered under the phase out of identified single use plastic items, shall be collected and managed in an environmentally sustainable way through the Extended Producer Responsibility of the Producer, importer and Brand owner (PIBO), as per Plastic Waste Management Rules, 2016 and EPR has been given legal force through Plastic Waste Management Amendment Rules, 2021.
- The rules constitute a Special Task Force for elimination of single use plastics and effective implementation of Plastic Waste Management Rules, 2016.
- A National Level Taskforce had also been constituted for taking coordinated efforts to eliminate identified single-use plastic items and effective implementation of Plastic Waste Management Rules, 2016.
- The State /UT Governments and concerned Central Ministries/Departments have also been requested to develop a comprehensive action plan for the elimination of single-use plastics and the effective implementation of Plastic Waste Management Rules, 2016, and its implementation in a time-bound manner.
- The Government has also been taking measures for awareness generation towards the elimination of single-use plastics and the effective implementation of Plastic Waste Management Rules, 2016. Eg: Awareness Campaigns of Single Use

Plastic, Essay writing competitions, India Plastic Challenge Hackathons, etc.

Concerns

- The All India Plastic Manufacturers Association has said that the ban would shutter 88,000 units in the plastic manufacturing business.
- These employ close to a million people and contribute to exports worth ₹25,000 crores.
- Fast Moving Consumer Goods companies (FMCG) would be severely affected by the ban due to their dependence on plastic straws, plates. Their replacements, industry representatives say, are available but cost much more than their plastic alternatives which may be unaffordable in most cases. This is primarily due to the scale at which the alternative market currently operates.
- There is also limited capacity in India to provide biodegradable replacements.
- The alternative market needs to be offered support through government initiatives to make its reach wider.

Way Forward

- Making India plastic-pollution free is not going to be easy and the responsibility is not limited to one stakeholder — the plastic industry or governments, for instance.
- All the stakeholders involved from the production of raw materials, plastic manufacturers, giant FMCG companies, national, state, and local governments along with the consumers have their parts to play to make the ban a success.
- The plastic industry, manufacturers, and FMCG companies should consider coming up with design changes in their product packaging to eliminate the necessity of ancillary plastics like straws. This will be possible when the companies come together and pool their resources to find an optimal design that not only promotes profit but also cares for people and the planet.
- The national and state governments have a long road ahead of them to ensure enforcement of the notified ban.
- Consumers have a larger role to play, which ranges from refusing the use of plastic carry bags irrespective the thickness, consuming consciously, and segregating the solid waste generated in the households. This will ensure plastic waste can be diverted away from dumpsites to treatment facilities, where it can be recycled and given a second life.

10) CPGRAMS & UMANG

About CPGRAMS

- **Centralised Public Grievance Redress and Monitoring System (CPGRAMS)** is an **online platform available to the citizens 24x7 to lodge their grievances to the public authorities** on any subject related to **service delivery.**
- It is a **single portal connected to all the Ministries/Departments of Government of India** and States.
- The **online web-enabled system** was developed by the **National Informatics Centre** in association with the **Department of Administrative Reforms and Public Grievances** (DARPG).
- It has been developed with **an objective of speedy redress and effective monitoring** of grievances by Ministries/Departments/Organizations of Government of India.
- It **enables the citizen to track online the grievance** with the unique registration ID provided at the time of registration of the complainant and also enables DARPG to monitor the grievance.
- CPGRAMS also **provides an appeal facility to the citizens** if they are **not satisfied** with the resolution by the Grievance Officer.
- Different Departments of Government of India **undertake periodic special campaigns to resolve public grievances** filed under CPGRAMS.

About UMANG

- **Unified Mobile Application for New-age Governance (UMANG)** is a

Government of India's **all-in-one single unified secure platform** for **accessing over 1,200 central and state government services** in multiple Indian languages.

- UMANG is developed by the **Ministry of Electronics and Information Technology (MeitY)** and **National e-Governance Division (NeGD)** to **drive Mobile Governance in India.**
- UMANG includes services such as **AADHAAR, Digi Locker, Bharat Bill Payment System, PAN, EPFO services, PM- KVY services, AICTE, CBSE, tax and fee or utilities bills payments**, education, job search, tax, business, health, agriculture, travel, Indian railway tickets bookings, birth certificates, e-District, e-Panchayat, police clearance, passport, other utility services from private companies and much more.
    - The India Meteorological Department has launched seven of its services (Current Weather, Nowcast, City Forecast, Rainfall Information, Tourism Forecast, Warnings and Cyclone) with 'UMANG' mobile App for use by the public.
    - The IMD has also developed mobile App 'MAUSAM' for weather forecasting, 'Meghdoot' for Agromet advisory dissemination and 'Damini' for lightning alert.

Issues in both the Platforms

- **Technical Glitches:** Like any other mobile application, UMANG can experience technical glitches such as crashes, slow loading, or unresponsiveness.
- **Slow Response or Delayed Updates:** The UMANG app relies on real-time data and updates from various government departments. However, there might be instances where the app's response is slow or updates are delayed.
- **Service-specific Errors:** Some users may encounter errors or issues while accessing specific government services through the UMANG app.

Way Forward

- Regular **feedback based mechanism** to address issues faced by the users.
- **Round the clock technical support** to manage and overcome the technical issues.
- **Periodic updation of the application** to solve the issues and improve the experience of the users.