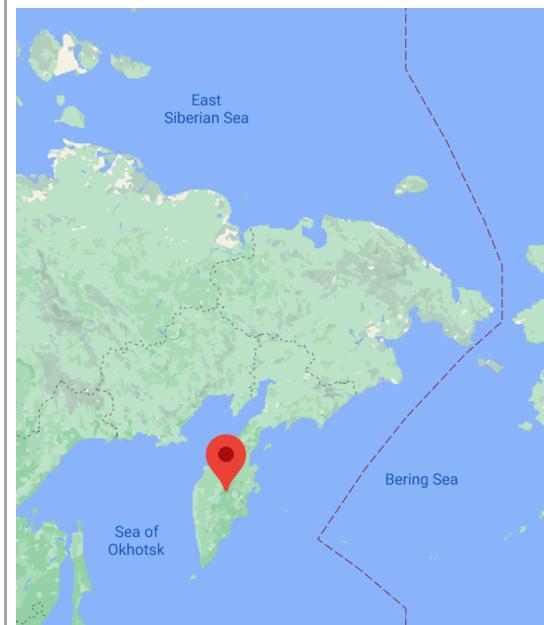


The Pacific Ocean and the Sea of Okhotsk make up the peninsula's eastern and western coastlines, respectively.

The peninsula is noted for its array of active and dormant volcano, geysers and geothermal springs.

Immediately offshore along the Pacific coast of the peninsula runs the 10,500 meter deep Kuril-Kamchatka Trench.

Biodiversity Disaster in 2020: Many dead sea creatures (Octopus, Seals, and other sea creatures) have washed up on beaches in Kamchatka, in Russia's far east, in what is being treated as a major marine pollution incident. Initial analysis detected oil products and phenol in the water.



7) MAPPING: KLYUCHEVSKAYA SOPKA VOLCANO

It is the tallest volcano of Eurasia and is located on Kamchatka Peninsula. It is a stratovolcano with a height of 4,650 m.

It has been active in recent years and have released lava in June 2023. It also erupted in Nov 2023 and sent ash as high as 13 kms above sea level.



8) ECONOMY: ADDITIONAL TIER-1 BONDS

- Why in news?

- » In Nov 2023, Swiss banking giant UBS sold additional tier-1 (AT-1) bonds for the first time and after taking over beleaguered banking peer Credit Suisse in March 2023.
 - Earlier, it was decided to write-off around \$17 billion in AT-1 bonds issued by Credit Suisse. This had invoked fury from investors.

- What are AT-1 Bonds:

- » AT-1 bonds are perpetual debt instruments issued by banks to raise money and build up their core equity capital. There is no maturity date, implying that the issuer doesn't pay the principal amount back to investors but makes periodical interest payments throughout the life of the bond.

- » '**Call Option**': In practice, AT-1 bonds typically come with a 'call option' which means that the bank issuing these instruments can redeem them or repay investors after a specified period.
- » These bonds were introduced according to Basel banking norms made after the Global Financial Crisis. These are a form of "**contingent convertible (cocos) bonds**" which were created to prevent the need for government-funded bail-outs of precarious banks.

- **Why the risks for investors?**

- » Some features of AT-1 Bonds make them riskier than several other bonds.
 - AT-1 Bonds have equity like characteristics (quasi-Equity instruments), which permit banks to absorb losses.
 - If the bank faces financial stress, with capital requirement dropping below a specific levels, the covenants of AT-1 bonds typically permit the lender to hold off on interest payments or pay a lower amount. The bonds may also be converted into equity, helping to preserve the capital.
 - Some provisions allow the banks to write-off AT-1 bonds in case of severe financial crisis.
 - Further, AT-1 bond investor (unlike other bond investors) are not at the top of pecking order when it comes to receiving pay-outs from a bank facing financial stress. In fact, details sometimes put equity investors above than the bond investors.

- **How are AT-1 bonds triggered?**

- » These have different trigger mechanisms:
 - For e.g. if the Bank's capitalization level falls below a preset threshold, the bond may be converted to shares, which eliminates bank's liabilities on the AT-1.
- To compensate for these risks, banks pay investors a higher rate of interest for AT-1 bonds than other debt instruments or deposits.

D) AT-1 BOND IN INDIA:

- **How much are the AT-1 bond holdings of Indian Banks?**
 - » Indian Banks don't depend on AT-1 bonds much.
 - In a study, brokerage firm Macquarie said that while India's **PSU banks** have an exposure of 1-2 percent to AT-1 bonds, private sector banks only have an exposure of 0-1 percent.
- The Indian market for AT-1 bond was upended in March 2020 following the crisis in Yes Bank.
 - Following severe financial stress, RBI and Yes Bank had decided to write-off additional tier-1 (AT-1) bonds worth Rs **8,415 crores**. Mutual funds were amongst the biggest sufferers.

- This was challenged in the court, and Bombay High Court in Jan 2023 ordered quashing of the write-off. But in Sep 2023, Finance Ministry has moved to the Supreme Court against the order.
- In 2021, SEBI amended valuation rule for perpetual bonds.
 - » Residual maturity of Basel-III AT-1 bonds will be 10 years until 31st March 2022.
 - » It will be 20 and 30 years for subsequent six months.
 - » From 1st April 2023, the residual maturity of AT-1 bonds will become 100 years from the date of issuance of the bond.
- SEBI then provided a phased timeline for mutual funds to value AT-1 bonds as 100-year instruments.
 - » The 100 year valuation kicked in from 1st April, 2023.
 - » Before this, AT-1 bonds were valued according to the call options on the papers - generally 5 to 10 years.
 - » **Impact:** Huge decline in mutual fund investments in AT-1 bonds as a 100-year valuation lead to very sharp movements in market yields of such papers.
- Recovery in AT-1 bond system in India:
 - » With improvement in banking sector in the form of reduced NPAs, the risk perception surrounding AT-1 bonds improved. In FY23, banks issued more than Rs 33,000 crore worth of AT-1 bonds.
- Note:
 - » AT-1 bonds are subordinate to Tier-2 bonds.
 - » Tier-2 Bonds are subordinate to unsecured creditors, banks depositors, and senior bonds. They are not perpetual instruments. They have a maturity period of minimum 5 years.

9) ECONOMY: INCREMENTAL CRR

In Aug 2023, RBI introduced Incremental CRR to absorb the surplus liquidity created in the system due to multiple factors, including the return of Rs 2,000 notes.

- » It was decided that wef from the fortnight beginning Aug 12, 2023, scheduled banks shall maintain an I-CRR of 10% on the increase in their net demand and time liabilities (NDTL) between May 19, 2023, and July 28, 2023.
- » This was purely a temporary measure for managing the liquidity overhang.
- » **Existing CRR** remained unchanged at 4.5%.
- » **Impact:**
 - Reduce the supply of money and thus curtail inflation.

In Sep 2023, RBI announced that it will discontinue the I-CRR in a phased manner.

- » **Why release in phased manner?**

- So that system liquidity is not subjected to sudden shocks and money markets function in a orderly fashion.
- » **RBI released 25% of I-CRR** on 9th, Sep; **25% on 23rd Sep** and **remaining 50% of the I-CRR on 7th October 2023.**

About Cash Reserve Ratio:

- Under **RBI Act, 1934** - Scheduled Banks are required to keep **a % of their net time and demand deposits (i.e. total deposits of customers)** in the **form of cash deposits with RBI**.
- **Objectives of CRR:**
 - » Since a part of total deposits in bank is available in the form of cash, it can be used to **readily make money available to customers when they demand it.**
 - » Further, **RBI also controls the amount of money in market** and thus **inflation** through CRR.
- **Note:**
 - » Banks **don't get any interest** for this money deposited with RBI.
 - » CRR has to be **maintained in cash only.**

10) DEFENCE: NIRBHAYA MISSILE

- **Why in news?**
 - Nirbhaya Missile to be with All Three Forces (Nov 2023: Source: ET)
- **Introduction**
 - These are **long-range sub-sonic cruise missiles** being developed by DRDO indigenously.
 - They are **nuclear capable** with a **range of 1,000 km and payload of 300 kg.**
 - It is a **terrain hugging missile**. It can fly almost at the level of tree-tops **to evade detection** by radars.
 - It has been built to **identify and strike targets in heavily populated areas with pin-point accuracy** and is capable of **carrying a nuclear capable warhead.**
 - It is **powered by solid rocket boosters** developed by Advanced Systems Laboratory (ASL).
- **Update: Nov 2023**
 - In a significant boost to the firepower of the defence forces, **all three defence forces will now have long-range cruise missiles of the Nirbhay class** in their arsenal to strike targets at ranges of over 1,000 Km range.



CURRENT AFFAIRS PROGRAM

PRE CUM MAINS 2024

NOV 2023: BOOKLET-4

SPECIAL BOOKLET ON DISASTER MANAGEMENT

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1. SYLLABUS AND PYQS

1) SYLLABUS

- Disaster and disaster management

2) PYQS

- i. How important are **vulnerability and risk assessment** for pre-disaster management? As an administrator, what are key areas that you would focus on in a Disaster Management System? [2013] [10 marks]
- ii. **Drought** has been recognized as a disaster in view of its spatial expanse, temporal duration, slow onset and lasting effects on vulnerable sections. With a focus on the September **2010 guidelines from the National Disaster Management Authority (NDMA)**, discuss the mechanisms for preparedness to deal with likely El Nino and La Nina fallouts in India. [2014, 12.5 marks]
- iii. The frequency of **earthquakes** appears to have increased in the Indian subcontinent. However, **India's preparedness** for mitigating their impact has significant gaps. Discuss various aspects [2015, 12.5 marks]
- iv. The frequency of **urban floods** due to high intensity rainfall is increasing over the years. Discussing the reasons for urban floods, highlight the mechanisms for preparedness to reduce the risk during such events [2016, 12.5 marks]
- v. With reference to **National Disaster Management Authority (NDMA) guidelines**, discuss the measures to be adopted to mitigate the impact of recent incidents of **cloudbursts** in many places of Uttarakhand. [2016, 12.5 marks]
- vi. On December 2004, **Tsunami** brought havoc on 14 countries including India. Discuss the factors responsible for occurrence of Tsunami and its effects on life and economy. In the **light of guidelines of NDMA (2010)** describe the mechanisms for preparedness to reduce the risk during such event. 2017, 15 marks]
- vii. Describe various **measures taken in India for Disaster Risk Reduction (DRR)** before and after signing '**Sendai Framework for DRR (2015-2030)**'. How is this framework different from '**Hyogo Framework for Action, 2005**'? (2018, 250 Words, 15 Marks)
- viii. **Vulnerability** is an essential element for defining disaster impacts and its threat to people. How and in what ways can vulnerability to disasters be characterized? Discuss different types of vulnerability with reference to disasters [2019, 10 marks, 150 words]
- ix. **Disaster preparedness** is the first step in any disaster management process. Explain how hazard zonation mapping will help in disaster mitigation in the case of **landslides** [2019, 15 marks, 250 words]
- x. Discuss the recent measures initiated in disaster management by the Government of India departing from the earlier reactive approach [2020, 15 marks, 250 words]

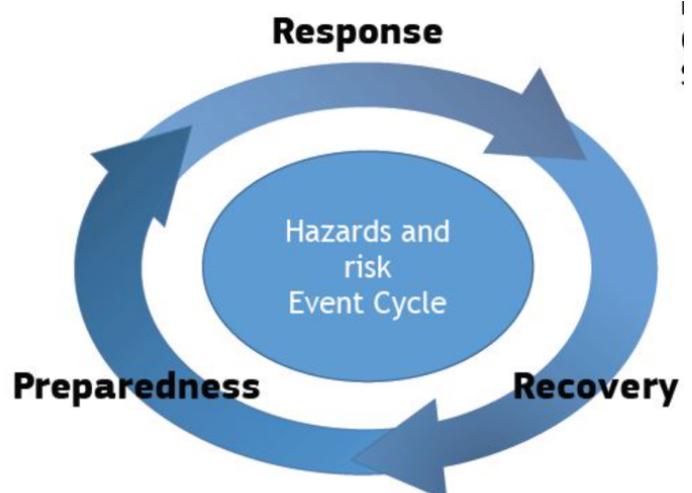
- xi. Discuss about the vulnerability of India to earthquake related hazards. Give examples including the salient features of major disasters caused by earthquakes in different parts of India during the last three decades. (2021, 10 marks, 150 words)
- xii. Describe the various causes and the effects of landslides. Mention the important components of the National Landslide Risk Management Strategy. (2021, 10 marks, 250 words)
- xiii. Explain the mechanism and occurrence of **cloudburst** in the context of the Indian subcontinent. Discuss two recent examples. [2022, 10 marks, 150 words]
- xiv. **Dam Failures** are always catastrophic, especially on the downstream side, resulting in colossal loss of life and property. Analyze the various causes of Dam failures. Give two example of large dam failures. [2023, 10 marks, 150 words]

2. BASICS

- "Disaster" is defined under section 2(d) of the Disaster Management Act, 2005 as a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, and is of such nature or magnitude as to be beyond the coping capacity of the affected area.
- Disasters, whether natural or man-made, have been part of man's evolution since times immemorial. Many civilizations including the ancient Indus Valley civilization is thought to have declined because of some natural or man-made disasters.

1) DISASTER MANAGEMENT

- **Key Components of Disaster Management**
 - » A disaster needs to be examined in terms of its management cycle that would enable us to anticipate the crisis, prevent and mitigate it to the extent possible and deal with the crisis situation as it emerges.
- The life cycle of disaster Management can be divided into **three phases**:
 - i. **Pre-Crisis: Preparedness/ Risk Reduction**
 - This is the period when the potential hazard risk and vulnerabilities can be assessed and steps taken for preventing and mitigating the crisis and preparing for actual occurrence.
 - **It includes:**
 - Creation of legal and institutional framework



- Hazard Mapping and Vulnerability Analysis.
- Adopting risk reduction techniques
- Setting up Early Warning Systems (EWS)
- Infrastructure improvement for risk reduction
 - **Infra improvement can be both long term and short term.**
 - a. **Long term Measures** - Embankments (floods); Augmenting Irrigation facilities, watershed management (drought proofing); afforestation (landslides); earthquake resistant structures and sound environmental practices.
 - b. **Short term measures** may also reduce or modify the scale and intensity of the threat. This may include implementation of building codes; zoning regulations; maintenance of drainage system; improved awareness in public about disaster etc.
- **Capacity building of government institutions and agencies to ensure fast response during disaster.**

ii. During Crisis: Emergency Response

- Disaster Response aims to provide immediate attention to maintain life, improve health, and to support the morale of the victim population.
 - It includes activities like **warning, search, rescue, evacuation**, followed by **provisions of basic needs** like first aid, medicine, food, clothing, shelter and other necessities essential to bring life of the affected back to a degree of normalcy.

iii. Post Crisis: The Three Rs (Recovery Rehabilitation and Resettlement)

- Post crisis activities can be summed in 3 R's: Recovery, Rehabilitation and Resettlement
 - a. **Early Recovery:** This is the stage when efforts are made to achieve early recovery and reduce vulnerability and future risks. It comprises activities that encompass **two overlapping phases of rehabilitation and reconstruction.**
 - b. **Rehabilitation** refers to actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victim's self-help efforts to repair dwellings and community facilities, and to facilitate the revival of economic activities with more sustainable livelihoods.
 - c. **Reconstruction** refers to permanent construction or replacement of severely damaged physical structures, the full restoration of all services and local infrastructure, and the revitalization of the economy (including agriculture). It should include **development of disaster resilient infrastructure** and must be fully integrated into long-term development plans.

2) DISASTER VULNERABILITY PROFILE OF INDIA

- India has recorded the **third highest number of natural disasters** (after China and USA) in last 20 years (2000-2019): Report "**Human Cost of Disasters**" by UN Office for Disaster Risk Reduction (UNDRR).
- **Vulnerability Profile of India:** India faces very high vulnerability due to various factors:
 - » **Adverse geo-climatic conditions**

- **The geo tectonic features** of the Himalayan region and adjacent alluvial plains make the region susceptible to earthquakes, landslides, water erosion etc.
 - **58.6 percent of landmass** is prone to earthquake of moderate to high intensity.
 - **Hilly areas** are at risk from landslides and avalanches.
- Of close to 7516 km long coastline, close to 5700 km is prone to cyclones and Tsunamis.
- **Droughts: The Western Parts of the country, including Rajasthan, Gujarat and some parts of Maharashtra** are hit very frequently by drought situation. If Monsoon worsens the situation spreads to other parts of the country as well.

» Socio-Economic Factors

- **High levels of poverty and risk to disasters** are inextricably linked and mutually reinforcing.
 - For e.g., poverty forces people to live in disaster prone regions. The quality of infrastructure, houses etc. available to them are poor.
- High **population density** -> easy spread of pandemic; More pressure on infrastructure - Road/Railway accidents etc.
- **Unplanned Urbanization and unscientific development** -> Urban Floods, Building fires etc.
- **Unregulated industrialization** -> River Pollution; Chemical accidents
- **Development within high-risk zones**

» Environmental Factors

- » **Increased land-degradation** -> Famines
- » **Water Pollution** and unsustainable ground water extraction -> Drought

» **Climate Change** is expected to further increase the frequency and intensity of current extreme weather events and give rise to vulnerabilities with differential spatial and socio economic impacts on communities.

- » Sea-level rise - coastal flooding
- » Melting of glaciers - River overflow and flooding
- » Higher temperature - Heat waves
- » Variation in weather pattern - Floods and Droughts

- Inspite of this, **India** doesn't have a **database at national level** to record these disasters. In 2018, India had announced that as part of its commitment to Sendai framework, the government would launch "a Uniform and credible national-level disaster database with locally obtained and validated data". But, it hasn't happened yet.

» Disadvantages of not having a Central Statistical database

- Major constraints for risk assessment and compilation of disaster history in the country.
- Different sources have different figures for casualties and impact - thereby hindering the objective analysis.
- SFDRR sets various targets, which can't be measured unless there is database.

3) WORLD CONFERENCE ON DISASTER RISK REDUCTION AND SENDAI FRAMEWORK

- **Introduction:** WCDRR is a series of United Nations conferences focusing on disaster and climate risk management in the context of sustainable development. The conference has been convened three times, with each edition to date having been hosted by Japan, in **Yokohama in 1994**, in Kobe in 2005 and in Sendai in 2015. UNISDR served as the coordinating body for the second and third conference in 2005 and 2015.
- The conference **brought together** government officials and other stake holders such as NGOs, civil society organization, local government and private sector representatives from around the world to discuss the sustainability of development by managing disaster and climate risk.
- **Three Conferences and Outcomes**

Conference	Outcome
First (1994)	Yokohama strategy and Plan of action of a safer world
Second (2005)	Hyogo Framework for Action 2005-2015 : Building the Resilience of Nations and Communities to Disasters
Third (2015)	Sendai Framework for Disaster Risk Reduction 2015-2030

- **Sendai Framework for Disaster Risk Reduction 2015-2030**
 - **Introduction:** It is a **15-year non-binding agreement** which recognizes that the state has the primary role to reduce disaster risk, but that responsibility should be shared with other stakeholders including local government and the private sector.
 - **Aim:** It aims at following outcome: "The substantial reduction of disaster risk and losses in lives, livelihood and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries".
 - **Sendai Framework sets four specific priorities for action :**
 - Understanding disaster risk
 - Strengthening disaster risk governance to manage disaster risk.
 - Investing in disaster risk reduction for resilience
 - Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

The Seven Global Targets



4) HOW IS SENDAI FRAMEWORK DIFFERENT FROM HYOGO FRAMEWORK FOR ACTION?

- **Time Frame:** Hyogo Framework (2005-2015); Sendai Framework (2015-2030)
- **Focus and Scope:** Sendai Framework has wider scope than Hyogo.
 - **Hyogo Framework** focused on reducing disaster losses and tried to minimize the impacts of disaster
 - **Sendai Framework** broadens the scope by emphasizing the importance of understanding disaster risk and addressing it across multiple sectors. It recognizes that disaster risk is not limited to specific hazards but encompasses all types of hazards, both natural and human-induced.
- **Sendai framework** has also put greater emphasis on **Recovery, Rehabilitation and Reconstruction**.
- **Inclusivity and Participation:** The Sendai Framework places a strong emphasis on involvement of all stakeholders, including governments, local communities, civil society organizations, private sector entities, and others. It recognizes that effective disaster reduction requires collaboration, knowledge sharing, and participation from diverse sectors.

5) INDIA HAS TAKEN SEVERAL STEPS FOR DISASTER RISK REDUCTION BOTH BEFORE AND AFTER SIGNING THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION (2015-2030)

A) PRE SENDAI STEPS:

- i. **Disaster Management Act, 2005** was enacted to provide legal framework to disaster risk reduction in India. It established various institutions and elaborated on their roles and responsibilities.
- ii. **National Disaster Management Authority (NDMA)** was established in 2005 as the apex body for disaster management in India. It is responsible for policy formulation, coordination and implementation of DRR measures across the country.

- iii. **National Disaster Response Force (NDRF)** was established in 2006 as a specialized force for disaster response. It consists of personnel trained in various aspects of disaster management and plays crucial role in rescue, relief, and response operations.
- iv. **National Policy on Disaster Management**, 2009: It outlines the framework for disaster management in India and emphasizes on risk assessment, capacity development, and involvement of multiple stakeholders.

B) POST SENDAI INITIATIVES TAKEN BY INDIA AND THE WAY FORWARD

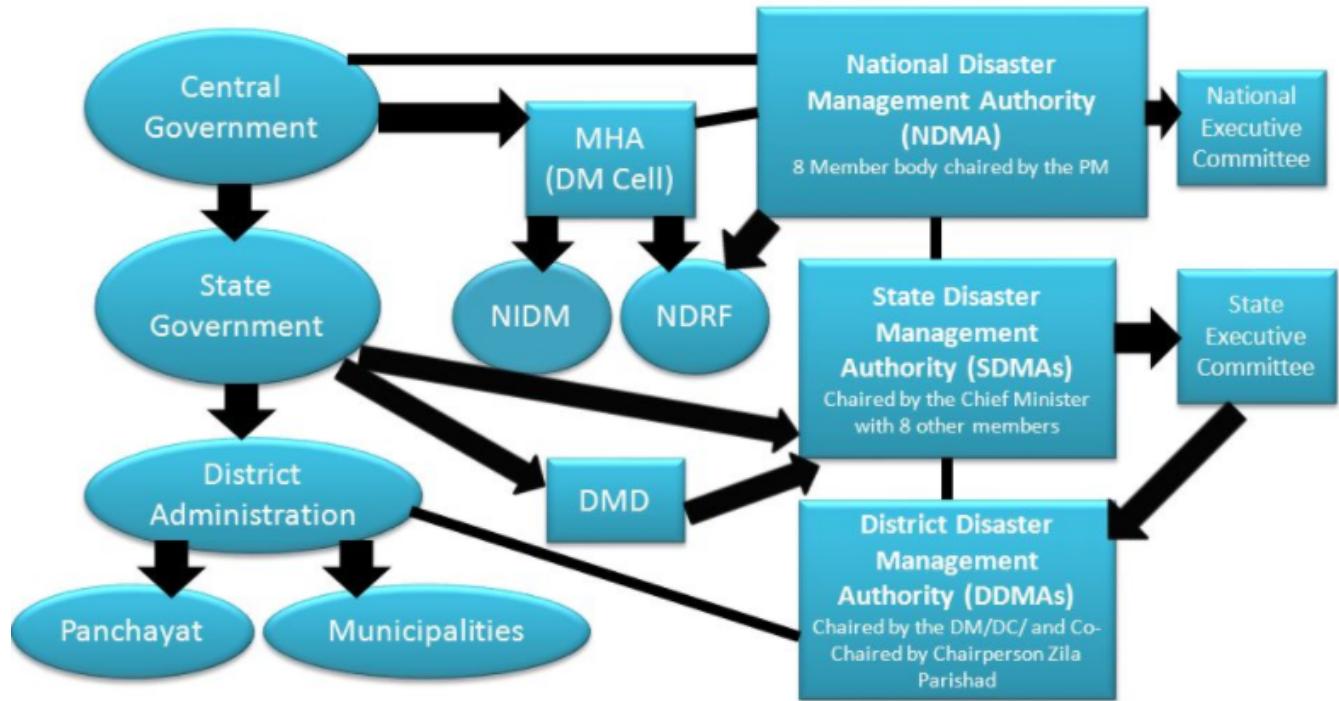
- In furtherance to its commitment to the Sendai framework, Government has taken up several important initiatives post Sendai Declaration.
 - i. India has hosted AMCDRR in Nov 2016 and adopted '**New Delhi Declaration**' and '**Regional Action Plan for implementation of Sendai Framework**'.
 - ii. GoI has issued a set of priority actions to all the state governments based on the goals, targets and priorities of Sendai Framework.
 - iii. **National Disaster Response Force (NDRF) has been strengthened**, both in terms of state of art training and equipment to further empower the professional disaster response force.
 - iv. Government has expressed its keenness to share India's expertise and help other countries in disaster response as it did during the Japan Earthquake in 2011 or the Nepal earthquake in 2015.
 - The government hosts SAARC Disaster Management Centre to reduce disaster risks in the region promoting knowledge sharing among the SAARC countries.
 - Similarly, INCOIS (Indian National Centre for Ocean Information Services) INCOIS, provides early warning not only to India but also to 28 countries in the Indian Ocean Rim.
 - v. NIDM has also signed an MoU with Jawaharlal Nehru University for establishment of a Centre of Excellence in Disaster Research and Resilience Building in JNU for promoting higher education and research within the multi-disciplinary framework.
 - vi. **Disaster Management guidelines** for different kinds of disasters have been prepared
 - vii. India is also in the process of creating National level Database for Disasters in India to help fulfill Sendai Framework requirements.

6) INDIA'S INSTITUTIONAL FRAMEWORK FOR DISASTER MANAGEMENT

- **Example Questions**
 - » "Ill-defined and conflicting institutional structures under the disaster management legal framework are among the major obstructions to effective disaster management" Discuss. [10 marks, 150 words]
- **Introduction:**
 - » **Constitution of India** does not mention disaster management under any of the three lists and thus it comes under **the residuary powers of the Union** under entry 97 of the union list. Thus, the power to legislate on the matter is with the Parliament.
 - » After the 2004 Tsunami, the Indian Parliament passed the **Disaster Management Act, 2005** which provides for institutional framework to deal with disasters in India.

- The Disaster Management Act, 2005 has created **new institutions** at the National, state, district and local levels. The new institutional framework is as follows:

LEGAL – INSTITUTIONAL FRAMEWORK



i. National Level

1. **National Disaster Management Authority (NDMA)** under chairmanship of the Prime Minister is responsible for policy formulation, making guidelines & best practices, and coordinating with SDMAs to ensure holistic and distributed approach to disaster management.
 - It also has the powers to approve National Plan and Plans of various ministries regarding DM.
 - Powers to superintendence and control of NDRF.
2. **National Executive committee**, chaired by home secretary, is responsible for preparing national plan, assisting NDMA to discharge their functions; monitoring the implementation of the National Policy and ensuring compliance to the direction issued by the Central Government.
3. **National Institute for Disaster Management (NIDM)** (earlier called National Centre for Disaster Management) is responsible for human resource development, planning and promoting training and research in the field of DM. It is also responsible for documentation

and creation of an information base relating to disaster management policies, prevention mechanisms and mitigation measures.

4. **National Disaster Response Force (NDRF)** is a specialized force responsible for quick response to a threatening disaster situation. It can also be deployed to provide assistance to civil authorities in case of impending disasters. It works under the overall supervision of the NDMA.

ii. **State Level**

1. **State Disaster Management Authority (SDMA)**- chaired by CM; responsible for policies and plans of DM at the state level. It also coordinates the implementation of state plan.
2. **State Executive Committee** draws up the state DM plan as prescribed by the national as well as state authorities.
 - It draws up the state disaster management plan as prescribed by the state and National authorities.

iii. **District Level**

1. **District Disaster Management Authority (DDMA)**- chaired by DM and have elected representatives of the local authority as co-chairperson. It is responsible for planning, coordinating and implementing Disaster Management at district level.

iv. **Funding mechanism under DMA, 2005 - Disaster Relief Fund and Disaster Mitigation Fund (at district, state and National Level)**

- See details separately
- **National Policy on Disaster Management, 2009**
- Approved in 2009
 - **Vision:** To build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response"
 - **Approach:** The policy seeks to evolve a holistic and integrated approach towards DM with emphasis on building strategic partnerships at various levels. The **key themes** of the policy are:
 - i. **Community participation** in the DM
 - ii. **Capacity development** in all spheres
 - iii. **Consolidation of past initiatives**
 - iv. **Cooperation** with agencies at national and international levels
 - v. **Multi-sectoral strategy**
 - The **key objectives** of the policy include
 - i. Ensuring efficient mechanism for identification, assessment and monitoring of disaster risks.
 - ii. Developing forecasting and early warning system.
 - iii. Promoting the culture of prevention, preparedness and resilience among all stakeholders
 - iv. **Encourage mitigation measures** with the help of traditional wisdom, environmental stability and technology.
 - v. Ensuring efficient response and relief with special focus on needs of vulnerable sections.

- vi. **Mainstreaming DM in developmental planning process.**
 - vii. Establishing institutional and technological framework for effective regulatory environment and compliance regime.
 - viii. Making reconstruction and opportunity to build disaster resilient structures and habitat.
- **National Disaster Management Plan, 2016**
- The plan focuses on aligning India's efforts towards Disaster Management to goals and priorities of Sendai framework.
 - **Analysis: Positives of the DMA, 2005**
 - The act rightly emphasizes the need to move from responding to disasters to effective preparedness, which has led to most states investing in resilient infrastructure, early warning systems and evacuation.
 - This has translated into timely warnings, relief shelters and massive evacuation exercises. All these have **reduced causalities**.
 - The **National Disaster Response Fund and State Disaster Response Funds** have helped in guiding immediate relief in the aftermath of disaster.
 - **Some limitations associated with the Disaster Management Act**
 - i. **Too Much Bureaucratization** -> top down approach -> ignores the role of local communities and civil society organizations
 - ii. **Poor Implementation** -> In Swaraj Abhiyan vs Union of India, 2016, the Supreme Court pulled government for poor and slow implementation of the law.
 - For e.g. the NDMF hasn't been created yet.
 - iii. **III-defined and Conflicting institutional structures** under the disaster management legal framework
 - Multiple authorities with overlapping jurisdictions -> lack of clarity in roles.
 - E.g. overlap in powers and functions of central and state governments in defining their ambit and demarcating their roles.
 - E.g. Overlap of role between NEC and already existing National Crisis Management Cell (NCMC).
 - There is absence of transparency and accountability mechanisms under the act.
 - iv. **Need of clarity and transparency on how the political and administrative authorities respond to a tragedy.**
 - For e.g. **multiple nomenclature**.
 - For e.g. in 2018, the Kerala state government didn't know that there is no provision for declaration of the situation as a "national disaster".
 - According to National Disaster Management (NDM) Guidelines, the floods were of "**L3 Level**" severity, i.e. a nearly catastrophic or a very large scale disaster that overwhelms the state and district authority.
 - Disaster Management Division of the Home Ministry declared it a "**Calamity of severe nature**".
 - v. **Neglected NDMA, NEC:** Vacancies, excessive executive incursion by MoHA, lack of regular meeting of NEC (reported in CAG report) etc.

vi. **Funding Misappropriation** (especially from SDRF)

vii. **Lack of Focus on Long Term Recovery**

- The DMA, 2005 largely focuses on improving preparedness, providing immediate relief, and protecting infrastructure. However, it neglects a key aspect of disaster management: Long term recovery.
- Post disaster relief and recovery **have been left to respective ministries and departments**.

- **Key Recommendations of ARC on NDMA, 2005**

i. **Decentralization:**

- **States should play primary role** -> Disaster Management should be the primary responsibility of state governments and union government should only play supportive role.
- **Local government's role should be brought to forefront** in disaster management.

ii. **Ending conflicting institutional structures**

- 2nd ARC recommended the scrapping of NEC as its function coincides with that of the already existing National Crisis Management Committee (NCMC) chaired by Cabinet Secretary.

iii. **Standardize the methodology for assessing a Disaster**

- The act should provide for the categorization of the disaster, this categorization will help in determining the level of authority primarily responsible for dealing with the disaster as well as the scale of response and relief.

iv. **Preventing misuse of the funds**

- The act must provide for stringent punishments and penalties in case of misuse of funds for disaster management

- **Other Important Recommendations**

i. Place Disaster Management in the concurrent list to ensure vertical and horizontal linkages in effective disaster management.

ii. **Long term recovery** needs to be thought of alongside development in an integrated and comprehensive manner by combining with health, skill building, and livelihood diversification schemes.

- **Conclusion**

- There is a need to move towards a regime that exists on a unified, codified and systematic approach to disaster management in which duties of center and states are well defined.

7) MANAGING DISASTER RISK REDUCTION FOR SUSTAINABLE DEVELOPMENT

- **Example Questions**

» 'Disaster Risk reduction is the most crucial component of Crisis Management' Discuss [10 marks, 150 words]

- **Introduction**

» Over the years disaster management has evolved from managing events of a disaster to managing the risks of a disaster. In the risk management approach to disaster, various risks of

hazards are analyzed and steps are taken to reduce and control these risks. Here both structural and non-structural steps can be taken for disaster risk reduction.

- » For the residual risk which can't be prevented, there has to be **disaster preparedness** i.e. getting ready to respond to disaster effectively. It involves preparing for early warning, evacuation, search rescue etc. Preparedness further means having policies, strategies and resources in place for 'building back better' livelihoods, houses, infrastructure etc. devastated during the floods.

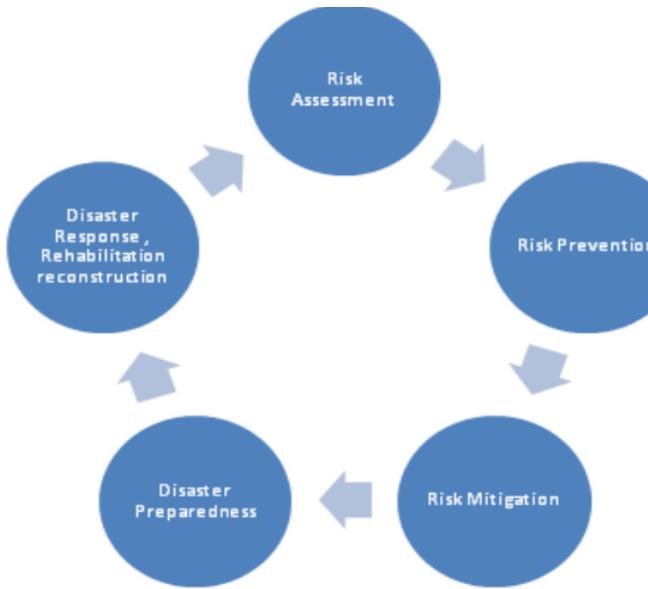


Figure 1 From Disaster Management to Disaster Risk Management

- **Significance of Disaster Risk Reduction**
 - i. Reduces the negative impact of disaster on lives, livelihood and infrastructure.
 - ii. Disaster risk management has assumed critical importance for sustainable development as damage and losses due to disaster are spiraling despite plethora of measures taken to reduce such losses.
 - iii. Economic advantages - WB estimates that India has lost at least 2 percent of our GDP because of disaster.
 - iv. Help in fighting poverty as disaster without risk reduction would undermine hard earned development gains.
 - Disasters generally exposes vulnerable communities and aggravates poverty situation.
- **Disaster Resilient Sustainable Development got a new momentum in 2015** when three parallel yet inter-dependent processes converged to define the development agendas for the next one and a half decade and beyond.
 - » **Sendai Framework on DRR 2015-2030**
 - » **The 2030 Agenda for Sustainable Development** adopted by UNGA in Sep 2015
 - It embedded disaster risk management in as many as 8 out of 17 sustainable development goals.

- » The **Paris Agreement on Climate Change** signed in Dec 2015 outlined 8 specific action areas for enhancing 'understanding, action and support for disaster risk reduction'.
 - These include Early Warning System; Emergency Preparedness; Slow onset events; Events that may involve irreversible and permanent loss and damage; Comprehensive risk assessment and management; Risk insurance facilities; climate risk pooling and other insurance solutions; Non-economic losses; Resilience of communities, livelihoods and ecosystems
- **Steps taken so far**
 - » India has put in place legal and institutional mechanisms at various levels and deployed scientific and technological capabilities for disaster risk management with clearly visible impact on loss of lives, as was demonstrated during some of the recent meteorological disasters like cyclones.
- **Challenges**
 - » **Disaster Preparedness and risk reduction** is invisible as compared to disaster response and **thus is sometimes ignored.**
 - Neither NDMA, nor various ministries and departments have come up with guidelines or concrete plan of action for building disaster resilience in their respective sectors.
 - » **We have not been very successful** in dealing with
 - **Hydrological disasters** like floods or cloudbursts (Uttarakhand, Srinagar, Chennai, Kerala etc) or **geological disasters** like landslides (Malign and north Sikkim)
 - **Technological disasters** like road accidents or industrial accidents continue to spiral;
 - **Threats of biological disasters** like epidemics and pandemics loom large, while **environmental disasters** like depleting water resources and rising level of air pollution in rapidly growing urban settlements are causes of major concerns.
 - India's **ability to manage earthquakes** have not been tested yet since the 2001 Kutch earthquake.
 - » **Our strong scientific base and traditional knowledge and understanding** of the natural and anthropogenic processes of risks of disaster are not being used in process of designing and implementation of social and economic development programmes, activities and projects, with the result that benefit of these projects for disaster risk reduction are not optimized and on the contrary some of these projects are directly or indirectly contributing to creation of new risks of disasters or exacerbation of existing risks of disasters.
- **Way Forward**
 - » **Mainstreaming Disaster Risk Reduction**
 - Implementation of Sendai framework in conjunction with SDG goals, and Paris Climate Agreement provide an opportunities for addressing this hitherto neglected but challenging tasks of disaster risk management in India.
 - » There is a need to **promote awareness generation** regarding adoption of disaster resilient building by laws, land use zoning, resource planning, establishment of early warning systems, and technical competence.
 - » **Promote Knowledge sharing** among Disaster Management community
 - We need a common platform to create a versatile interface among policy-makers in the Government and disaster managers at all administrative levels.
- **Conclusion**

- » If national targets for growth and development - including employment and trade - are to be realized, the shift from managing crisis to managing risk must be reflected in public policy frameworks and planning decision processes so as to enable risk informed investment and practices.

3. FLOODS

1) FLOODS – THE MOST RECURRENT DISASTER FOR INDIA

- **Past year Questions**
 - » Why are floods such a recurrent feature in India? Discuss the measures taken by the Government for flood control (1985, 20 marks)
 - » In what way can flood be converted into a sustainable source of irrigation and all-weather inland navigation in India. [2017, 250 words]
- **Other Practice Questions**
 - » "Floods - fluvial or pluvial - are often triggered by extreme weather events, but they translate into disaster risk due to anthropogenic factors" - Elaborate [15 marks, 250 words]
 - » "Floods are natural, but disasters are manmade" Discuss [12.5 marks, 200 word]
- **Introduction**
 - » Inundation of land and human settlements by the rise of water in the channels and its spill-over presents the condition of flooding. Flood is a natural disaster which affects some or the other part of the country for almost every year now. (Kerala, Chennai, Assam, Bihar, UP etc.).
 - » According to ADB, floods are the most devastating among climate related disasters in India. They account for more than 50% of all climate related disasters in the country.
- **Situation in India**
 - » In India, around 40 million hectares area is flood prone, which is 1/8th of the total area.
- **Causes of Floods**
 - » **Natural Causes:** Flood is generally seen as a natural phenomenon. It is associated with:
 - **Heavy Rainfall**
 - Cyclones etc.
 - Monsoon Climate - all rainfall confined to a period
 - **What caused heavy torrential rain in Himachal, Punjab, J&K and Delhi** in the first week of July 2023
 - **Interaction of Western Disturbance with the Monsoon Low Pressure System.**
 - **A western disturbance (WD)** is an extra tropical storm in the upper layers of the atmosphere that is carried towards India by the subtropical jet stream, a band of fast flowing winds that circulates the Earth.
 - **A Low Pressure System (LPS)**, is an area of low pressure that generally forms over seas and oceans and cause rainfall.
 - **This is rare phenomenon** as the WD generally don't occur during Monsoon season. But, global warming have brought variability and have increased the instances of WD during monsoon.

- **A Heat wave in northern Bay of Bengal:**
 - The Bay of Bengal, especially its northwestern part, is usually warm. This enables it to play an important role in NW Monsoon trajectory.
 - **Deep Convection** triggered by orographic uplift combined with the steep terrain of Himalayas.
- **Sediment Deposition**
 - Causes rivers to overflow or change paths
- » **Manmade causes:** Experts believe that the recent increase in intensity of floods have to do a lot with human activities:
 - i. **Climate Change** has led to extreme variability in the intensity of rainfall which has increased the chances of floods.
 - For e.g., global warming has caused rainfall due to western disturbances even in Monsoon season in July 2023 causing huge rainfalls in NW India.
 - ii. **Unplanned development along the natural drainage system** has led to rivers losing its buffer areas and thus any increase in the water levels is causing floods. This include colonization of flood plains and river beds.
 - The number of people living in floodplains across the world increased by 58-86 million during 2000-2015
 - iii. **Indiscriminate Deforestation** has led to increased devastation due to floods. Trees generally acted as a breaker in the intensity of floods.
 - For e.g. According to Madhav Gadgil, if we would have protected Western Ghats, the loss and devastation by the Kerala floods of 2018 would have been less severe.
 - iv. **Unsustainable agri-practices** can also be considered an important factor behind the recent rise in floods.
 - v. **Inefficient Dam Management** sometimes lead to large scale release of water in small time period leading to flood conditions
 - E.g. Kerala floods pf 2018
 - vi. **Urban Floods** are also mostly a result of human made factors
 - **Blocking the natural flow of rivers**
 - **Destroying the natural sinks** like ponds, lakes etc.
 - **Concretization** - Reduces the seepage of water - all water flows and cause floods
 - **Improper Urban Planning** -> siltation of drainage system, Insufficient drainage system
- **Consequence of floods** - Life, Property, Infrastructure, Agriculture, Water Borne diseases etc.
 - » According to Central Water Commission, the total flood related losses in the country were estimated to be over 37 lakh crore from 1953 to 2017.
 - » As per the the State of the Climate in Asia 2021 report, loss and damages from floods, storm cost India **\$7.6 billion in 2021** alone.
- **Some positive impact**

- » It deposits fertile alluvial soil and thus perpetuates the fertility of the area.

- Dealing with Flood Disasters/ Flood Management in India

- a. Risk Reduction, Preparedness

- **Flood Plane Zonation (FPZ)** to mitigate damages caused by floods and to allow rivers their '**Right to Way**'. As a policy flood plain zonation has two major components: Removing Encroachment and Regulating Land Use.

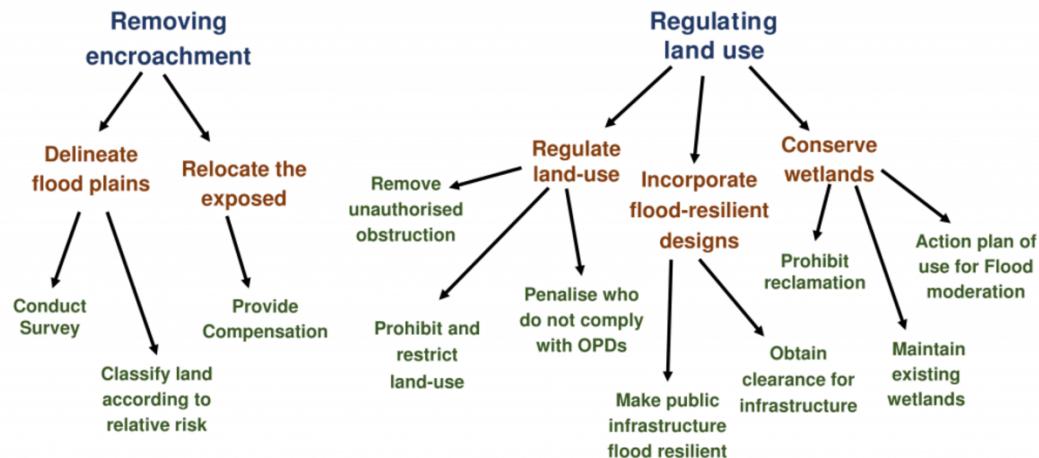


Figure 2: Flow Diagram showing the Operational Attributes of the proposed Floodplain Zoning Policy in India. Source – Modak and Kaduria (2020)

- **Other River Related Steps**

- **Embankments:** e.g. Embankments on Yamuna in Delhi has been successful in controlling the flood to large extent.
 - **Periodic desilting of river**
 - **Watershed based master planning** and development legislated guidelines for **each major river basin** is needed.
 - It should demarcate ecologically sensitive zones.
 - There must be clear land use plan for these zones specifying flood plains, protected forest areas, agricultural and plantation zones.
- **Continuous modernization of flood forecasting, early warning and decision support systems**
 - There is a need of **more accurate rain forecast** and **more detailed warnings** in place of the current categorization as "heavy" or "very heavy".
 - **IMD** needs more **Doppler weather Radars** which can extend the lead time of forecast by three days.
 - E.g. **IFLOWS-Mumbai** was launched in June 2020 as an state of art integrated flood Early Warning system for Mumbai to enhance the resilience of Mumbai specially during high rainfall events and cyclones.
- **Reservoirs:** Construction of reservoirs in the course of rivers could store extra water at the time of flood.

- Such measures **have not been much successful**. Moreover it has led to increased deposition of silt in the river and reducing the water flow and further increasing the flood. (e.g. Farakka Barrage causing problems in Bihar)
- Moreover, **during huge floods, dams are double-edged sword**. (e.g. Kerala floods of 2018)
- **Afforestation:** the fury of flood could be minimized by planting trees in catchment areas of the river
- **Planned Scientific Development of Cities**
 - Protect natural sinks like Ponds, lakes etc., development away from the river channel, proper drainage infrastructure, regular cleaning of this infrastructure.
 - Review and revise **building by laws** to focus more on environmental sustainability. They should clearly provide that natural drainage and streams shall not be obstructed by this development/ building permit.
- **Improving awareness and preparedness of all stakeholders** in the flood prone areas.
 - **Regular Drills in Flood Prone Areas** to ensure preparedness of NDRF and awareness among masses regarding steps to be taken during floods.
 - Introducing **capacity development interventions** for effective Flood Management (including education, training, capacity building, R&D, documentation) etc.
- **International Cooperation** with neighboring countries on flood controls as a number of rivers which cause flood in India originate from other neighboring countries.
 - For e.g. Dams on Rivers in Nepal can play an important role in controlling floods in the state of Bihar.

b. Response

- Improve the response system of NDRF especially for rural states like Bihar and Odisha.
- Need to enhance capacity building for catastrophic weather events
 - Serious attention needs to be given to fast tracking the setting up of relief camps, crisis proof health infrastructure and stockpiling of dry ration and medicines.
- Increased use of technologies like drones to identify people who are trapped in flood

c. Recovery

- Special Focus on Water borne diseases as they are the biggest killer in the post flood situation.
- Ensure that the new infrastructure created is resistant to floods.
- Bring in changes like broadening ecologically sensitive domain to protect more area from environmental degradation.

- Conclusion1:

- By recognizing the increasing threat of extreme precipitation and implementing proactive measures, India can improve its resilience to extreme weather events.

- **Conclusion2:**
 - India being a sub-tropical country with Monsoon kind of climate will remain vulnerable to floods due to heavy rainfall and increased climate variability. An efficient disaster management mechanism will ensure that these floods remain a natural phenomenon and doesn't become a natural disaster.

2) ASSAM CASE STUDY

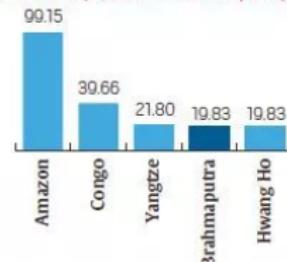
- **Why in news?**
 - Most of the districts of Assam face flood every year. For e.g. in June 2023, more than 11 districts were affected by the first wave of flash floods in Assam (June 2023)
- **Why is Assam so vulnerable to floods?**
 - **Incessant Monsoon Rainfall**
 - **Nature of River Brahmaputra** -> Dynamic and Unstable
 - It figures amongst the world's top five rivers in terms of discharge as well as the sediments that it brings.
 - Because of earthquake prone nature of the region, the river has not been able to acquire a stable character.

AREA OF INFLUENCE

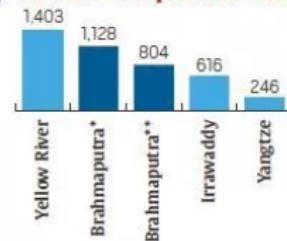


STRONGEST & SILTIEST

AVERAGE DISCHARGE AT MOUTH (1,000 CUBIC m/sec)



SEDIMENT YIELD (TONNES PER sq km PER YEAR)



*at Bahadurabad, Bangladesh; **at Pandu, Guwahati

- **Man-Made Factors**
 - Habitation, deforestation, population growth in catchment areas also lead to higher sedimentation in the region.
 - **Destruction of wetlands:** For e.g. Sylhet districts traditional wetlands called 'haor' used to act as sponges absorbing runoff, have been destroyed, thereby enabling the recent floods.
- **How has government tried to address the factors that cause flood in Assam**

- In its master plan on the river in 1982, the **Brahmaputra Board** has suggested that dams and reservoirs be built to mitigate floods .
 - But, the idea has been seen as a double edged sword.
 - Further, opposition from locals, and environmentalists on the grounds of displacement and destruction to ecology, prevented the plan from moving forward.
- **Building Embankments** were proposed as an interim measure to deal with floods and government has recently used this as the only major approach to control floods.
 - But since, there were temporary measures, most embankments which were built in 1980s were not strong enough and thus easily give way in case of overflow of rivers.
- **Dredging** is another thing that government has considered, but experts have opposed it as Brahmaputra sediment yield is amongst highest in the world and next year sediments will reverse the efforts of this dredging. So, even this hasn't been done.

- **Conclusion**

- The above initiatives are clearly not the sustainable solution to floods. There is a need of a **basin wide approach** to the problem. There is a need of integrated basin management system that should ideally bring in all basin-sharing countries on board.

3) GLACIAL LAKE OUTBURST FLOOD

- **Why in news?**

- India and Pakistan make up one-third of the total number of people globally exposed to GLOF - around three million people in India and around 2 million people in Pakistan (Feb 2023)
- Scientists suggest that the outburst of a Glacial lake was the primary reason for the Feb 2021 flash flood in the Chamoli district (Feb 2021)
 - The DRDO have said that a portion of the Nanda Devi glacier broke off, creating an avalanche, releasing water trapped behind the ice.

- **Example Questions**

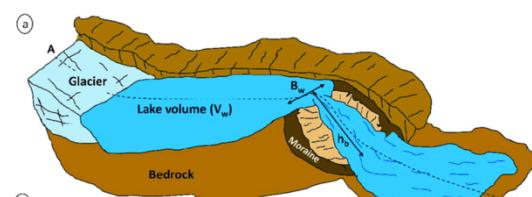
- » Discuss the key factors which is making Himalayan region more vulnerable to Glacial Lake Outburst floods (GLOF). In light of the recent NDMA guidelines, suggest measures to reduce risks of GLOF disasters (15 marks, 250 words)

- **Introduction**

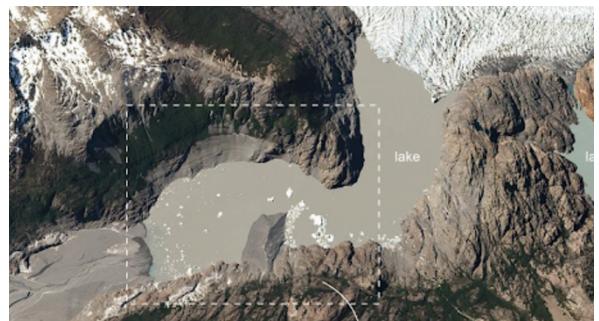
- » GLOFs are sudden fast flowing release of glacial lake water that move downslopes as a result of dam failure. They are recognized in the National Disaster Management Plan (NDMP) 2019 of India as a potential climatological disaster.

- **Glacial lakes** are either moraine dammed or ice margin dammed.

Moraine Dam Glacial Lakes are formed due to the retreating of glaciers, which leave behind soil and rocks and lead to an increase in capacity of lake, making it prone to bursting.



ICE Dam Lakes are created when ice from upper parts of glaciers fall and block passing rivers, giving rise to glacial lakes.



- **Different types of lakes may have different hazard potential:**
 - For e.g. Moraine-dammed lakes have high probability of breach and hazard potential, whereas the rock dammed lake have little chance of breach and low hazard potential.
- **Current Situation:**
 - A study, 'Glacial Lake outburst floods threaten million globally' published in the journal **Nature** in Feb 2023 highlights that:
 - Around 15 million people globally face the risk of GLOF.
 - Around 20% of them (**3 million**) live in India.
 - India, Pakistan, Peru and China have more than 50% of the vulnerable people.
- **Causes of increasing GLOF**
 - **Global Warming -> Climate Change**
 - Increasing number of Glacial Lakes due to acceleration of glacier melt in recent decades.
 - Increased water pressure due to more water being available due to Global Warming.
 - **Ice or rock avalanches, Erosions or other natural disruptions**
 - **Earthquakes** - Himalayan region is especially prone to earthquakes
 - **Human Activities ->** increased tourism, expansion of roads and hydropower projects, deforestation etc have also increased the vulnerability of burst in these lacs.
- **Recent Examples:**
 - **Flash Floods in Sikkim in Oct 2023** which killed 90+ people, destroyed infrastructure like bridges and roads, and damaged state's largest hydropower project, the 1.2 GW Teesta-III.
 - The flash floods were caused by access rainfall and Glacial Lake Outburst Floods (GLOF).
 - South Lhonak lake, the site of GLOF in Sikkim, was already recognized as potentially hazardous and scientists at the National Remote Sensing Centre had warned of a 42% chance of GLOF in as early as 2013.
 - **How it happened in Oct 2023:**

WHAT CAUSED THE FLOOD IN SIKKIM



- The GLOF overflowed into Teesta river, creating flash floods that destroyed the Chungthang dam which is the key component of the state's largest hydro-electric project, and washed away highways, villages and towns. The worst affected districts are Mangan, Gangtok, Pakyong and Namchi.
 - The economic loss will be thousands of crores. Chungthang dam itself cost about Rs 14,000 crores.
- **Note:** Scientists have said that Sikkim's Glacial Lake is still at risk of GLOF, floods as there is a slight reduction in the ice area but almost half of the glacier hasn't deglaciated yet. Thus, the lake will further increase in size due to glacier melting and inflow from the North Lhonak glacier.
 - Therefore, it should be monitored to prevent another GLOF.
- The **Chamoli Flash floods of 2021** may have caused economic damages worth Rs 4,000 crore. It swept away the Rishiganga Hydel Power Project and inflicted substantial damage on the Tapovan Power Project.
- **2013 Kedarnath** flash floods was also result of GLOF.
- **Adverse Impact**
 - These floods pose **severe geomorphological hazards and risks**
 - It can wreck havoc on all man made structures located along the path and thus endanger people, infrastructure, fields and livestock.

- For e.g. the **Chamoli Flash floods of 2021** may have caused economic damages worth Rs 4,000 crore. It swept away the Rishiganga Hydel Power Project and inflicted substantial damage on the Tapovan Power Project.
- Similarly, the Kedarnath flash flood in 2013 was caused by GLOF.
- **Long term Climate Impact** may be caused by large glacial lake as they would increase the amount of water in ocean and reduce it in Himalayas.

- **Steps taken so far:**

- **CWC** has done some work towards identification of such lakes;
 - Some other aspects are still work in progress including a robust early warning system, and a broad framework for infrastructure development, construction and excavation in vulnerable zones.
- **Geological Survey of India (GSI)** carries out assessment of the GLOF threats and provide input to the National Disaster Management Authority (NDMA) for developing risk mitigation strategies.
- **National Disaster Management Authority (NDMA)** in collaboration with Swiss Agency for Development and Cooperation (SDC) have prepared **Guidelines on the Management of Glacial Lake Outburst Floods (GLOFs)** (Oct 2020)
 - The guidelines are aimed at improving the administrative responses, drawing on international best practices; and bringing together the relevant scientific capabilities of the nation to eliminate potential losses from glacial hazards.

- **Key Highlight of the NDMA Guidelines**

- i. **Inventorization: Hazard and Risk Mapping**
 - Regular monitoring of glacial lakes using satellite observations.
 - Cooperation with neighbouring countries (Nepal, Bhutan and China) to identify transboundary threats and manage it properly.
- ii. **Reduction of Hazards**
 - **Short term actions** - lowering the lake level through siphoning
 - For instance, high density PVC pipes were installed in **South Lhonak lake in Sikkim**, to reduce the pressure on the lake
 - **Long Term Actions**
 - **Artificial drainage channels** to lower lake levels
 - Reinforcement of dam
 - Enhancement of river cross section/ protection from erosion
 - **Restricting constructions and development** in GLOF prone areas is a very efficient means to reduce risks at no cost.
 - **Develop regulation for Land Use Planning** in GLOF areas.
- iii. **Reduction of Exposure**
 - Establishment of Early Warning System.
 - **Comprehensive alarm system** - including classical alarming infrastructure as well as modern technology using smart phone notifications etc.
 - Evacuation based on EWS

- Involve local population closely from the beginning in the design, planning and implementation of risk reduction and management strategies in a transparent collaboration mechanism.
- iv. **Awareness and Preparedness** through posters, social media, apps etc.
- v. **Capacity Development -**
 - Apart from specialized forces such as **NDRF, ITBP**, and the **ARMY**, the guidelines emphasize on need for trained local manpower.
 - Training of professionals and practitioners;
 - Strengthening Academic Education in relevant disciplines from natural and social sciences.
 - **Heavy earthmoving and search and rescue equipment**, as well as motor launches, country boats, inflatable rubber boats, life jackets etc.
 - Setting up **Quick Reaction Medical Teams, mobile field hospitals, Accident Relief Medical Vans**, and **heli-ambulances** in areas inaccessible by roads.
- vi. **Promote R&D in GLOF Management**
 - Promote development of **Modelling tools** to simulate the entire chain of mass movement and outburst process
 - **Historical records** should be effectively used to understand flood processes.
 - Expand the use of local knowledge, experience of local people. Engaging the local population in **joint-knowledge production** is considered indispensable for effective community based disaster risk management.
- vii. **Regulation and Enforcement**
 - A well drafted **techno-legal regime** is necessary to prevent future development of GLOF and protect existing Glaciers.
 - The regime should include a Himalaya GLOF mitigation Policy, no habitation and construction zones; and provisions for strict implementation.
- **Other steps**
 - Need of a **nodal agency** to coordinate all the researches related to glaciers in the region .
 - Fighting Climate Change
 - **Sustainable Development**
 - Restricting Tourism in these areas or promoting only sustainable tourism
 - **Detailed Project Reports and Environmental and Social Impact Assessment** needs to take into account the **Glaciology study** to better understand the impact of these projects on glaciers and glacial lakes.
 - **International Cooperation:** GLOF risk is transboundary in nature, thus there is an urgent need for a comprehensive regional risk governance framework including India, Nepal, Bhutan etc

4) URBAN FLOODS

- **Practice Questions**
 - The frequency of urban floods due to high intensity rainfall is increasing over the years. Discuss the reason for urban floods, highlight the mechanisms for preparedness to reduce the risk during such events. [12.5 marks, 200 words] [CSE Mains 2016, GS3]
 - Major cities in India are becoming vulnerable to flood conditions. Discuss [12.5 marks, 200 words] [CSE Mains 2016, GS1]

- Account for the huge flooding of million cities in India including the smart ones like Hyderabad and Pune. Suggest lasting remedial measures [CSE Main 2020, GS1]
- Urban floods are a result of ecological disturbance and socio-political apathy. Discuss [15 marks, 250 words]

- **Introduction**

- Recent instances of floods such as the one in Bengaluru in Sep 2022, Chennai in 2015 and Mumbai in 2005 illustrate the increasingly vulnerability of Indian cities to this disaster. A complex set of factors have worked together to deteriorate the condition of our cities and increase their susceptibility to this devastation.

- **Main Causes of Urban Floods**

i. **Unplanned Urban Development:**

- **NDMA Report: Increasing Concretization** of city land reduced the seepage of water in the ground and has increased the runoff.
- **Loss of Natural flood storage** in urban areas by filling of ponds and lakes to reclaim land for development.
 - For instance, in Chennai the number of water bodies have come down to less than 50 from 600 in 1980s. This became a major cause of 2015 floods.
 - Similarly, Bengaluru had 1,452 water bodies in 19th century, this has now reduced to only 193 lakes.
 - Here about 10,787 acres of lakes worth Rs 1.5 lakh crore has been encroached upon.
- **Encroachment of Flood Plains** of the rivers have led to loss of natural flood storage.
 - 2013 Uttarakhand floods
- **Rapid urbanization** has led to massive changes in land use patterns, as residential areas had sprung up in farmlands

i. **Improper and Inadequate Drainage system**

- A lot of sewerage and drainage network is old and lack volume to carry flood water.
 - » For e.g. The current drainage system of Delhi is based on the 1976 master plan.
- **Poor Desilting and blockage of drainage systems**. This was the main reason for 2005 Mumbai floods and a major factor in Sep 2022 Bengaluru floods.
 - » **Improper Waste Management** leads to a lot of solid waste blocking the drains. This hinders the flow of water during rainfall and contributes to floods.

iii. **Global Climate Change** have led to change in weather pattern which is sometimes causing unusually heavy rainfall thus causing floods in urban areas.

- For e.g. On 5th Sep 2022, Bengaluru received 131.3 mm of rainfall.

iv. **Social and Political apathy**

- **Religious practices** such as dumping of religious symbols, dead bodies etc. in rivers also lead to blocking of rivers. Inefficient management of gathering like Kumbha contribute to unnecessary concretization and thus floods.
- **Socio-economic factors** contribute to illegal encroachment of flood plains by slums etc. which increases the intensity of the urban floods.

- At the same time we have seen **an absence of political will** to give priority to the issue. This has happened both at national and international level.
- This lack of political will has resulted into paucity of funds which delays the key drainage infrastructure
 - The river water information sharing has remained a major issue between India-Bangladesh and India China.

- Consequences

- **Human and Infra Loss** - deaths and devastation; loss of telecommunication, road and railway lines; increased probability of disease epidemic
- **Economic Losses:**
 - » Other than economic losses because of destruction of infrastructure, floods result in traffic jams, temporary closure of business, destruction of property etc. which leads to loss of manhours, hindering of economic activities etc.
- **Environmental Pollution**
 - » Urban floods also lead to washing away of various pollutants including industrial waste into water bodies thus intensifying river pollution.

- Way forward

- **Promote the ideas of Sponge Cities** -> **Urban planning should keep in mind the geological and hydrological cycle:** Planned Development of cities should ensure that flood plains are not encroached upon, sinks like ponds are protected/restored and pavements are porous to allow infiltration of rainwater in the ground.
 - » There should be increased focus on these goals through an **Mission on Sponge Cities**.
- **Improvement of drainage system.**
 - » Proper maintenance, desilting of existing drainage system
 - » Providing alternative drainage path for flood waters (may be underground)
 - » Control of solid waste entering the drainage systems through proper Solid Waste Management
- **Change in social attitude of Common Citizen** will go a long way in controlling urban floods
 - » Reduction of solid waste, promoting environment friendly religious practices can all contribute towards limiting urban floods.
- **Disaster preparedness**
 - » Even after all proper steps, nature may cause havoc and cause floods, therefore a **proper disaster management plan** should be prepared by the ULBs to be battle ready in emergency situations. Fresh Hazard profiles should be created for the cities based on the historic as well as recent flood vulnerabilities.

- Conclusion

- We must not allow nature, human conduct, and urbanisation to be mystified and rendered as trans-historic villains. We can learn to live with nature, we can regulate human conduct through the state, and we can strategically design where we build. We need to urgently rebuild our cities such that they have the sponginess to absorb and release water without causing so much misery

and so much damage to the most vulnerable of our citizens, as we have seen in case of Mumbai, Chennai and Bengaluru.

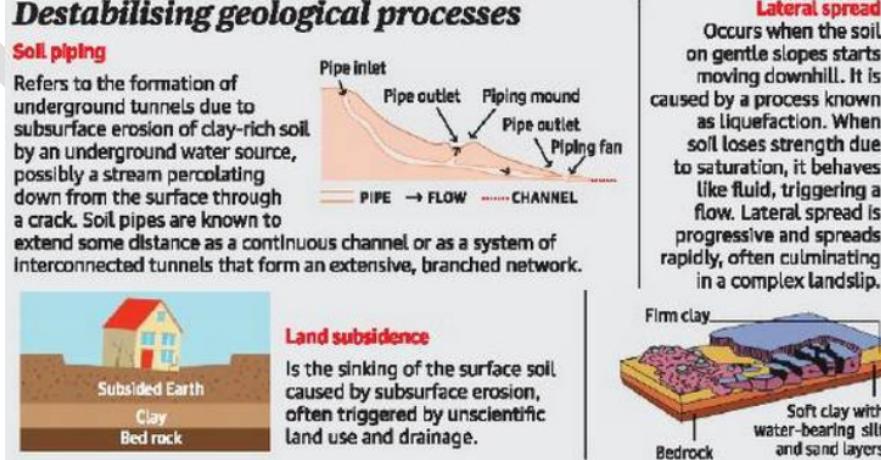
5) CLOUD BURST

- **Practice Questions:**
 - Explain the mechanism and occurrence of cloudburst in the context of the Indian subcontinent. Discuss two recent examples. [Mains 2022, 10 marks, 150 words]
 - Cloudbursts are often associated with flash floods. Explain the relationship between cloudbursts and flash floods, and discuss the challenges in managing flash flood events. [10 marks, 150 words]
- **What is cloudburst?**
 - A cloudburst refers to an extreme amount of rain that happens in a short period, sometimes accompanied by hail and thunder. IMD defines it as unexpected precipitation exceeding 10 cm per hour over a geographical region of approximately 20-30 sq km.
 - For e.g. the 2013 floods in Kedarnath were caused by Cloud Burst. In 2021, Amarnath region was impacted by cloudburst.
 - **Impact:** This sudden discharge of rain leads to floods including flash floods, landslides etc. which may result into human casualties, and property loss.
- **Mechanism: How does cloudburst occur?**
 - When cumulonimbus clouds (which stretch to even 13-14 kms in height) are trapped over a region or there is no air movement for them to disperse, they discharge over a specific area.
 - Here, saturated clouds ready to condense into rain can't produce rain, due to the upward movement of the very warm current of air.
 - Instead of falling downwards, raindrops are carried upwards by the air current. New drops are formed and existing raindrops increase in size. After a point, the raindrop are too heavy for the cloud to hold on to, and they drop down together in a quick flash
- **Other key aspects:**
 - It is very difficult to forecast the event due to its very small scale in space and time.
 - To monitor or nowcast (forecasting few hours of lead time) the cloudburst, we need to have dense radar network over the cloudburst-prone areas or one need to have a very high resolution weather forecasting models to resolve the scale of cloudburst. Doppler radar can be very useful in predicting them.
 - **Mountain regions are more prone to cloudburst due to orography (terrain and elevation)**, though they may occur in plains as well.
- **Way forward:**
 - **Hazard zonation mapping:** Identifying the areas vulnerable to flash floods.
 - **Improving forecasting (nowcasting) Infrastructure:** Increasing the coverage of doppler radars. Currently Himalayan region has 7 doppler radars (2 each in J&K and Uttarakhand, 1 each in Assam, Meghalaya and Tripura).
 - **Building flood resistant infrastructure:** To reduce damages due to flash floods
 - **Regulating settlements** in the river banks
 - **Strengthening institutions** to provide quick response at the time of cloudburst in the form of emergency evacuation, medicine etc.

- **Conclusion:**
 - By taking steps to predict, prepare, and respond to these events, we can reduce the loss of life and the property damage that they cause.

4. LANDSLIDES

- **Why in news?**
 - Landslide near Gangtok in March 2023
 - Around 50 people died due to landslide in Makhuam village of Manipur's Noney district on June 30, 2022. These people were working on the railway project (June 2022)
- **Example Questions**
 - While the **Himalayan region was always vulnerable to landslides**, the recent years have seen the peninsular hills also becoming increasingly prone to this natural disaster. Give reasons. What are the NDMA guidelines for management of landslides? [15 marks, 250 words]
- **Introduction**
 - Landslide is defined as the **movement of a mass of rock, debris or earth down a slope**. This is a type of mass wasting, which denotes any down-slope movement of soil rocks under the direct influence of gravity.
 - The term "landslide" encompasses five modes of slope movement: Falls, topples, slides, spreads, and flows.
 - There are **two landslide hotspots** that exist in India - along the **southern edge of the Himalayan arc** and the **Western Ghats region**.
- **Key causes of landslides:**
 - **Himalayas** are prone to landslides because of several **morphological and geological factors** like:
 - Tectonic movement
 - Glacial movements
 - Freeze and thaw effect
 - Unstable rock structure
 - Steep slopes etc.
 - Most regions with more than 20 degrees are prone to landslides.
 - Types of rocks, weaknesses, zone of rupture etc.
- **Destabilizing Geological Processes - Soil Piping, Land Subsidence, Lateral Spread etc.**



- But in recent years, we have also seen the stable Peninsular Hills like in Western Ghats becoming vulnerable because of the human made factors.
- **Human Induced Causes**
 - o **Climate Change: Extreme Rainfall Events trigger slope failure** where lateral spread and soil piping have occurred.
 - For instance, unusually high rainfall in Kerala since Aug 2018 has destabilized the already vulnerable hill slopes in the high ranges and has caused many landslides.
 - o **Illegal Mining, deforestation etc** have made the **surface weak and vulnerable to landslides**
 - For e.g. the railways have blamed two successive land slides along their project site in Manipur on the traditional practice of Jhum or shifting cultivation.
 - o **Unscientific Farming and Construction Activities**
 - UNDP's assessment after the 2018 flood says that changes in land cover, blocking of natural drains, and poor agricultural practices such as monocropping have all exacerbated the risk of landslides in Kerala.
 - Since 19th century, 50% of the land with tropical forests and grasslands has been converted to monoculture plantations and agricultural fields.
 - o **Illegal landgrab** using fake deeds have contributed to unscientific land use and thus landslides.
 - o **Inadequate Early Warning Systems** makes the impact of the disaster worse.
- **Government Efforts and Way Forward**
 - o **A national landslide susceptibility map** has been created by Geological Survey of India (GSI) under the **National Landslide Susceptibility Mapping Project.** This national landslide susceptibility map should be integrated with infrastructure development and planning in hilly areas.
 - o Union Ministry of Earth Science has also **initiated steps to establish a network of landslip monitoring stations** in the highlands.
 - » The units which will be based on acoustic emission technology will also have an early warning mechanism to alert the local community.
 - o **NDMA guidelines for management of Landslides**
 - » **Inventorization and regular update**
 - » **Landslide Susceptibility Map** at macro and meso scales
 - » **Awareness Generation and preparedness** among various stakeholders through setting up of institutional mechanisms.
 - » **Capacity Building to deal with Landslides**
 - Enhancing education and training of professionals involved in landslides management.
 - Capacity development of organizations working in the field of landslides
 - » **Create an Autonomous National Centre** for landslide studies research and management.
 - o **Other steps that can be taken**
 - » **Deploy Early Warning Systems** based on rainfall thresholds in various vulnerable regions.
 - o **Note: In way forward also suggest** things like increase afforestation, banning of mining in sensitive areas, sustainable forms of agriculture etc.

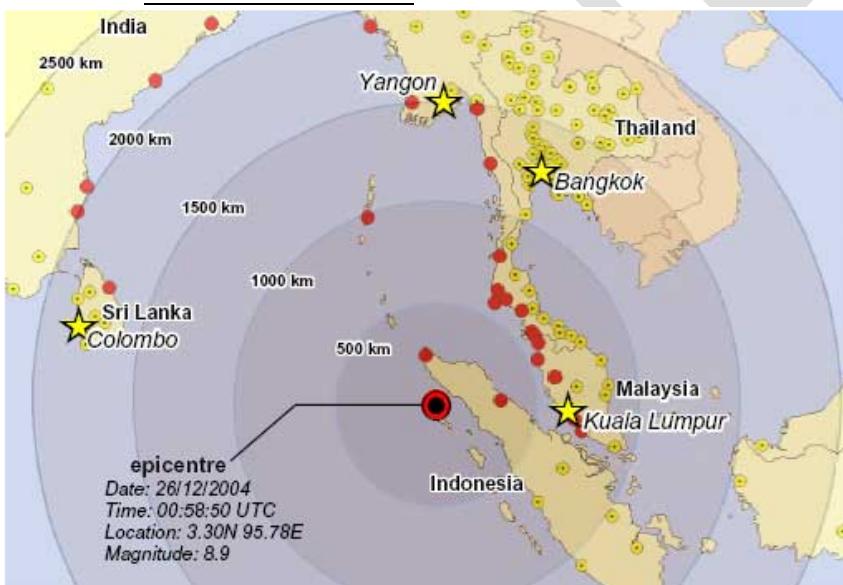
5. TSUNAMI

- Example Questions

1. On December 2004, tsunami brought havoc in 14 countries including India. Discuss the factors responsible for the occurrence of Tsunami and its effects on life and economy. In the light of guidelines of NDMA (2010) describe the mechanisms for preparedness to reduce the risk during such events. [15 marks, 250 words][CSM 2017]
2. Discuss the key steps taken by India towards Tsunami Disaster Preparedness since the 2004 Tsunami? [10 marks, 150 words]

- Introduction

- The term Tsunami has been derived from the Japanese term 'Tsu' meaning harbour, and 'nami' meaning waves. Thus tsunami means 'harbour waves'..
- Tsunami consist of a series of waves which rise as high as 10 meters or more. They move inland, several hundred kms causing untold disasters. These waves move at great speed and sometimes they move even 50 km/h on the coastal plains.
- **26th Dec 2004 Tsunami/Great Sumatran Andaman Earthquake / Asian Tsunami / Boxing Day Tsunami**
 - An undersea earthquake occurred on Dec 26, 2004, with an epicenter off the west coast of Sumatra, Indonesia. The earthquake triggered a series of devastating Tsunamis along the coasts of most of the countries bordering the Indian Ocean. 225,000 people were killed in 11 countries.



- The earthquake which triggered the Tsunami was of a magnitude between 9.1 to 9.3 on the Richter scale. It is second largest earthquake ever recorded on a seismograph. This earthquake lasted for about 10 minutes. It caused entire planet to vibrate as much as 1 cm and triggered other earthquakes as far as Alaska.

- Causes of Tsunami

1. **Earthquake** of more than 6.5 on the Richter Scale, with a vertical disruption of water column due to vertical tectonic displacement of the sea bottom along a zone of fracture in the earth's crust is the most important cause of Tsunami.

2. **Volcanic Eruption**, and **submarine landslides** are other reasons which may displace water and cause it to inundate coastal region.
 3. **Nuclear Explosion**, **fall of large celestial bodies** (like asteroid, meteorites, comets etc can also cause Tsunami)
- **Tsunami Detection**
- i. **Different Ways to detect Tsunamis – Coastal tidal gauges, Satellite technologies; deep ocean assessment and report** (using pressure changes)
 - ii. **State Preparedness Measure Before Tsunami**
 - Hazard Mapping: Identify Tsunami prone areas
 - Establishment of Early Warning System
 - Educate people in these regions about Tsunamis - inform them about the evacuation routes in case a Tsunami hits the coast.
 - Mock Evacuation drills should be conducted periodically so that people are aware of it
 - Capacity Building to deal with Tsunami disaster
 - Provisions for sufficient provisions during emergency
 - Land use planning and engineering solutions
 - Increasing plant biodiversity along the coast.
 - iii. **Preparedness by citizens**
 - Live at safe distance from coastline; in elevated houses; well managed drainage system; easy access to information system like TV radio etc; following SOP during Tsunami.
 - iv. **Tsunami Response**
 - **People on Land:** After warning sound move to safer places with cattles (top floor of the multi-storied buildings); stay away from rivers that flow into the oceans; Listen to radio and TV for updates regularly.
 - **People on Sea:** Don't return to coast; if time is available move to deeper waters;
 - **Government:** Search and rescue; basic services like water, first aid etc.
- **Nodal Agency for Tsunami Forecast:** Indian National Center for Oceanic Information Services (INCOIS)
- **Steps taken by India Since 2004 Tsunami:** The **2004 Tsunami highlighted the clear lack of preparedness** about Tsunamis all over the world. None of the affected countries, including India had any system for early warning of such Tsunamis, nor was there any plan for emergency response. Learning a lesson from 2004 Tsunami, GoI have taken a number of steps:
1. **Early Warning System:** GoI has established the state-of-art India Tsunami Early Warning Centre (ITEWC) (operational since 2007) at the Indian National Centre for Ocean Information Services (INCOIS) as an autonomous body under Ministry of Earth Sciences.
 2. INCOIS has extended **GIS-based 3D protocol on Tsunami warning to all vulnerable areas** in the country with new methodologies and improved warning procedures.
 3. **Strengthening Tsunami Research** has been a key focus of GoI since 2004.
 4. **National Disaster Management Guidelines** for management of Tsunami, 2010
 5. **Regular Mock Drills** are conducted by NDMA, INCOIS and Ministry of Home Affairs

- These exercises help familiarize participants with their responsibilities, actions required and further help them evaluate the Standard Operating Procedure (SOP) for Tsunami warnings.

6. Awareness generation programs in coastal area is also conducted regularly since 2004.

- Steps that we further need to take

- Improve EWS: Advanced technology such as Artificial Intelligence and Machine learning should be incorporated to improve the Early Warning System in the country.
- Increased International Collaboration in real time monitoring will help support each other during emergencies.
 - BIMSTEC can play a very important role in promoting this collaboration in Bay of Bengal region.
- Regular training and Capacity building through workshops, drills etc. can help us avoid the 2004 scenario.
- Land use planning is one area which has been mostly ignored.
 - There is a requirement of more vegetation cover in coastal region, but various studies have shown that mangrove cover has gone down over the years.
- Removing the limitations of India's disaster management institutional framework

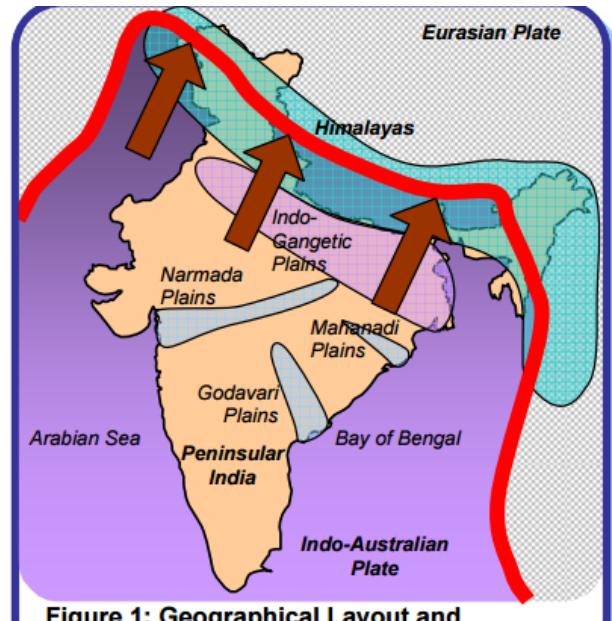


Figure 1: Geographical Layout and Tectonic Plate Boundaries at India

6. EARTHQUAKE

- Introduction

- India lies at the northwestern end of the Indo-Australian Plate, which encompasses India, Australia, a major portion of the Indian Ocean and other smaller countries.
- The major reason for the high frequency and intensity of earthquakes is that Indian plate is driving into Asia at a rate of approximately 47 mm/year.
- According to NDMA, about 59% of India's land could face moderate to severe earthquakes.

- Different zones

- Bureau of Indian Standards, based on the past seismic history, grouped the country into four seismic zones, viz. Zone-2, Zone-3, Zone-4 and Zone-5. Of these, Zone 5, is the most seismically active region, while zone 2 is the least.
- The Modified Mercalli (MM) intensity, which measures the impact of the earthquakes on the surface of the earth, broadly associated with various zones, is as follows :

▪ Seismic Zone Intensity on MM Scale

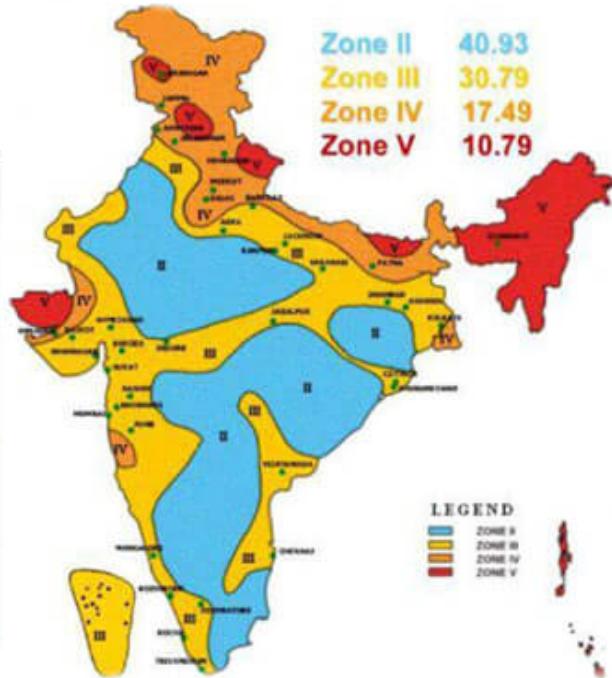
Seismic Zone Intensity	MM Scale
Zone - V (Very High Intensity zone)	IX (or more)

Zone -IV (Severe Intensity Zone)	VIII
Zone - III (Moderate Intensity Zone)	VII
Zone - II (Low Intensity Zone)	VI (or less)

- **Zone 5:** Areas with highest risk; suffers earthquakes of intensity MM IX or greater; IS code assigns zone factor of 0.36 for Zone 5.
 - **Regions in India:** Parts of J&K, Himachal Pradesh, Uttarakhand, Parts of North Bihar, Entire North eastern region, and Andaman and Nicobar Islands.
- **Zone 4:** Areas within High Damage Risk Zone and covered areas are liable to MM VIII; IS code assigns a zone factor of 0.36 for Zone 4
 - **Regions in India:** Parts of J&K and Himachal Pradesh, UT of Delhi, Northern Part of UP, Bihar and Bengal, Sikkim, Parts of Gujarat, Small Portion of MHA near the west coast and Rajasthan.
- **Zone 3:** Classified as Moderate Damage Risk Zone; liable to MM VII; IS code assigns zone factor of 0.16 for zone 3.
 - **Regions in India:** Kerala, Goa, Lakshadweep islands, and remaining parts of Uttar Pradesh, Gujarat and West Bengal, parts of Punjab, Rajasthan, MP, Bihar, Jharkhand, Chhattisgarh, Maharashtra, Orissa, Andhra Pradesh, Tamil Nadu and Karnataka.
- **Zone 2:** The region is assigned low damage risk. The IS code assigns zone factor of 0.10 (maximum horizontal acceleration that can be experienced by a structure in this zone is 10% of gravitational acceleration) for Zone 2.
 - **Region:** Rest of India.
- **Zone 1**
 - Since the current division of India into earthquake hazard zones does not use Zone 1, no area in India is classed as Zone 1.

Seismic Zone, Map of India 2002
About 59 percent of the land area of India is liable to seismic hazard damage

Zone	Intensity
Zone V	Very High Risk Zone Area liable to shaking intensity IX (and above)
Zone IV	High Risk Zone Intensity VIII
Zone III	Moderate Risk Zone intensity VII
Zone II	Low Risk Zone VI (and lower)



- Causes of Earthquakes

- The important causes of earthquakes can be divided into two categories: Natural and Manmade

i. Natural Causes

1. **Tectonic Movements**
2. **Volcanic Activities**
3. **Adjustment in the inner rocks beds (Plutonic Earthquakes)**
 - Adjustment between Sima and Sial in the interior of the earth's crust.
4. **Pressure of Gases in the interior**
 - The expansion and contraction of gases in the interior of the earth sometimes cause a sudden shake on the earth's surface
5. **Other causes**
 - Landslides and avalanches
 - Denudation of landmasses and deposition of materials

ii. Man-made causes

1. **Dams:** Impounding of large quantity of water behind the dams disturb the crustal balance and can cause earthquakes
2. **Nuclear Bombs**
 - The shockwaves through the rocks set up by underground testing of Atom bombs or Hydrogen bombs may be severe enough to cause an earthquake.

iii. Causes which make India very vulnerable

- Fragile built environment (Similar sized earthquake in Japan or USA will cause much smaller damage)

- Consequences of Earth Quakes

- Human and livestock loss
- Damage to Property
- Tsunamis
- Change in river course - floods
- Fountain of muds
- Landslides

- **NDMA Guidelines for Management of Earthquake: Six Pillars of Earthquake Management in India**
 - a. Ensure the incorporation of earthquake resistant design features for the construction of new structures.
 - b. Facilitate selective strengthening and seismic retrofitting of existing priority and lifeline structures in earthquake-prone areas.
 - c. Improve the **compliance regime** through appropriate regulation and enforcement.
 - d. Improve the **awareness and preparedness** of all stakeholders.
 - e. Introduce **appropriate capacity development interventions** for effective earthquake management (including education, training, R&D, and documentation).
 - f. **Strengthen the emergency response capability** in earthquake-prone areas
- **Earthquake hazard Reduction and Mitigations**
 - Earthquake is a natural phenomenon which is **difficult to prevent and therefore we can only prepare for the earthquake and post-earthquake response**. The foreknowledge of potential danger areas can help mitigate the impact of a disaster.
- **Steps that needs to be taken**
 - **Short Term Steps:**
 1. **Preparing Vulnerability Map** of the country
 - Establishing infrastructure for early warning system in vulnerable areas.
 2. **Strengthening Early Waring Infrastructure** -> for providing those crucial extra seconds of a minute in disaster scenario.
 3. **Strengthening Institutional Framework** -> Shortage of manpower in SDRF and NDRF should be rectified. Local governments, NGOs etc also need to be prepared for post disaster response especially in vulnerable areas.
 4. **Implementing Building Codes** -> Municipalities need to ensure that BIS codes and guidelines are properly being followed in new buildings.
 - The lifeline buildings which have been built in the past and are not earthquake resistant needed to be upgraded by retrofitting techniques
 5. **Improving building code** through a new architecture regime and this be made mandatory for all builders and developers.
 6. **Educating people** through dissemination of information about the ways and means of minimizing the adverse impacts of earthquakes. Dissemination of techniques such as 'Drop, Cover and Hold' is very important reducing the loss of life during earthquakes.
 - **Community preparedness** is very important for dealing with earthquake. Though we have NDRF and other bodies to do search and rescue operations, but experience shows that most of the time it is the community which plays the first

hand role in disaster situation and therefore they have to be given proper training regarding search and rescue as well.

- Community should have a disaster emergency kit ready for disaster situation
 - Community also needs to participate in planning, implementation and monitoring process of any method being used.
- **Long Term steps:**
 1. **International Collaboration**
 - We should collaborate with other countries in development of earthquake resistant infrastructure. Our collaboration with countries like Japan will be very crucial in enhancing our preparedness for earthquakes.
 2. **Decongesting of Cities** to reduce risk and vulnerabilities
- **Conclusion**
 - Earthquake may not yet be predictable and certainly not preventable, still if effective and timely steps are taken, the adverse impact of Earthquakes can be considerably blunted.
- ## 7. HEATWAVES - ALREADY COVERED IN PREVIOUS BOOKLETS
- **Why in news?**
 - » Many Heat wave deaths in Uttar Pradesh and Bihar (June 2023)
 - » Earlier in April 2023, **13 people died from apparent heatstrokes** while attending a government award function in an open space in Navi Mumbai. This is possibly the biggest ever heatwave-related death toll from a single event in the country, and brings back to spotlight on potential risks from heatwaves, whose intensity and frequency is expected to rise because of climate change.
 - **Example Questions**
 - » What are heat waves? Suggest a strategy to reduce India's vulnerability to heatwaves. [15 marks, 250 words]
 - » With a focus on the Oct 2019 guidelines from the National Disaster Management Authority (NDMA), discuss the mechanisms for preparedness to deal with Heat Waves in India. [15 marks, 250 words]
 - » Heatwaves can pose economic challenges to various sectors. Evaluate the economic consequences of heatwaves on industries such as agriculture, tourism, and energy, and suggest some measures to minimize their adverse effects [15 marks, 250 words]
 - **Definition**
 - A heat wave is a **period of abnormally high temperatures, more than the normal maximum temperature** that occurs during the summer season usually in the north-western parts of India. In India, heat waves typically occur between March and June, and in some rare cases extend till July.
 - **Indian Meteorological Department (IMD)** has given following criteria for heat waves.
 - **Maximum Temperature of at least 40 degree Celsius for Plains, 37 degree Celsius for coastal regions** and atleast **30 degree Celsius for hilly regions**.
 - Following conditions are used declare heat waves:

- a. **Based on Departure from Normal**
 - **Heat Wave:** Departure from normal is 4.5 degree to 6.4 degree
 - **Severe Heat Wave:** Departure from normal is > 6.4 degree

- b. **Based on Actual Maximum Temperature (for plains only)**
 - **Heat Wave:** When actual maximum temperature \geq 45 degree Celsius
 - **Severe Heat Wave:** When actual maximum temperature \geq 47 degree Celsius.

- **Note:** Heat wave has not been notified as a disaster by the Government of India yet and hence is not eligible for relief under National/State Disaster Response Fund norms.

- **Increasing cases of Heat Waves in India:** According to Lancet Report, India faced 60 million heatwave exposure events in 2016, a rise from 40 million exposures in 2012. Similarly, the average length of heat waves in India ranged from 3-4 days, which is more than double of global average of 0.8 - 1.8 days. The key factors responsible for this are:
 - » **Climate change -> higher temperatures**
 - According to a report by UNICEF "*The Coldest year of the Rest of Their Lives*" - nearly every child will face frequent heatwaves by 2050.
 - » **Sparser Pre Monsoon shower and Delayed Monsoon**
 - This weather pattern coupled with El-Nino effect, which often increases temperature in Asia, combine to create the record high temperatures.
 - » **The Loo (hot and dry winds) originating from Pakistan and Northwest India**, has also contributed to increasing temperature in India.
 - » **Urbanization and its problems like Urban Heat Island (UHI) Effect** exacerbates the problem of heat wave in many parts of our country.
 - » **Decreasing Tree Covers ->** concrete jungles, land heats up more.

- **Impact of Heatwaves**
 - » **Health Impacts**
 - The heat waves are associated with increased rate of heat stress and heat stroke, worsening heart failures and acute kidney injury from dehydration.
 - Children, elderly and those with pre-existing morbidities are particularly vulnerable.
 - According to NDMA, more than 24,000 people have died in India due to heat waves between 1992-2015.
 - » **Economic Loss**
 - According to Lancet, the output of workforce in India declined by 7%, equivalent to 75 billion labor hours every year.
 - » **Worsening of air pollution problems** -> increased electricity use -> more fuel burned.

- **Steps Taken So Far**
 - » The **IMD** has regularly issued heat wave warnings in different parts of the country to make people aware of the worsening situation.
 - » The **NDMA** has suggested things like covering of head, cross-ventilating rooms and sleeping under a slightly wet sheets.

- **NDMA's revised guidelines for prevention and management of Heat Waves in India (Oct 2019)**
 - » **Aim/Objective**
 - The guideline aims to provide framework for developing Heat Action Plans for implementation, inter-agency coordination and impact evaluation of heat wave response activities in cities/towns.
 - » **Developing a Heat-wave Plans**
 - Generating heat wave risk and **vulnerability map and mapping hotspots** for developing a strategic mitigation action plan.
 - Identifying **Vulnerable Population** - elderly, pregnant women, chronic disease patient, resident of a particular type of housing, certain type of occupations etc.
 - **Identification and Evaluation of factors** leading to disproportionate increase in temperature in the city
 - » **Reducing Temperature** in the cities through vertical gardens, small parks with water fountains etc.
 - » **Coordinate with Research institutions** for better built environment.
 - Government budget should allocate funds for R&D in this field
 - » **Curb Future UHI manifestation** by incorporating findings from the built environment assessment
 - » Adhere to city building codes.
 - » **Preparedness at the local level** for health eventualities.
 - » **Health care system capacity building**
 - » Collaboration with private and Non-Government and Civil Society
 - » Establish Early Warning System and Communication Systems
 - » Developing inter-agency response plan and coordination in the field.
- **Other Steps that can be taken:**
 - » **Preparedness:** Already discussed with NDMA guidelines
 - » **Response:**
 - Ensuring quick advanced communication and guidelines during heatwave condition.
 - Drinking water supply should be increased along the roadside during heatwave conditions
 - Health facilities should respond with all the relevant facilities.
- **Other steps:**
 - » **Reviewing the existing occupational health standards, labor laws, and sector regulation** for worker's safety.
 - **Special focus on farm laborers** as the agricultural sector was more vulnerable compared to the industrial and service sectors because workers there were more likely to be exposed to heat.
 - » Increased work on amenities like increased access to drinking water, indoor ventilation, healthcare, regular work breaks, and protection against wage loss.
 - » **Promoting more greenery throughout the city** especially on both sides of the roads to ensure cooler roads.
 - » **Making communities more aware and resilient** to after effects of the heatwaves.

- » Internationally, the **global community** should work towards achieving the **climate change mitigation goals** by working towards Paris Climate targets and making the NDCs more ambitious.

8. DROUGHTS

- **Important Quotes:**
 - » "Indians know that the Monsoon is the real finance minister of India" - Environmental Activists Sunita Narain
- **Intro**
 - » Drought is a period of below average precipitation in a given region, resulting in prolonged shortages of its water supply, whether atmospheric, surface water or ground water. A drought can last for months or for years.
- **Types of droughts**
 - » **Meteorological drought** is brought about when there is a prolonged time with less than average precipitation. Meteorological drought usually precedes other kinds of drought.
 - » **Agricultural droughts** are droughts that affect crop production or ecology of the range. They are caused by shortfall in water available to the crops. It can be caused by extended period of low precipitation, poor water management, soil erosion or other such situations.
 - » **Hydrological drought** is brought about when water reserves available in sources such as aquifers, rivers, lakes and reservoirs fall below the statistical average. Hydrological drought tend to show up more slowly because it involves stored water that is used but not replenished. Like an agricultural drought this can be triggered by more than just a loss of rainfall.
 - » **Socioeconomic droughts** occur when water shortage starts to impact people's lives, individually and collectively.
- **Causes**
 - » **Natural Factors**
 - **Precipitation deficiency**
 - **El Nino Southern Oscillation:** All the severe meteorological and hydrological droughts between 1870-2018 were found to be caused due to positive phase of ENSO (El Nino Southern Oscillation)
 - Lack of pre-Monsoon shower. For e.g. in 2019, India witnessed the second driest pre-monsoon season in 65 years.
 - **Dry Season**
 - **Land Degradation** - Desertification, erosion etc.
 - » **Anthropological factors**
 - **Poor water management**
 - Subsidies on equipment and electricity usage has encouraged over-exploitation of ground water.
 - Surfeit of dams have wreaked havoc on riverine system.
 - Poor rainwater conservation - Currently India captures only 8% of its rainfall - one of the lowest in the world.

- Too much focus on **water consuming power generation** (like coal based power plants)
 - **Agricultural inefficiencies** - Agriculture consumes more than 90% of India's water use. 80% of this water is used for water guzzling crops like rice, wheat and sugarcane. Further, less penetration of technologies like drip irrigation and other forms of micro-irrigation also leads to inefficient water utilization.
 - **Improper and Unsustainable implementations of Watershed Development Programs**
 - **Water pollution** - India ranks 120th among 122 countries in a global water quality index.
 - **Climate Change** - The global temperature is already higher by more than 1 degree Celsius from the pre-industrial era. This has also contributed in the spell of drought in India. For instance, drought continued in India post 2016 despite a change from El-Nino conditions due to climate change.
- **Impacts of Droughts in India:** For a developing country like India where more than 50% of the population is still dependent on agriculture, the drought comes as a bane. The negative impact of drought can be summed up under the following heads.
 - i. **Physical - Geographical-Environmental Impact:**
 - Meteorological drought adversely affects the recharge of soil moisture, surface runoffs and ground water. Rivers, lakes, ponds etc. tend to dry up.
 - **Exacerbates ground water extraction and depletion**
 - Increases **water and soil pollution** - for instance deeper borewell have higher chances of arsenic and fluoride contamination.
 - ii. **Economic Impact:** According to MoEF&CC - desertification, land degradation and drought cost India nearly 2.5% of GDP in 2014-15.
 - iii. **Impact on Agriculture** - Large percentage of agriculture rain dependent -> reduction in agri output
 - shortage of food and other agri-produce -> **inflation**
 - Reduced farmers income -> **increased farmer distress** -> increased farmer suicide
 - iv. **Other Economic and Social Impacts**
 - **Water Security:** Scarcity of drinking water -> **Health issues**
 - **Energy supply** may get impacted if the country increases its dependency on hydropower. (Note: India gets 17% of its electricity from Hydropower)
 - **Loss of livelihood** -> **unemployment** -> **Poverty** -> **Distress migration to cities, sale of property & livestock**
 - **Slowing down of secondary and tertiary activities** due to fall in agricultural production and decline in purchasing power.
 - **Increasing inequality** -> Drought hampers weaker section of society including farmers, landless workers, weavers, artisans etc.
 - **Social stress and tension**, disruption of social institutions and increase in social crime
 - Growth in superstition, increasing belief in supernatural powers etc.
 - v. **Increased inter-state and International river water dispute** -
 - e.g. the Cauvery water dispute between Karnataka and Tamil Nadu exacerbated during less rainfall year.
 - E.g. the disputes between India and China for the water distribution of 10 major rivers originating in Tibet

- **How is Drought Declared in India**
 - According to the Manual for Drought Management 2016 - **two factors** are considered for drought:
 - i. The extent of rainfall deviation (depreciation)
 - ii. The consequent dry spell
 - **Four indicators are used to assess the extent of drought**
 - Agriculture, Remote Sensing, Soil Moisture and Hydrology
 - Each impact indicator has various levels of severity
 - **For severely drought-hit** - at least 3 of the four indicators must indicate drought
 - **For Moderate drought-hit** - at least 2 (in addition to rainfall) must check out
 - **If only one indicator** (in addition to rainfall) checks out, the area is not considered to be drought affected.
 - **Impact of Drought Declaration**
 - In case of severe category of drought, assistance can be got from **National Disaster Response Fund** for mitigation and relief.
 - **Concerns of States**
 - States are unhappy with the recent drought manual as it has made it difficult to establish severity of drought and would drastically reduce assistance from the Centre's National Disaster Relief Fund (NDRF).
 - Sometimes only 10-20% of the state's area is under drought. In such cases Center has overlooked the severity of drought in a limited area and the state gets no assistance from the National Disaster Response Fund.
- **Drought Relief Measures / Coping with droughts**
 - Management of drought has now been outlined in much elaborate manner in the drought manual issued by the ministry of Agriculture and Cooperation.
 - **Drought Monitoring:** Continuously monitoring rainfall situation and the available water in various lakes, rivers, tanks etc. This will help us to plan better for the impending drought scenario.
 - **Contingency Crop Planning:** All the stakeholders need to prepare the contingency crop plan and disseminate it among farmers with the help to support agencies, mentioned below. The alternative crop planning involves choosing suitable crops and/ or crop varieties, alternative crop strategies, mid season's corrections and crop life saving measures.
 - **Relief Employment:** The most important relief component is the generation of employment provision during drought period. Extension of MGNREGA, Food for Work program of various states etc. can play a big role in relief employment.
 - **Water Resource Management** - One of the most critical task of relief operations - measures such as augmentation of water supply, rationing of water use, and efficient utilization and management of water resources, in both urban and rural areas
 - **Food Security** is one of the most important objective of drought management. It is provided through food for work programs etc.
 - **Relief through tax waivers and concessions**

- **Cattle Camp and Fodder Supply:** State governments need to support their farmers in protecting their cattle population during a drought situation by providing necessary assistance for fodder, feed, and cattle health. During the drought situation, every measure needs to be taken to save useful cattle. If the cattle wealth is depleted recovery will be slow.
 - **Health and Hygiene:** During drought health issues related to contamination of water and spread of infection among workers of public work program has been seen. Health relief is also an important component of drought relief.
 - **Institutional Response**
 - Drought management requires a strong institutional structure to monitor and provide a timely response to drought. While it is primarily the responsibility of the state government to manage drought, the central government also plays an important role in monitoring drought and providing financial assistance to the states.
 - The **district administration headed by the collector** plays the most critical role in responding to drought on the ground. At the central level, the ministry of Agriculture is the department responsible for drought monitoring and management.
 - **Role of Panchayati Raj Institutions**
 - It is necessary to include PRIs in all the operations as they are more connected to ground and have better understanding of the regional problems.
 - **Information management and Media Coordination**
 - The Central and State governments should provide information on all aspects of drought to people and media. It is necessary to inform the people about the severity and impact of drought and the measures being taken to alleviate the drought situation.
 - **Some Limitations of Drought Management in India**
 - Drought management continues to be inadequately addressed in India due to **improper planning and coordination** between different functioning units and **poor implementation** at the ground level.
 - There is a **lack of focus on long term sustainability and livelihood issues** and quick fix solutions are resorted too
 - **The process of declaration of drought** has been made **long and difficult** by the drought manual issued by central government in 2016.
 - This prevents timely relief measures like drinking water supply, subsidized diesel and electricity for irrigation, increasing number of days of work under MGNREGA etc.
- **Way Forward**
1. **Scientific mapping of Drought Prone areas**
 2. **A system of Early Warning** at least in drought-prone areas
 3. **Robust methodology for Drought declaration**
 4. **Holistic and Sustainable Development of Watershed** with community participation.
 5. **Efficient utilization of water in Agriculture** - since it accounts for 80% of India's water use
 - Awareness programs regarding the efficient use of water

- Using advanced improved methods of irrigation like micro-irrigation - sprinkler and drip irrigation.
 - **Change in cropping pattern.**
 - Awareness
 - Reform in MSP regime - to cover more millets, pulses, oilseeds etc.
 - **Rationalize electricity charges** for farmers - to prevent overuse and overexploitation of ground water.
6. **Preservation of Rain water in both Urban and Rural Areas** - Rainwater harvesting, Recycling of treated water.
- Improve and Implement building codes to promote water conservation and rainwater harvesting.
7. **Afforestation**
- It ensures water retaining capacity of the soil and also increases the chances of rainfall.
8. **Paris Agreement Targets**
- National Action Plan on Climate Change and State Action Plan on Climate Change needs to get into implementation mode very quickly.

9. DAM SAFETY

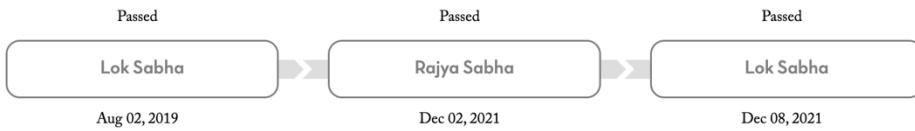
- **Why in news?**
 - In Oct 2023, Sikkim's highest Dam (Teesta-III Dam at Chungthang) was washed away after an GLOF which raised doubts about hydropower projects being developed in the country (Oct 2023)
 - Various reports have since revealed that there were no EWS, no risk assessment or preventive measures in place as required under the 2021 Dam Safety Act.
- **Example Questions**
 - Discuss the key provisions of the Dam Safety Act 2021. How far does it go in ensuring structural and operational safety of dams [12.5 marks, 200 words]
 - What are the key concerns related to Dam Safety in India? How far will the Dam Safety Act, 2021 be able to resolve these concerns? [10 marks, 150 words]
- **Introduction**
 - Dams are playing a very important role in the development of India. They not only supply water for irrigation, but also contribute in flood control and Energy generation (around 17% of India's total electricity).
 - In terms of **number of Dams**, India stands third in the world with more than 6,000 large dams in operation and another 400+ large dams under construction. Further, India has thousands of medium and small dams.
 - However, a **poorly maintained and ill-operated dam** can become a source of threat not only for human life and infrastructure, but also for the environment. Therefore, there has been a long felt need of a **uniform law and administrative structure** in the country for the purpose of dam safety.
- **Key concerns associated with Dam Safety in India**

- » **Very Old Dams** - around 4% (227) of large dams are more than 100 years old and 80% are more than 25 years old.
- » Many of these dams are located in earthquake prone zones.
- » India has faced 36 major dam failure in the past, the worst one of Machchhu Dam (Gujarat) in 1979 in which about 2000 people had died.
- » There are **varying degree of inadequacies** in meeting the current standards of dam health and safety.
 - **Poor Implementation** of the existing safety provisions
 - A report by CAG has found that
 - The structural strength of 348 large dams are suspect and they have not been inspected for over a decade.
 - Similarly, the **world bank report on Dam Rehabilitation and Improvement Project (DRIP) indicates** that the implementation of the program has been moderately unsatisfactorily.

- **Institutional Framework/Programs/Schemes dealing with dam safety in India**

- **The Central Water Commission**, Ministry of Jal Shakti through the National Committee on Dam Safety (NCDS), NDSO, SDSCO etc has been making constant endeavours in the direction of Dam Safety.
- **Dam Rehabilitation and Improvement Project (DRIP)** is being implemented by Ministry of Jal Shakti with assistance from World Bank.
 - The main objectives of DRIP are:
 - TO improve the safety performance of selected existing dams (223 dams across 7 states) in a sustainable manner
 - To strengthen the dam safety institutional set up in participating states as well as at central level.
 - The seven DRIP states are - Uttarakhand, Madhya Pradesh, Jharkhand, Odisha, Karnataka, Kerala and TN.
- **The Dam Health & Rehabilitation Monitoring Application (DHARMA)**
 - It is a webtool/app which is focused on digitizing dam related data effectively. It will help in easy identification of vulnerable dams and ensure need based rehabilitation.
- **Ministry of Power and DRDO have signed an MoU for vulnerable Hydro Projects/ Power Stations in Hilly Areas**
 - Under this they would work jointly together towards developing suitable mitigation measures against avalanches, landslides, glaciers, glacial lakes, and other geo-hazards
 - For vulnerable projects in hilly areas, expertise of DRDO will be used for developing comprehensive EWS.

1) DAM SAFETY ACT, 2021



- The act is aimed at helping states and UTs to adopt uniform safety procedure and thus ensure safety of the dams. It also gives statutory backing to various dam safety institutions and provides for strict punishment in case of the violation of the law.
- It provides for surveillance, inspection, and maintenance of all specified dams across the country.
 - » These dams are with height more than 15 meters, or height between 10 meters to 15 meters but with certain design and structural principle.
 - » The act establishes a **robust Institutional Framework for Dam Safety**.
 - It sets up **two national bodies**
 - i. **The National Committee on DAM SAFETY** which would evolve policies and recommend regulations regarding dam safety.
 - ii. **The National Dam Safety Authority** which would implement policies of the National Committee, provide technical assistance to State Dam Safety Organizations (SDSO) and resolve matters (dispute resolution) between SDSOs of states or between SDSOs and Dam Owners.
 - » The law also sets up **two state bodies**
 - i. **State Committee on Dame Safety** which will review work of SDSO, order Dam Safety Investigation, recommend dam safety measures and review the progress of such measures.
 - ii. **State Dam Safety Organization (SDSO)** will be responsible for surveillance, inspection, monitoring, operation, maintenance and investigation of dams.
- **Jurisdiction over dams**
 - » All specified dams will fall under jurisdiction of the SDSO of the state in which dam is situated.
 - » For dams owned by CPSU or which extends in two or more states or when a dam owned by one state is situated in other state, NDSA will have the jurisdiction and will play the role of SDSO.
- **What are states required to do?**
 - » Provisions require states to classify dams based on hazard risk, conduct regular inspections, create emergency action plan, institute emergency flood warning systems, undertake safety reviews and period risk assessment studies.
- **Duties and Functions of DAM owners** (sufficient funds, trained manpower, dam safety units to conduct regular inspections, mandatory presence of engineers during floods and emergency, install emergency flood warning system; carry out risk assessment at regular intervals)
- **Comprehensive DAM Safety Evaluation (CSE)**
 - The act provides for comprehensive safety evaluation by independent panel of experts at regular intervals.
- **Offences and Penalties** for violation of provisions

- **Analysis of the act : Key challenges/Limitations**
 - **Jurisdiction of Parliament on the issue** (**Entry 17 of the State List read with Entry 56 of the Union List**, gives powers to state to make laws on water supply, irrigation and canals, drainage and embankments, storage etc for intra state rivers) .
 - The **functions** of the NCDS, NDSA, SCDS are listed in the schedule of the act which can be modified by government through notification. Experts have raised concerns over this kind of overwhelming powers with central government.
 - **States Raising Concerns** regarding NDSA having jurisdiction over dams owned by one state but situated in others. Some states feel that this takes away rights of states over their dams.
 - Note: TN own dams in the state of Kerala (in Mullaperiyar, Parambikulam, Tunakadavu, and Peruvanipallam)
 - **States lack technical capability** to really implement the act in terms of number of trained personnel's, engineers etc.
 - The Sikkim GLOF reveals poor compliance at all levels of dam safety, from the dam's design to the spillway capacity.
 - **Environment Impact ignored**
 - The act does not contain any norms which relates to environmental impact in the upstream and downstream of the rivers.
 - **Lack of focus on operational safety** (like rate of filling or rate of water release) could lead to continuance of cases of Dam induced floods (e.g. Kerala floods, 2018)
- **Other problems related to Dam**
 - **Lack of coordination between states** leads to faulty management of dams.
 - For e.g., the recent floods in Odisha was caused by faulty management of Hirakud Dam. One of the reasons for it was lack of information from Chhattisgarh to Odisha regarding the flow of water.
- **Way forward**
 - **Set up the institutional framework envisaged under the law**
 - **Dam Safety Policy** should be finalized quickly to act as a guiding principle towards protection of Dams.
 - **Promote More transparency:**
 - Dam Safety is a public purpose and thus everything about dam safety, functions of institutions, their reports, decision minutes and agendas, everything should be promptly available to public.
 - **Human Resource development:**
 - We will need huge human resource for ensuring that trained people man dams, engineers are available for inspection and monitoring, emergency action plan etc.
 - **Land use plans** should have dam safety issues integrated in it.
 - **Operational Safety and Environment Impact** needs to be better integrated in the act and any future policies.
 - **Increased coordination between states:**
 - E.g. of the **United States web-based integrated risk management tool** called Dam Sector Analysis tool. The tool was developed using variables from dam failure models and decision support systems, which enables the software to project downstream risk in the case of a dam failure.

- Conclusion:

- India's first prime minister, Pandit Jawaharlal Nehru, had referred to dams as the 'temples of modern India'. These temples would remain a boon, only if all the stakeholders work towards eliminating risks associated with Dam Safety.



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1. GENERAL STUDIES – 2

1) BHUTAN: BASIC GEOGRAPHY FACTS

- Located in eastern Himalayas, it is bordered by China in the north and India in the south.
 - » **Indian states touching Bhutan:** Sikkim, West Bengal, Assam and Arunachala Pradesh.
 - » **Thimpu** is the capital and the largest city.
 - » **Phuntsholing** is its financial center.
- **Enduring Independence**
 - » The independence of Bhutan has endured for centuries, and the territory was never colonized in its history.
- **Polity**
 - » In 2008, it transitioned from an absolute Monarchy to a constitutional Monarchy and held the first election to the National Assembly of Bhutan, that was a two-party system characterizing Bhutanese democracy.
- **Geography**
 - » 72% of land area under forest. Committed to stay carbon neutral for all the times to come.
- **Religion**
 - » Vajrayana form of Buddhism is practices here as in Tibet.
- **Welfare**
 - » Healthcare and primary and secondary education are free in Bhutan and aid is provided on the basis of merit for higher education also.



A map of Bhutan showing its borders with Tibet and India as of 2015.



2) INDIA-BHUTAN

A) EVOLUTION OF INDIA-BHUTAN RELATIONS

- India and Bhutan enjoy long-standing and exceptional bilateral ties characterized by utmost trust, goodwill, and mutual understanding at all levels.
- **The Treaty of Punakha, 1910:**
 - Under this treaty, Britain (British India) guaranteed Bhutan's independence, granted increased stipend to Bhutan Royal Government and got control over Bhutan's foreign relations and defence. Thus, Bhutan had become a protectorate of British India.
- **1949 Treaty of Friendship:** After Independence of India, India and Bhutan came together for a new Treaty:
 - » The treaty called for peace between two nations and non-interference in each other's internal affairs.
 - » Bhutan agreed to let India "guide" its foreign policy and both nations would consult each other closely on foreign and defence affairs.
 - » The treaty also established free trade and extradition protocol.
 - » **Analysis**
 - The treaty had more or less succeeded in keeping India and Bhutan together.
 - On India-China issues, Bhutan has stood with India. This was seen in the 1962 war or later when Bhutan has not accepted the "package deal" for solving the boundary dispute between China and Bhutan.
- **Annexation of Tibet by China**
 - » **Brought India-Bhutan closer.**
 - Bhutan allowed India to build its first motorable road connecting Indian border to the country's capital Thimphu.
 - The period after this has seen increase in India's economic, military and development aid to Bhutan, which has also embarked on a programme of modernization to bolster its security.
 - » Indian leaders on a number of occasions have declared in the parliament that any aggression against Bhutan would be seen aggression against India.
 - » Further, both India and Bhutan have border disputes with China and thus are wary of China's misadventure in their territories.
- **Establishment of Direct Diplomatic Relations**
 - » Diplomatic relations between India and Bhutan were established in 1968 with the establishment of special office of India in Thimphu. Before this our relations with Bhutan were looked after by our political officer in Sikkim.
 - So in 2018, we have completed **50 years of diplomatic relations**.
- **Continuous Indian Support for Bhutan**
 - » Since 1960s, India has played a crucial role in infrastructure development of Bhutan. India constructed roads (under project Dantak by BRO), Bhutan's first airfield at Paro and provided grants/loans for a number of hydel power projects.
- **India-Bhutan Friendship Treaty of 2007**

» **Need of the new treaty**

- There was an increasing view among Bhutanese people that the 1949 treaty was an unequal one and that India may hold Bhutan hostage for its own geo-political interests under the treaty. This was creating friction in India-Bhutan relations.

» **Key Highlights**

- The treaty reaffirmed the two country's respect for each other's independence, sovereignty and territorial integrity.
- It has removed the provision requiring Bhutan to take India's "guidance" on foreign policy matter.
- The treaty also provides that India and Bhutan shall cooperate closely with each other on issues relating to national interest. Neither government will allow the use of its territory for activities harmful to the national security and interest of others.

» **Significance**

- The treaty has been good for India too as India had never invoked the "guidance" provision but the provision was used as an argument by our adversaries to portray India as a hegemon.
- Since this treaty, Bhutan has followed a more open foreign policy and have established diplomatic relations with many countries.

- **2007: Constitutional Monarchy** from absolute monarchy.

- **Efforts to strengthen Political Ties:**

▪ **Bilateral Visits:**

- Bhutan was the destination of PM Modi's first foreign visit in 2014. It showed the importance India gave to the political relations to our neighbouring countries and specially with Bhutan. The visit was seen as a 'charm offensive' that sought to check Bhutan-China relations that had recently been formalized. A number of steps were taken to strengthen India Bhutan relations. For e.g. India increased annual aid to Bhutan, increased scholarships to Bhutanese students and signed several agreements related to border infrastructure.

- In Nov 2014, the President of India visited Bhutan after a gap of 27 years. Agreements related to increased cooperation in the field of education and infrastructure was finalized.

- Visit of His Majesty, the Bhutanese King Jigme Khesar Namgyel Wangchuk to India (April 2023)

- India and Bhutan discussed the "entire gamut" of bilateral cooperation and issues of national and regional interests, and that the two countries share an "exemplary" relationship of "trust, goodwill and mutual understanding".

- Visit of His Majesty, the King of Bhutan to India (Nov 3-10, 2023)

• **Key highlights:**

- The visit saw discussions on the entire gamut of bilateral cooperation on regional and global issues of mutual interest.

- The two sides assessed the expanding partnerships between the two countries, including in new areas of connectivity in its broadest form, cross border trade infrastructure, trade and mutual investments, energy, Health, Education, Skill Development, Space technology, environment conservation, and close people to people contact.

B) IMPORTANCE OF INDIA FOR BHUTAN

1. Security

- India acts as overall security provider for Bhutan.
 - E.g. In the Doklam crisis issue, India had stayed with Bhutan
- The Indian Military Training Team continues to train Bhutanese soldiers.
- The 2007 agreement legally obliges both countries to respect each other's interest.

2. India's support for Socio-Economic Development of Bhutan:

- India is committed to Socio-economic development of Bhutan and is Bhutan's biggest development partner. For the 12th five year plan of Bhutan, India contributed Rs 4,500 crores which constituted 73% of Bhutan's total external grant component.
 - India has also committed to continue the support for Bhutan's 13th five years plan.
 - During his visit in Nov 2023, His Majesty Jigme Khesar Namgyel Wangchuk conveyed appreciation for the invaluable support that the government of India continues to provide for Socio-Economic development of Bhutan.

Bhutan also thanked India for the timely release of development assistance to ensure smooth and uninterrupted conclusion of crucial projects.
- India has funded a number of infrastructure projects through grants/loans in Bhutan.

3. India is Bhutan's most important economic and trading partner: :

- India accounts for about 80% of imports and 80% of exports of Bhutan.
 - The bilateral trade between the two countries has increased from 94 billion in 2020 to 134 billion in 2022.
- Bhutan's currency, the ngultrum, is only exchangeable with Indian rupee.
- Further, Bhutan trades with other countries through India.
 - For e.g. in Nov 2023, the two countries agreed to facilitate Bhutan's trade with Bangladesh by allowing Bhutanese trade items to be carried further from Haldibari in WB to Chilhati in Bangladesh.

4. India's assistance with hydropower projects and Bhutan's hydropower exports form a significant component of the win-win relationship between India and Bhutan.

5. Socio-Cultural significance of India

- The two countries share a strong cultural tie. India in the past have provided assistance to Bhutan in preserving various cultural heritage.
- India also provides scholarships and facilities for Bhutanese students to come and study in India.

C) WHY IS BHUTAN SIGNIFICANT FOR INDIA?

1. Strategic Importance: Combating China

- Bhutan's Geographical location is very strategic for India.
 - Bhutan's border dispute with China on the western sector includes Doklam plateau which lies immediately east of Indian defences in Sikkim. This piece of dominating ground not only has a commanding view of the Chumbi valley, but also overlooks the Siliguri Corridor (Chicken Neck) further to the east.
 - Bhutan in past has not accepted generous package deals of China in 1996, that offered larger disputed areas, in exchange for sections of the 269 sq km of Doklam plateau.
 - India thus needs strong ties with Bhutan to prevent this area ever going to China.
 - During Doklam standoff in 2017, Bhutan allowed Indian troops to enter Bhutan to resist Chinese incursions.
 - Bhutan also acts as a buffer between India and China.
- Increasing Chinese Presence in Bhutan
 - India is concerned over increased Chinese presence in Bhutan and its security impact for India

2. Internal Security

- Bhutan has taken action against North East Insurgent Groups
 - In the past, Bhutan undertook Operation All Clean (Dec, 2003 - Jan, 2004) to flush out thousands of BODO and ULFA militants from the jungles of southern Bhutan.

3. Energy Partnership in Hydro and non-hydro renewables:

- Hydropower cooperation is an important pillar of Indian Bhutan bilateral economic partnership.
 - For e.g. during the visit of King of Bhutan to India, the two sides welcomed export surplus power by Basochhu hydro power project through the Indian Energy Exchange beginning Oct 2023 paving the way for access to another energy market. The two sides also expressed satisfaction with the progress in construction of the 1020 MW Punatshangchhu-II hydro power project and looked forward to its early commissioning in 2024.
- In Nov 2023, the two sides agreed to extend the existing India-Bhutan energy partnership in hydro and non-hydro renewables, such as solar as well as green initiatives for hydrogen and e-mobility.
- **Importance of Hydroelectric Projects:**
 - More capacity will help Bhutan reduce its trade deficit with India.
 - Cheap Power is imp for dev of North-East and reduce floods in Assam valley.

4. Regional Connectivity and Sub-Regional Integration

- Nov 2023 visit of Bhutan's King Jigme Khesar was an important marker towards more bilaterally driven regional initiatives:

- A joint statement speaks of completing surveys for the Kokrajhar-Gelephu rail link that connects Bhutan to Assam, beginning discussions on another Bhutan to West Bengal rail link, while also facilitating Bhutan-Bangladesh trade, with yet another rail link, and upgrading checkpoints along the India-Bhutan border.
- These plans can contribute a lot in development of West Bengal and north-east India other than ensuring better regional connectivity.
- In past, there was a plan for BBIN MVA (Motor Vehicle Agreement).
 - But, Bhutanese Parliament decided not to endorse the plan over sustainability and environmental concerns. Therefore, In 2022, Bangladesh, Indian and Nepal moved ahead on Motor Vehicle Agreement without Bhutan. **BIN-MVA**.
 - ADB has supported the project as part of its South Asian Sub-Regional Economic Cooperation program.
 - World Bank has also announced its interest in supporting the infrastructure project.
- Though Bhutan is not participating in BBIN, its significance in improving regional connectivity can't be ignored. It is key to India's plan to push for subregional cooperation.

5. Support at various international forum

- Bhutan has regularly supported India at various international forums.
- It is also the only country which has not joined China's OBOR Summit (it doesn't even have diplomatic ties with Nepal)

6. New Areas of Partnership: It now encompasses Startups, Space and STEM education.

- Both sides recognize the progress made in the space sector including the launch of the first satellite jointly developed by India and Bhutan and inauguration of the satellite's ground earth station in Thimphu in 2023

D) SOME KEY ISSUES IN INDIA-BHUTAN RELATIONS

1. China's Growing economic and military influence in Bhutan poses a threat for India.

- » In October 2023, Tandi Dorji became Bhutan's first foreign minister to visit China and concluded 25th round of border negotiations. This visit underscores increasing signs of normalization of relations between the two countries.
- » India is currently observing the border negotiations carefully to ensure that the negotiations don't harm India's strategic interest.

2. Growing and Unsustainable Trade Balance:

- » Trade deficit of Bhutan in its bilateral trade with India has been seen as a cause of concern. Thus, Bhutan has been seeking more access to Indian markets which could reduce the trade deficits.
- » Bhutan trade deficit has worsened with GST which makes export cheaper and imports from Bhutan more expensive, putting at peril Bhutan's industrial sector.

3. Concerns related to Hydropower projects:

- » Bhutan has raised concerns that the terms associated with hydropower projects tend to favor India's interests. This has also led to negative public opinion regarding involvement of India in the hydro-projects in Bhutan.

4. Other Issues

- » There are other issues like delay in project completions, finalization of tariffs and the impact of GST on these projects.
- » GST has also impacted India-Bhutan trade.
 1. For e.g. GST has brought Bhutan's Cardamom export to India to a halt.

E) WAY FORWARD AND CONCLUSION

- **Engaging with Political Dispensation on all sides of the spectrum**
 - The perception that India is close to PDP (People's democratic party) who ruled from 2013-18 and not very close to DPT (Bhutan Peace and Prosperity Party) who rules from 2008 - 2013 and came to power again in 2018, needs to change.
- **Keep a close eye on Bhutan-China border negotiation** and keep **Bhutan engaged so that India's interest are not hampered in border settlement**.
- **Intensify Economic Cooperation:** India needs to invest more in infrastructure development of Bhutan. This will help Bhutan revive its economy, become self reliant and create employment opportunities for its people. This will also protect Bhutan from the carrot of economic support by China.
- **Increased Connectivity:** Sub regional integration will be crucial for all the countries of the region. It will not only contribute to integration of South Asian market, but will also keep China out of the region.
- **Efficient and time-bound execution of various agreements and infrastructure projects** is another key for strong bilateral relations.
- **Conclusion**
 - » India-Bhutan ties are built on spiritual underpinning, and imperatives of geography, economy and connectivity. The key to strengthening India-Bhutan relationship is for India not to show any insecurity about this relationship, or in any way attempt to stifle differing voice, but to pursue this relationship with trust and complete faith.

3) BHUTAN-CHINA BORDER ISSUE

- The main area of dispute between China and Bhutan are:

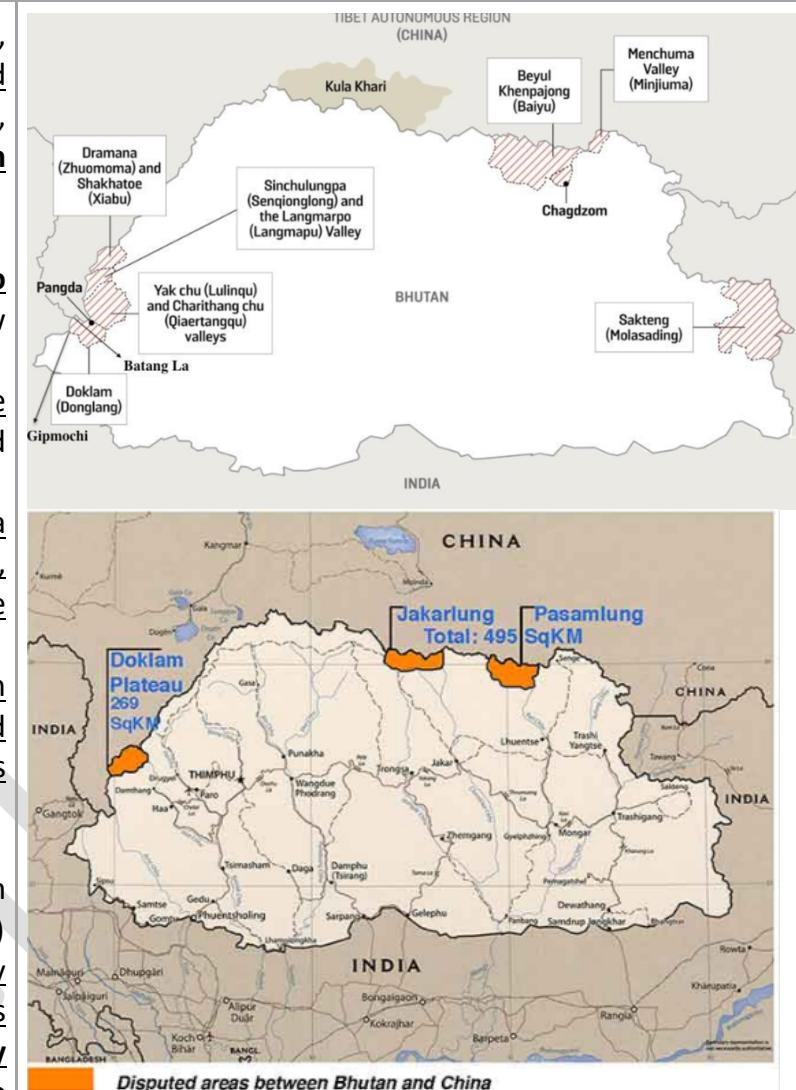
Disputed region in West: In the Western sector, China and Bhutan dispute are in Dramana and Shakhaote, Sinchulungpa and Langmarpo valley, Yak chu and Charithang valleys, and the Doklam region.

- These disputed regions are adjacent to China's strategic Chumbi valley - a narrow triangle between India and Bhutan.
- **Doklam** is the only trijunction area of the sector where the borders of China, India and Bhutan meet.
- Going by its current claims (Map-1) China intends to broaden and deepen the triangle, which will enable it to improve its offensive positioning against India.
- Having control over Doklam offers China an in-depth presence in the valley, and strengthens its surveillance capabilities across India's Siliguri corridor.

Jakarlung and Pasamlung - the two northern areas with a total area of 495 sq km. (See Map-2)

- Geographically this sector is considerably larger than the Western sector and is culturally crucial to Bhutan. But it holds very little geopolitical and strategic importance for China and India.
- As a result, China attempted to settle the dispute by unsuccessfully asking Bhutan to retain this region and cede the strategically crucial western sector. In the past Bhutan has rejected this package deal.

In the east, the Sakteng (See Map-1) region stands disputed. The assertion was made only in 2020 and presumably originates from Beijing's claim over Arunachal Pradesh. The region doesn't border China and hasn't been discussed in earlier negotiations.



- **Why is India concerned about China-Bhutan Border dispute?**
 - » If Doklam is ceded to China in the border dispute settlement, it would enable China to overlook the sensitive Siliguri Corridor that links mainland India to the north-eastern region.

- **Background of China-Bhutan bilateral relations:**
 - » Bhutan's relationship with China is determined by its long-standing reservations about opening up to the world and becoming embroiled in great power politics.
 - China's annexation of Tibet in the 1950s, and the subsequent seizure of eight Bhutanese enclaves exacerbated these concerns.
 - As a result, Bhutan had cutoff diplomatic relations with China and was hesitant to have diplomatic relations with the P5 countries.
 - It also embraced a special relation with India. China's perception of Bhutan being part of Tibet's five fingers continued to push Bhutan towards India.
 - » It was only with the beginning of bilateral talks in 1984 that China explicitly narrowed the disputed region to two sectors: In the north of Bhutan and in the West of Bhutan.

- **Why did China need to bring Bhutan on negotiating table?**
 - » For its status as an Asian power:
 - Bhutan is the only neighbouring country of China to have no diplomatic relations and 2nd out of 14 countries (other than India) to have unresolved border disputes. This challenges China's status as a rising power and Asian hegemon.
 - » Improving its offensive position vis-a-vis India.

- **Stick and Carrot strategy of China** to convince Bhutan to end the border dispute and establish diplomatic relations.
 - » Stick: China has continued to intimidate Bhutan by releasing new maps, encouraging border intrusions, weaponizing Tibetan herdsmen to drive away Bhutan grazers, and promoting settlements within Bhutanese territory. Further, in recent years, China has continued building new border villages in Bhutan's disputed North and Western sectors and has made new claims in Bhutan's Eastern sector.
 - In response, Bhutan has sped up its border dispute negotiations.
 - » Economic problems in Bhutan has also made Bhutan go close to China:
 - China's export to Bhutan have increased from 2 billion in 2020 to 15 billion in 2022.
 - Youth exodus triggered by structural issues and lack of opportunities has further necessitated the need for reforms.
 - For these reasons Bhutan see China has an inalienable partner for its path to recovery and reform.

- **In 2020, following the Galwan clashes - both Bhutan and China negotiated the three-step roadmap to demarcate borders on the table. 10th expert group meeting in 2021 and 11th, 12th and 13th in 2023 eventually culminated in 25th round of their border talks in Oct 2023.**
 - » IN 2021, Bhutan and China signed the 3-step Roadmap MoU.
 - It involves:
 - a. Agreeing to the border "on the table"
 - b. Visiting the sites on the ground

c. Formally demarcating the boundary

- » A **Joint Technical Team (JTT)** on the delimitation and demarcation of Bhutan China border was established in Aug 2023.
- » It can be noted that since 1984, Bhutan and China had held 24 rounds of talks to resolve the disputes until 2016. But the 25th round couldn't start due to Doklam standoff in 2017 and later due to Covid-19 pandemic.
- » The 25th round of talks held in Oct 2023 in China marked the end of 7 years of impasse. It was led by Bhutanese Foreign Minister Lyonpo Tandi Dorji and Vice Foreign Minister of China Sun Weidong. The talks also marked the first ever visit of a Bhutanese Foreign Minister to China.
- » **Key outcomes of the 25th round of border talks:**
 - The two sides signed a **Cooperation Agreement** detailing the function of the Joint Technical Team (JTT)
 - Both sides also expressed interest in ending the border dispute at the earliest and also exploring opportunities to establish diplomatic relations.

- **Analysis:**

- » **Bhutan realizes that it can no longer afford to ignore a swiftly changing world order** - where an assertive and economically mighty China plays a crucial role.
 - Bhutan is plagued by a number of challenges on economic front including dwindling foreign reserves, increasing trade deficit, weak private sector, looming debts etc. **China has hinted at prospects of cooperation and trade concessions for Bhutan with the establishment of diplomatic relations.**
- » At the same time, **Bhutan also needs to keep interest of its most trusted partner, India, in mind.**
 - Given **Bhutan's unique dependence on India**, there is little doubt that Bhutan will try to keep New Delhi on board in its efforts to normalize relations with China. One key redline will involve **keeping China away from southern Doklam's ridges** that overlook India's Siliguri corridor. **Infact, Bhutan has indicated that negotiations over the Doklam region would be a trilateral issue.** Similarly, in the East, it is unlikely that the concessions will include the Sektang sector - as it would open a new theatre of threat for India and also legitimize Chinas' claim over Arunachal Pradesh.
- » **India continues to watch the developments between China-Bhutan very closely:**
 - Closer ties between China and Bhutan (one of India's closest neighbours) is a cause of concern for India.
 - Despite the developments, **New Delhi hasn't made any public statements demonstrating its trust in this special relationship and understanding Bhutan's security and economic challenges.** India has understood Bhutan's reasoning in Thimphu's talks with China.

- India's interest will be best served by taking Bhutan on board and aligning strategies rather than by expecting acquiescence from a sovereign nation that will understandably pursue his own.
- Conclusion:
 - » India should approach the border negotiations between Bhutan and China with a greater understanding of Bhutan's reasoning, and with confidence that India's long-trusted neighbor will take both India's interests and its own consideration before any final agreement.



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1. GENERAL STUDIES – 2

1) INDIA SRI LANKA

A) SOME BASIC FACTS ABOUT SRI LANKA

Historically known as Ceylon, Sri Lanka is an island country located in South Asia. It lies in Indian Ocean, southwest of Bay of Bengal.

It is located between latitudes 5 degree 55' and 9-degree 51' North.

Gulf of Mannar and Palk Strait separate Sri Lanka from India.

Maritime Borders: Sri Lanka shares a maritime border with the Maldives in the south-west and India in the northwest.

Colombo, the largest city is also executive and judicial capital of Sri Lanka.

Important Ports of Sri Lanka:

1. **Port of Colombo:** The largest port of Sri Lanka. It is located at the mouth of river Kelani Ganga.
2. **Port of Hambantota:** It is also known as the Magapura Mahinda Rajapaksha port and is situated in the southern part of the SL. It is close to Asian and European marine trade routes, Suez Canal, and Malacca strait. It was constructed with the help of China's aid and has been given to China on a 99-year lease.
3. **Port of Galle:** Located on southwest of the country, it is the largest port of the region.
4. **Oluvil Port:** The port project was started in 2008 with the financial support of Denmark's foreign ministry. It is being developed in stages and 1st phase became operational in 2013.



1. **Port of Trincomalee:** It is located on the NE shores of SL and has the second largest natural harbour in the world. It is ten times bigger than the port of Colombo capable of accommodating ships of any size in its anchorage area.

B) POLITICAL HISTORY OF SRI LANKA

- **1948:** Independence proclaimed; D.S. Senanayake becomes the first Prime Minister.

- **1956:** Solomon Bhandarnaike was elected as the Prime Minister of Sri Lanka. He made **Sinhala the only official language**. More than **100 Sri Lankan Tamil people were killed** after the **Tamil members of parliament protested**.
- **1959:** Solomon Bhandarnaike was **shot by Talduwe Somarama**, a Buddhist monk. He succumbed to injuries the next day.
- **1960:** **Sirimavo Bandarnaike** becomes the **first women prime minister of the world**. She was sworn in on July 21, 1960, after her United national party won the elections.
- **1965:** **Opposition party wins** the election and **tries reverse the nationalization**.
- **1970:** **Sirimavo Bandarnaike reelected** and **brings back Sinhalese Nationalism**.
- **1977:** **LTTE was formed**
- **1983:** **'Black July' riots erupted** in Sri Lanka; about 400-3000 people were killed.
 - The **bilateral relations between India and Sri Lanka deteriorated** in **1980s** with rising Tamil militant separatism in Sri Lanka.
- **1987:** **Indo-Sri Lanka Accord**, which was intended to end the civil war between Sri Lankan Tamil nationalists and LTTE, signed.
 - It proposed a **political solution** to Sri Lanka's conflict by establishing a **provincial council system** and **devolution of power** for nine provinces in Sri Lanka. This is popularly known as the **Thirteenth Amendment (13A)** to the Constitution of Sri Lanka.
 - India also deployed **IPKF in Sri Lanka** intended to ensure peace (It is known as '**Operation Pawan**', which ultimately resulted in the assassination of PM Rajiv Gandhi)
- **1988:** Nationalist Janatha Vimukthi Peramuna (JVP) protest against the Sri Lanka-India agreement.
- **1990:** **Second Elam war breaks**. East province taken over by Sri Lankan Forces after heavy fighting. The LTTE continued to kill civilians in the Eastern Province.
- **1991:** LTTE suicide bombers kill Rajeev Gandhi in Tamil Nadu. He was instrumental in bringing the Indo-Sri Lanka accord.
- **1993:** An LTTE **suicide bomber kills Ranasinghe Premadasa**, the third President of Sri Lanka during a mayday rally.
- **1994:** President Kumaratunga again initiates peace talks with LTTE.
- **1995:** **The third Elam war breaks** out after a suicide squad attacked two naval vessels in Trincomalee killing 12 soldiers.
- **2000:** The EU criticizes both the Tamil Tigers and the Sri Lankan security forces concerning the human rights situation in Sri Lanka.
- **2003:** **The Sri Lankan government and LTTE holds peace talks and agree on a ceasefire**.
- **2005:** Rajapaksa elected for the first time.
- **2006:** The political killings, child soldiers, abductions, and clashes between the government and LTTE creates tension around the country. The Trincomalee massacre of students happened in 2006. **It was considered to be an act of state terror**. Vankalai massacre of four minority Sri Lankan Tamils. It was also considered to be an act of state terror.
- **2007:** Atleast 28 people which includes, 14 cadres of LTTE, die in clashes between the security forces and the Tamil Tigers in September.

- **2008:** Government blames LTTE after 12 civilians killed and 100 injured over a suicide bomb attack. **Government launches a massive offense ending the 2002 ceasefire agreement.**
- **May 2009:** Velupillai Prabhakaran was killed by Sri Lankan army. The war between the tigers and Sri Lankan military reaches its bitter end and the tigers decide to silence their guns in the interest of Tamil citizens.
- **2010:** Mahinda Rajapaksa re-elected. He promised to restore an Independent National Human rights commission along with other commissions.
- **2012:** Rajapaksa government dismisses UN report which states that Sri Lanka intimidated UN members investigating abuses at the end of civil war in 2009. The former Sri Lankan Army chief, Sarath Fonseka freed after 2 and a half years. Sri Lanka was in the same state when it came to ensuring justice to the victims of numerous Human Rights violations.
- **Jan 2013: Dismissal of Chief Justice**
 - Rajapaksa dismisses Chief Justice Shirani Bandaranayake after finding her guilty on three offences including financial irregularities.
- **Sep 2013:** Tamil National Alliance (TNA) wins election at the Northern provincial council.
- **2014:** President Mahinda Rajapaksa doesn't allow the UN to investigate the war crime during the Tamil Tiger insurgency.
- **2015:** Maithripala Sirisena defeats Rajapaksa in Presidential elections, pledging accountability over alleged atrocities during the civil war.
- **2017 - Jan:** Police clash with protestors demonstrating against a plan to evict villagers to make way for a mostly Chinese port and industrial zone near the port city of Hamabantota.
- **2018 - Oct:** Constitutional crisis as President Sirisena replaces Prime Minister Ranil Wickremsinghe with former President Mahinda Rajapaksa and suspends Parliament.
- **2019 Nov:** Gotabaya Rajapaksa, the younger brother of former president Mahinda Rajapaksa, wins the presidential election.
- **2020 Aug** - President Rajapaksa's SLPP party wins large majority in Parliamentary elections.
- **2022** - Protestors force President Gotabaya Rajapaksa out of office during an economic crisis.
- **2022-July:** Ranil Wickremesinghe elected President by MPs.
 - This was after the ex-president **Gotabaya Rajapaksa** fled the country after thousands of protestors stormed his presidential residences. The protestors had also called for resignation of Mr Wickrem Singhe, a close ally of Rajapaksa political family who was appointed Prime Minister in May 2022.

C) INDIA-SRI LANKA RELATIONS

Introduction

- **India-Sri Lanka relations** are more than 2,500 years old and are built upon, geographical, historical, cultural, economic and religious factors. Bilateral relations have traditionally been good.

- **The year 2023** is particularly significant in India-Sri Lanka relations as it marks 75 years of diplomatic relations between the two countries and 200 years of the arrival of Tamil community in SL.
- **Both ethnic groups of SriLanka** (Sinhalese Buddhist and Tamils) have origins in India.
 - » Sinhalese Buddhist who constitutes 80% of the population claim to have come from Orissa in the 5th century BCE.
 - » Tamils are the other ethnic group who constitute 20% of the population.
- **Traditionally**, as Sri Lanka's close neighbor, India has had a huge influence in the Island Nation's political, economic, social and cultural consciousness and its world view.
- **But** the relations saw deterioration in 1980s.
 - » SL accused India of supporting the Tamil Separatists in the north of Sri Lanka.
 - » Ethnic Civil war created lakhs of refugees creating security concerns in India.
- **The Year 1987** saw the signing of India-Sri Lanka Peace Agreement.
 - SL amended the constitution to establish provincial councils, but it is not in practice till now.
 - India sent IPKF to see the implementation of the agreement. But LTTE didn't accept it leading to war. It led to death of 2,000 Indian soldiers and later the death of former PM Rajeev Gandhi.
- **Hands off Policy of India** in 1990s:
 - In 1990s India followed hands off policy which **gave space to extra-regional players**. This is seen as a strategic mistake on India's part by various international relations experts. It led to increased influence of China in Sri Lanka.

Factors Which Bind India and Sri Lanka Together:

1. **Geopolitical Significance of SriLanka for India**: Geographical location of Sri Lanka gives it a strategic place along the major sea lanes of communication from Europe to East Asia.
2. **Strong Political Cooperation**:
 - Sri Lankan Presidents, PMs, and foreign ministers have generally made New Delhi their first overseas destination, within days or weeks after taking charge.
 - For e.g. President Maithripala Sirisena visited India in Feb 2015 and May 2016.
 - Similarly, after getting elected for 2nd term in 2019, Sri Lanka was the first destination for PM Modi.
 - In July 2023, President Ranil Wickremesinghe visited India and took several steps towards strengthening of bilateral relations.
3. **Promoting Regional Cooperation**: Sri Lanka is both a member of SAARC and BIMSTEC and thus will play a crucial role in India's efforts to increase the regional cooperation in South Asia.

4. **Commercial Partnership** is very vibrant between the two countries and has witnessed considerable expansion in recent years. The coming into force of India-Sri Lanka FTA (ISFTA) in 2000 contributed to the bilateral trade.
 - India continues to remain the largest trade partner for SL.
 - India is also among the largest investor in SL.
 - After a five-year hiatus, in Nov 2023, India and Sri Lanka have relaunched talks on the Economic and Technology Cooperation Agreement. The 2 sides held 12th round of negotiation on the agreement in Colombo.
5. **Development Cooperation:** India's development portfolio is quite wide in Sri Lanka. It includes housing projects, education, health, agriculture, infrastructure etc.
6. **India's support during the financial crisis of Sri Lanka:**
 - India offered Sri Lanka assistance of \$4 billion through currency swaps, loan deferrals, loan facilities, and multiple line of emergency credit.
 - India also lobbied for Sri Lanka in the IMF and the Paris Club (despite not being a part of it). India became the first country to assure IMF of its debt restructuring to Sri Lanka.
7. **Cultural Aspects and People to People Contact:**
 - Other than Tamils, 1,000s of people of Indian origin comprising of Sindhis, Gujaratis, Memons, Parsis, Malayalis and Telugu speaking persons have settled in SL and are engaged in various business ventures. Each of these communities have their own groups which organize festivals and cultural events.
 - The Cultural Cooperation Agreement has been signed between both the countries. The Indian cultural centre in Colombo actively promotes awareness of Indian culture by offering classes in Indian music, dance, Yoga etc.
 - Education is another important area of cooperation between India and Sri Lanka. India offers scholarship slots annually to deserving Sri Lankan students.

President Ranil Wickremesinghe's India visit (July 2023)

Nearly a year after being sworn as the President of SL, Ranil Wickremesinghe visited India in July 2023. The visit was significant in the growing relations between the two countries.

- **Key Highlights:**
 - A joint statement on economic cooperation titled "Promoting Connectivity, Catalyzing Prosperity: India-Sri Lanka Economic Partnership Vision" was released after talks between PM Modi and President Wickremesinghe. It lays out vision in five areas: Maritime, Air, Energy, Trade and People to People initiatives.
 - » **New Investments in Maritime and Air Connectivity** will involve developing ports and airports in Sri Lanka, resuming ferry services, expanding flight networks to TN and SL's northern and eastern province.
 - The two sides have also agreed to do feasibility study on land bridge (consisting of railway line).

- » **A major surge in energy connectivity** will include renewable energy wind and solar plants in Sri Lanka. The two countries have also agreed to establish a power grid interconnection for bidirectional trade.
- **Trade, Economy and Finance:**
 - » Both sides agreed to boost private sector investments, recommence discussions on the Economic and Technology Cooperation Agreement, use the rupee as a currency for trade, and operationalize UPI (digital connectivity).
 - » They also agreed to explore the ways of enhancing tourism and cultural religious travel and educational collaboration.
- **Together, the idea was to promote 'civilization ties, geographical proximity, cultural connect, and age-old goodwill between the people of two countries'.**
- **Concerns:**
 - » None of the written documents released during the meet acknowledged previous commitments by Sri Lanka on honoring the 13th amendment for devolution of powers to the North and Eastern Provinces, and for resolving the long-pending issues over arrest of Indian fishermen.
- **Conclusion:**
 - » The recent visit is an attempt to build on the looming optimism. Both countries hope that connectivity will bring them together, build their trust, and further their interest.

Key Pain points/Challenges in India Sri Lanka Relations:

1. **Increasing Penetration of China in Sri Lanka**
 - China, as part of their string of pearl strategy is trying to encircle India by building strategic ports all along the Indian Ocean including in Pakistan (Gwadar), Bangladesh (Chittagong), Myanmar (Kyauk Phru) and Sri Lanka (Hambantota)
2. **Tamil Issues:**
 - Ethnic conflict between the Sinhala majority and Tamil Minority in SL has severely undermined the bilateral ties between the two countries in recent decades.
 - Repatriation of refugees is another bone of contention
 - Post war political and human rights issues; and India voting in UNHRC.
3. **Fishermen Issues and Kachathivu Island Issue**
 - Incidents of straying of Indian fishermen in SL waters cause regular tensions between the two countries.
4. **Domestic Politics of Sri Lanka:**
 - While the current SL government has indicated a strong desire to increase integration and connectivity with India, India is worried if this kind of commitment will continue with future governments or not. As Sri Lanka heads to presidential elections in 2024, India has

to be watchful about if the appetite for connectivity and integration will persist with the future government.

Way Forward for India

- » **Economic Integration of SL with India:**
 - Closer economic integration between India and SL can result in technology transfer, skill transfer, and investment flow towards SL.
 - Establishment of a land bridge between TN and SL can lead to increased trade between South India and impoverished northern part of SL.
 - China's passivity and India's proactive assistance during SL's financial crisis has encouraged Sri Lanka to embrace a major geopolitical turnaround and calls to integrate with India are increasing in Colombo.
 - This integration will also be supported by positive sentiments about India among Sri Lankan population in general. India's future support in strengthening and development of areas such as agriculture, dairy sector etc can have a lot of positive impact on the lives of people and create positive sentiments about India.
- » **Prosperity through connectivity:** 'Positive transformation' in India Sri Lanka relations can be brought through increased connectivity.
 - During the visit of SL President Ranil Wickremsinghe in 2023 an agreement for exploring the possibility of land bridge (positively) having railway line was signed.
 - Another very significant outcome was the joint decision to 'carry out feasibility studies on establishing a petroleum pipeline (energy connectivity)'. This will ensure fuel sufficiency and thus energy security for Sri Lanka.
 - After Nepal and BD, Sri Lanka is the third neighbours with whom India is building 'energy connectivity', both in petroleum and power grid.
 - Other agreements related to maritime connectivity, energy connectivity and fintech connectivity were also discussed.
 - More work can also happen on maritime connectivity and air connectivity.
 - E.g. the recent restart of Kankesanthurai-Nagapattinam ferry service after almost 40 years.
 - All these connectivity initiatives are in sync with '**India's Neighborhood First**' policy and '**SAGAR**' Vision.
- » **India should consolidate its fragmented aid program:** Currently Indian aid is routed via multiple ministries and agencies. A single development bank will be much better.
- » **India should engage with all sides of the political spectrum in SL:** This would ensure that the process of cooperation, connectivity and integration between India and Sri Lanka will continue irrespective of the results of the 2024 Sri Lankan elections.
- » **On Ethnic Issue,** SL should ensure that aspirations of Tamils are fulfilled, and the process of rebuilding should ensure equality, justice and peace.
- » **Strengthening Security Cooperation:** SL needs to understand India's security concerns better.

vi. Conclusion:

- "Security and development interests of the two countries are intertwined, and therefore "it is essential that we work together, keeping in mind each other's safety and sensitivities" PM Modi.

2) SOME ISSUES IN INDIA-SRILANKA RELATIONS (DETAILS)

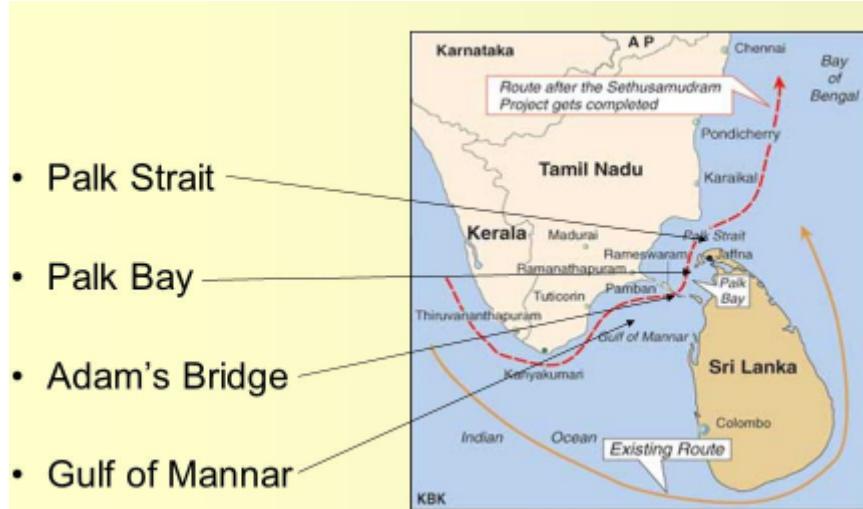
A) CHINA

- **Background:**
 - In 2000s, China realized Geographic strategic importance of Sri Lanka which straddles the Indian Ocean and halfway between Gulf of Aden and Malacca Strait.
 - It understood the significance of SL to challenge both India and US naval forces in the Indian Ocean.
 - During the SL civil war, it provided arms and training to SL army. India was hoping that China's influence will reduce once the war was over. But the outcome was quite contrary. Currently, China has emerged as the biggest investor of Sri Lanka.
- **China's increasing Influence in SL and India's concerns:**
 - **Increasing Chinese Military Presence:** China's string of pearl strategy.
 - » Visit of Chinese Spy vessels (termed as 'research vessel by China') to Sri Lanka:
 - For e.g. in 2022, Chinese vessel the **Yuan Wang 5**, docked at **Hambantota port** in Sri Lanka. It was considered a ballistic missile and satellite tracking ship.
 - China reportedly has 7 such tracking ship, which can operate in the Pacific, Atlantic, and Indian Oceans. This ship-based monitoring adds to China's land based tracking system.
 - **Chinese continue to claim** that these are scientific missions. But the Indian suspicion of China using these missions for military purpose, including intelligence gathering is also substantial.
 - **China is also using Hambantota port** to refuel its warships and other ships that are present at any given point in time across western-eastern and southern ocean regions.
 - **Military Cooperation:** China has provided military assistance to Sri Lanka including training and equipment. This cooperation strengthens China's military presence in the Indian Ocean region and gives it greater influence over SL's military policies.
 - **Huge Chinese debt to Sri Lanka:**
 - » **China owns 52% of Sri Lanka's debt.** And thus, Sri Lanka is too dependent on China and may succumb to Chinese pressure and compromise India's security.
 - **Economic Relations**
 - » **Investments** China has invested in road infra, power plants, railways, EEZ, water supply (softening) etc.
 - » **Trade:**
 - China has emerged as the largest trade partner of SL
 - Sri Lanka and China are negotiating an FTA.
 - » SL is also participating in China's OBOR and under this China has built two ports - one in Colombo and another in Hambantota.
 - **Soft power:** China is using various soft power mechanisms, such as cultural exchange programs and scholarships, to increase its influence in Sri Lanka. This approach is subtle, but plays an important role in shaping public opinion.
 - **How has India tried to counter China's influence in SL?**
 - a. **Economic Measures:**

- India was proactive in supporting Sri Lanka during its financial crisis of 2022.
 - **Increased Investment:** India's investment in China has significantly improved. India is focusing on the development of ports, railways, roadways, housing infrastructure etc.
 - India is also planning to build Trincomalee port. The port is envisioned as an Indian counterweight to Chinese development at Hambantota port.
 - In 2015, India-Sri Lanka signed the civil nuclear agreement making India the first country to do so.
- b. **Increased focus on Connectivity:**
- The 2023 visit of President Wickremsinghe to India primarily revolved around connectivity. India has focused on various types of connectivity (exploring land bridge, beginning of ferry after 40 years, maritime and air connectivity, energy connectivity, digital connectivity etc.).
- c. **Political:**
- Recent bilateral visit between the two countries have increased.
- d. Since 2014, India has abstained from voting on UNHRC resolutions against SL.
- e. India is also collaborating with other regional powers like Japan and France to counter China's influence in SL and promote a rule-based order in the Indo-Pacific region.
- f. **Other aspects of relationship** as discussed in India-SL topic.
- **Conclusion:**
- » India remains suspicious of China's increasing presence in the Indian Ocean and its influence on SL, which is strategically placed halfway along key east-west international shipping routes.

B) FISHERMEN ISSUE

- **Why in news?**
- » In Aug 2023, the chief minister of Tamil Nadu M.K. Stalin revived the debate over Kachathivu, by reiterating the demand for retrieval from Sri Lanka. (Aug 2023)
- **Example Questions**
- » What are the key factors behind Indian fishermen regularly trespassing into Sri Lankan waters? Suggest some measures to deal with the issue? [15 marks, 250 words]
- **Background**
- » The Palk Bay, a narrow strip of water separating the states of TN in India from Northern Provinces of Sri Lanka, has historically provided rich fishing grounds for both countries.
- » Historically, the shallow waters of Palk Bay and geographical contiguity between India and Sri Lanka facilitated the movement of ideas, goods and men. The bonds of ethnicity, language, and religion helped fisherman lead lives of harmonious coexistence for several centuries. Frequent migration, inter-marriages were very common.



- » During the height of civil war, SL had imposed ban on fishing because of fear of LTTE's Boat Bombs. Indian fishermen exploited the situation and crossed IMBL (international maritime boundary line). During this phase there was perfect camaraderie among Indian Tamil and Sri Lankan Fishermen as Sri Lankan Tamils who came to India as refugees were also being employed by Indian trawlers.
- » End of Civil War in SL in 2009:
 - The conflict has taken a new dimension since the end of Sri Lankan Civil war. The region has become highly contested site in the last 13 years.
 - Sri Lankan Tamils had lost ground to Indian fishermen.
 - Sri Lanka's complain of frequent trespassing of Indian fisherman in its waters.

- Main Issues (1. Kathchatheevu Island 2. Trespassing on IMBL 3. Economic and Environmental Issues)

» Kathchatheevu Island:

- About the Island: it is an uninhabited and barren 285 acre islet. It is located around 14 nautical miles from Rameshwaram.
- Ongoing disagreement over the territorial rights to the island of Kathchatheevu.



- Maritime Boundary Agreement of 1974: PM of India Shrimati Indira Gandhi and PM of SL Sirima R.D. Bandaraike, signed an agreement to demarcate the boundaries between the two countries.

countries. A close personal relations between both Prime Ministers, Indira Gandhi and S. Bhandarnaike, facilitated the successful conclusion.

- **Opposition to agreement:** During the parliamentary debate, most of the opposition including DMK, AI DMK, Jan Sangh, Swatantra and Socialist Party, staged walkout in both houses.

» TN government and opposition parties had also criticized the transfer of Kathchatheevu and said that it didn't reflect the realities on ground.

» In the last 15 years, both Jayalaithaa and Karunaidhi had approached the Supreme Court on the matter.

- **What is the current stand of GoI?**

» In Dec 2022, the Union government, while referring to the two agreements, pointed out in its reply in the Rajya Sabha that Kathchatheevu "lies the Sri Lankan side of the India-Sri Lanka International Maritime Boundary Line". It also added that matter was subjudice in the SC.

- **Note:**

- The 1974 agreement had allowed Indian fisherman some traditional rights around Kathchatheevu island.

- St. Anthony's Church there holds an annual festival either in Feb or March drawing devotees from both sides of the Palk Bay, a tradition which has been going on.

- A supplemental pact in 1976 made it clear that fishing vessels and fishermen of the two countries "shall not engage" in fishing in the historic waters, territorial sea and EEZ of either of the countries.

» **Trespassing by Indian Fisherman :** Frequent poaching by Indian fisherman into Sri Lankan waters. This causes Indian fisherman from coastal TN and Puducherry getting frequently arrested by the SL navy for "poaching" or engaging in illegal fishing activity in Sri Lankan waters.

- Several rounds of bilateral negotiations between the two countries and talks between fishing community leaders from both sides have been held over the years, but a solution remains elusive.

» **Economic and Environmental damages due to use of mechanized deep water trawlers:**

- Deep water trawlers drag fishing nets through the seabed. The practice scoops out eggs, young fishes, and other marine organisms that eventually die and are thrown back into the sea.
 - This causes long term damage to both economy and environment.

- Reasons for these issues

- a. No well-defined boundary line between the two nations despite the 1974 agreement. It leads to fishermen trespassing into Sri Lankan waters in search of better catch.
- b. LTTE issue had raised vigilance.
 - To check intermittent flow of Tamil Refugees
 - To prevent flow of armed supplies to Tamil Militant groups.
- c. Historical Perspective

- Both Indian and Sri Lankan fisherman fishing in the Palk Bay area for centuries.

Other complaints against Indian Fishermen

- Deep Sea trawling: TN is yet to agree to the chief demand of the northern Tamil Fishermen - to stop bottom trawling to restore trust between both the sides.
- Misuse of Kathchatheevu rights given to Indian fishermen.

- Impact

- » **Bilateral Relations:** Cases of arrest of Indian fishermen by Sri Lanka leads to worsening of relations between the two countries.
- » **Economic losses:** Unsustainable fishing from the region is depleting fishing resources of the region and impacting livelihood for fishermen on both sides.
- » **Palk Bay's Marine ecology** is also suffering impacting both environmental and economic sustainability.
- » **Increasing harassment of Indian fisherman :** Sri Lankan Navy has taken tough stand on the breaching of International Maritime Boundary and resorted to arresting , killing and damaging of boats.
- » **Tensions between TN and Central government in India:**
 - TN assembly has passed a resolution asking Indian government to take over Kathchatheevu island.

- Possible Steps that can be taken

- a. Developing fish farming extensively in Indian waters would prevent our fishermen from venturing into Sri Lankan waters for 'big catch'.
- b. India can also think of leasing fishing blocks, especially those identified as 'surplus' total available catch, from Sri Lanka.
 - One option could be to get back the island of Kathchatheevu on "lease in perpetuity"
- c. Strict and complete ban on mechanized trawlers - to preserve marine resources
 - It is banned in Sri Lanka, so ban by India would ensure equal rights for Sri Lankan Tamils
 - It would also reduce animosity between the fishermen of two countries.
- d. Educate Indian fishermen to keep on the Indian side on high sea : Use devices integrated with GPS to check weather on Indian waters or not.
- e. Greater cooperation between coast guards of the two countries.
- f. Permit licenses Indian fishermen to fish within designated area of Sri Lankan waters and vice versa.
- g. The two government could also consider the creation of Palk Bay Authority, comprising fishery experts, marine ecologists, fishermen's representatives, strategic specialists, and government officials. It should include officials from both governments.
 - The authority should determine ideal sustainable catch, type of fishing equipment that can be used, and the number of fishing dates for Indian and Sri Lankan fisherman.
 - Special provisions could be made to protect the interest of traditional fisherman.

- Conclusion:

- Fishermen issue has remained a bone of contention in the bilateral relations of the two countries for long now. The recent cordiality in relations between the two countries gives an opportunity of bringing back the issue of table and find a long-term sustainable solution to the problem.

C) TAMIL ISSUE

- Why in news?

- Focusing on 13-A sans police powers 'practical': Ranil Wickremesinghe tells Parliament (Aug 2023)

- Important concerns from India's perspective:

- » Repatriation of refugees currently in India

» Post war political and human rights issues:

- » Key concerns of Tamils include military involvement in civil life in north and eastern province, occupancy of land by armed forces; women security;

▪ Lasting political solution to address the grievances of Tamil people: 13th Amendment:

- Born out of Indo-Lanka accord of 1987 - 13th amendment has remained a long pending demand of Tamil National Alliance (TNA), the main party representing the island's Northern Tamils.
- The amendment envisages substantive devolution of political powers to the provinces.

- India stands for United SL and devolution of powers to provinces.

- PM Modi, in his press conference after meeting Mr. Wickremesinghe on 21st July 2023 aid: "We hope that the Government of Sri Lanka fulfill its commitment to implement 13th amendment and conduct provincial council elections"

- In Aug 2023, Sri Lankan President Ranil Wickremesinghe reiterated his offer to the Tamils of implementing 13th Amendment without police powers, while proposing a step-by-step approach to devolving powers to provinces.

- » Under the 13th Amendment, police powers have emerged as the most delicate issue in the transfer of authority to the Provincial Councils.

- » The Tamil National Alliance (TNA), the largest parliamentary grouping of Tamil legislators from the island's north and east, 'categorically rejected' it saying that the proposal is far from meaningful power devolution based on federal arrangement.

- India's voting at UNHRC:

- » Differences over former President's reluctance to address post-war political and human rights issues relating to the Tamil minority led to India voting against Sri Lanka twice (2012 and 2013) at the UN Human Rights Council and abstaining once.

- » But, since 2014, India has abstained from voting in resolution criticizing Sri Lanka.

- » In 2022, also India abstained from voting on a resolution on Sri Lanka at the UNHRC, while observing that Sri Lanka's progress in implementing commitments on the 13th Amendment, meaningful devolution, and early provincial elections remains "inadequate".

- The resolution was passed, and called upon the government of Sri Lanka to ensure prompt, thorough and impartial investigation and, if warranted, prosecution of all alleged crimes relating to human rights violation and serious violation of international humanitarian law.

- Earlier, in 2021 also India had abstained from voting a resolution against Sri Lanka.

D) RECENT START OF FERRY SERVICE (USEFUL FOR PRELIMS)

Passenger Ferry Service between India and Sri Lanka begins again after nearly 40 years (Oct 2023)

Background:

- » Maritime linkage between India and Sri Lanka isn't new. The Indo-Ceylon Express of Boat Mail ran between Chennai and Colombo via the Thoothukudi port from the early 1990s up until 1982.
- » However, the Civil war in Sri Lanka resulted in the halting of these services.

Re-beginning:

- An international, high-speed passenger ferry service between Nagapattinam on eastern coast of TN and Kankesanthurai in the northern province of SL, has resumed from 14th Oct 2023.
- The high - speed craft (HSC) Cheriyapani, embarked on its journey with 50 passengers and 12 crew members.

- Significance:

- » The initiative is aimed at bolstering bilateral ties, boosting tourism, and increasing people-to people contact. It will bring our countries, people and hearts closer.
 - PM Modi has called this a new chapter in diplomatic and economic ties between India and Sri Lanka.
 - Increased connectivity between the two nations whose people have travelled across the Palk bay for centuries.
 - The service will strengthen cultural ties by boosting religious tourism. From India, travelers can access significant religious sites in Colombo and southern parts of SL. Indian Pilgrim centers such as Nagapattinam, Nagore, Velankanni, Thirunallar, and temple towns such as Thanjavur, Madurai, and Tiruchi, are expected to see an influx of Lankan tourists.
 - It will also strengthen cultural ties between the two nations as several religious places could be visited through this service.

3) PARIS CLUB

- Why in news?

- » **Sri Lanka reaches agreement with India, Paris Club on debt treatment** (Nov 2023)

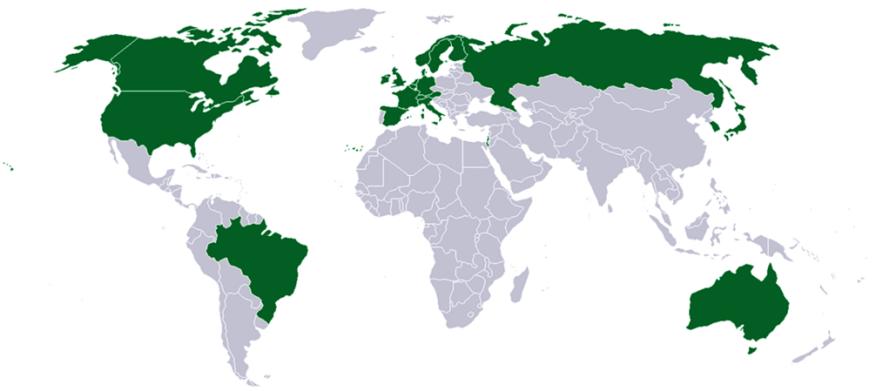
The Paris Club is a group of mostly western creditor countries that grew from a 1956 meeting in which Argentina agreed to meet its public creditors in Paris.

- It describes itself as a forum where official creditors meet

to solve payment difficulties faced by debtor countries.

- When debt countries undertake reforms to stabilize and restore their macroeconomic and financial situation, Paris Club Creditor provide an appropriate debt treatment.

Their objective is to find sustainable debt relief solutions for countries that are unable to repay their bilateral loans.



Map showing Paris Club countries highlighted in green. (Via Wikimedia Commons)

There are 22 members to this grouping and all of them are members of OECD

Members are: Canada, USA, Brazil, Ireland, UK, Spain, France, Italy, Switzerland, Germany, Belgium, Netherlands, Denmark, Austria, Norway, Sweden, Finland, Russia, Japan, South Korea, Israel, and Australia.

» **How many agreements have Paris Club been involved in?**

- Since its beginning, Paris Club has reached 470+ agreements with 102 different debtor countries. Since 1956, the debt treated in the framework of Paris Club Agreements amount to more than \$610 billion.

» **How has Paris Club been involved in debt agreements: Key Features of Paris Club Debt Agreements:**

- **Principle of Consensus and Solidarity:** Any agreement reached with debtor country will apply equally to all its Paris Club creditors.
- A debtor country that signs an agreement with its Paris Club Creditors, should not then accept from its non-Paris Club commercial and bilateral creditors such terms of treatment of its debt that are less favorable to the debtor than those agreed with the Paris Club.

» **The role and importance of Paris Club Creditors:**

- The Paris Club countries dominated bilateral lending in the last century, but their importance has receded over the last two decades or so. This is because of rise of China as the world's largest bilateral lender.

» **Sri Lanka agrees debt restructuring with Paris Club Creditors and India (Nov 2023)**

- Sri Lanka has reached an "agreement in principle" with India and the Paris Club group of creditors including Japan, on a debt treatment plan that will help the crisis hit island nation tap the next tranche of the IMF's nearly \$3 billion recovery package.
- **Background:**
 - Due to economic crisis, Sri Lanka defaulted on its nearly \$51 billion foreign debt. Therefore, restructuring of loan became necessary to begin its economic recovery plan.

- Major lenders formed OCC (Official Creditor Committee) in May 2023 in response to Colombo's request for debt treatment.
 - This OCC is co-chaired by India, Japan, and France, as chair of the Paris Club.
 - This committee held several discussions with Sri Lankan officials over the last few months, evaluating possible options in recasting Colombo's outstanding debt, such as altering the interest payments or the term of loans.
 - China, which is the largest creditor of Sri Lanka has decided to stay out of the platform but attended the meeting as observer.
 - **Japan and India**, the two other largest creditors for Sri Lanka have called for the need for creditor parity and transparency.

- » In Nov 2023, the OCC [Official Creditor Committee] and Sri Lanka agreed on the main parameters of a debt treatment consistent with those of the Extended Fund Facility arrangement between Sri Lanka and IMF.
 - The parameters of the agreement have not been finalized yet, but the Paris Club said that OCC is ready and looks forward to formalizing the agreement in the coming weeks in a MoU with Sri Lanka.
 - OCC has also noted that it expects that "other bilateral creditors" (a reference to China) should consent to sharing in a transparent manner, the information necessary for the OCC to evaluate comparability of treatment regarding their own bilateral agreement.
 - The OCC further asked Sri Lanka to continue to engage with its private creditors - who would hold the largest chunk of the island's foreign debt - and swiftly firm up "an agreement on terms at least as favorable as the terms offered by the OCC".
 - China has assured Sri Lanka of cooperation in the debt restructuring process and Sri Lanka has, in turn, assured other creditors of China's transparent participation, but the specifics of the possible debt treatment plan are awaited

4) COMPREHENSIVE NUCLEAR TEST BAN TREATY (CTBT)

- **Why in news?**
 - » **Russia** passes a law revoking Russian ratification of nuclear test ban treaty (Nov 2023)

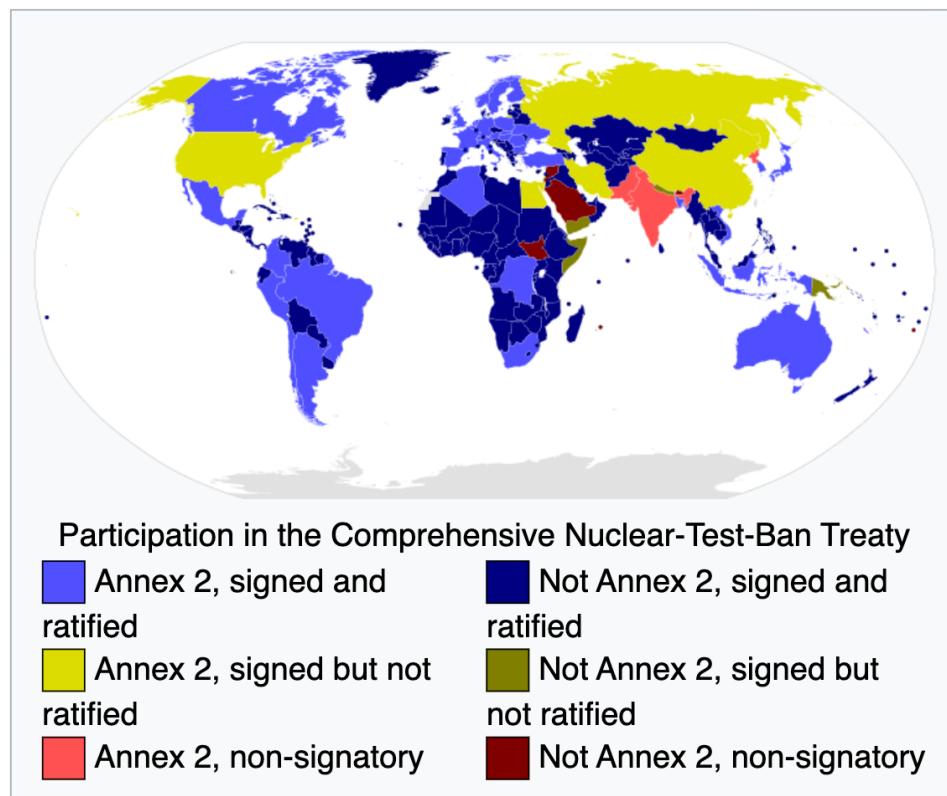
- **Introduction**
 - » CTBT is a multilateral treaty by which states agree to ban all nuclear explosions in all environments, for military or civilian purposes.
 - **Need:** Between 1945 and 1996, over 2,000 nuclear tests were conducted – mainly by the US (over 1,000), Soviet Union (700) and France (200) – the treaty was brought to bring this to halt.
 - » The treaty was negotiated at the Conference on Disarmament in Geneva and adopted by the UNGA in 1996. But the treaty has not entered into force yet, due to the non-ratification of the 8 specific nations.

 - » **When would the treaty come in force?**
 - The treaty would enter into force 180 days after the 44 states listed in Annex-2 of the treaty ratify it. These annex-2 states are those states which participated in the CTBT's

negotiation between 1994 and 1996 and possessed nuclear power reactors or research reactors at that time.

- » As of Dec 2023, 9 annex-2 states have not ratified.
 - USA, China, Egypt, Iran and Israel have signed but not ratified.
 - Russia had signed and ratified but later withdrew ratification.
 - India, North Korea and Pakistan have not signed the treaty.
- » Total 184 countries have signed the treaty (17 (including Russia) without ratification):

Comprehensive Nuclear-Test-Ban Treaty (CTBT)



- Significance of CTBT

- » Prevents Nuclear Proliferation: CTBT is the last barrier on the way to develop nuclear weapons. It not only curbs the development of new weapons, but also prevents the improvement of existing designs. When in force, it will provide a legally binding prohibition on nuclear testing.
- » Prevents environmental damage that occurs due to nuclear testing.
- » It's non-discriminatory as under this treaty everyone has the same obligation -> never to conduct nuclear explosion.

- Russia withdraws from the ratification of the treaty. (Nov 2023)

- » Russian President Vladimir Putin has signed a law revoking Russian ratification of the CTBT. Russia had ratified the agreement in 2000.

» **Why?**

- Russia says the aim is to restore parity with the US, which has signed but has never ratified the 1996 treaty, and that it will not resume testing unless Washington does.

- **Why has India not signed the treaty yet?**

- » **CTBT doesn't deal with India's stand of Complete disarmament** in a time bound manner. It is just restricting the new tests.
- » **Discriminatory**
 - For countries who **already have large stockpiles** of nuclear weapons, this is advantageous as it prevents others from getting it. For India, this pact will act as a hindrance in testing new technologies.
- » **Technology difference between P-5 countries and India**
 - P-5 countries no more need to go for testing to enhance their stockpiles as they have developed laboratory stimulated testing mechanism which will not require nuclear explosions.
- » **India's vulnerable neighborhood** makes it mandatory for India to keep the option of future tests open. China already has a huge stockpile and as per CTBT (and NPT) it will be able to retain its arsenal but prevent India from developing more. This will give China an upper hand.

- **Conclusion**

- » India's concerns are genuine and moreover the objectives of CTBT have been almost completely achieved (except in case of North Korea) by voluntary moratorium on tests by all the countries. India should keep striving for a more comprehensive agreement which calls for denuclearization of earth in phased manner rather than allowing some countries to remain with large arsenal and preventing others from getting the same.

5) VIENNA CONVENTION OF DIPLOMATIC RELATIONS (VCDR), 1961

E) ABOUT THE CONVENTION

- **Introduction**

- » VCDR of 1961 is an international treaty that defines the framework for diplomatic relations between independent countries. It specified the privileges of a diplomatic mission that enable diplomats to perform their functions without fear of coercion or harassment by the host country.
- » It forms the legal basis of diplomatic immunity. Its articles are considered cornerstone of modern international relations.

- **History**

- » The first attempt to codify diplomatic immunity into diplomatic law occurred in Congress of Vienna in 1815.
- » The present treaty on the treatment of diplomats was the outcome of a draft by International Law Commission. The treaty was adopted on 18 April 1961, by the United Nations Conference

on Diplomatic Intercourse and Immunities held in Vienna, Austria and first implemented in April 1964.

- The same conference also adopted the Optional protocol concerning the acquisition of Nationality, the Optional Protocol Concerning the Compulsory settlement of Disputes, the Final Act and four resolutions annexed to the act.

- **Key Provisions of VCDR**

- **Persona Non Grata:** The host nation at any time and for any reason can declare a particular member of the diplomatic staff to be persona non grata. The sending state must recall this person within a reasonable period of time, or otherwise this person may lose their diplomatic immunity. (Article 9)
- **Inviolable Premise:** The premises of a diplomatic mission, such as an embassy, are inviolable and must not be entered by the host country except by permission of the head of the mission. Furthermore, the host country must protect the mission from intrusion or damage. The host country must never search the premises, nor seize its documents or property. (Article 22)
 - Article 30 extends this provision to the private residence of the diplomats.
- **Archives and document inviolable:** Article 24 establishes that the archives and documents of a diplomatic mission are inviolable. The receiving country shall not seize or open such documents.
- **Free Communication:** The host country must permit and protect free communication between the diplomats of the mission and their home country. A diplomatic bag must never be opened even on suspicion of abuse. A diplomatic courier must never be arrested or detained. (Article 27.)
- **Diplomatic Immunities:** Diplomats must not be liable to any form of arrest or detention. They are immune from civil or criminal prosecution, though the sending country may waive this right under Article 32. (Article 29)
 - Under Article 34, they are exempt from most taxes, and under Article 36 they are exempt from most customs duties.
 - **Actions not covered by diplomatic immunity:** Actions not covered by diplomatic immunity: professional activity outside diplomat's official functions. (Article 31.1c)
 - **Extension of protection to family members:** The family members of diplomats that are living in the host country enjoy most of the same protections as the diplomats themselves. (Article 37)

- **Optional Protocols**

- In the same year that the protocol was adopted, two amendment protocols were added. Countries may ratify the treaty without necessarily ratifying the optional protocol.
 1. **Concerning Acquisition of Nationality** : The head of the mission, the staff of the mission, and their families, shall not acquire the nationality of the receiving country.
 2. **Concerning compulsory settlement of dispute** : Dispute arising from the interpretation of this treaty may be bought before the ICJ.

- **Membership**

- As of Nov, 2023, it has been ratified by 193 countries.

F) INDIA-CANADA RIFT ON DIPLOMATIC ROW

- **India Sought Parity in number of diplomats:**
 - India asked Canada to downsize its diplomatic staff in India. India has 20 diplomats in Canada and sought a similar number of Canadian diplomat in India.
 - India's move followed the Canadian PM Justin Trudeau's remarks in Canadian Parliament in Sep 2023 who claimed a potential Indian link to the Killing of pro-Khalistan separatist leader Hardeep Singh Nijjar in Canada earlier this year. India has rejected this claim and have called it "absurd" and "motivated".
- In Oct 2023, Canada announced recalling of 41 diplomats and their families. It was done as the diplomats were in danger getting their immunity stripped on an arbitrary date.
 - Canadian foreign minister has said that the "unilateral revocation of the diplomatic privilege and immunity is contrary to international law" and is violation of the Vienna Convention on Diplomatic Relations.
 - **US and UK backed Canada**, stating that Diplomats are required to be on the ground to resolve differences. Notably, the two countries are also part of the **Five Eyes Intelligence-sharing alliance** with Canada, which also include Australia and New Zealand.
- **What did India say?**
 - Official statement of MEA has clarified that India hasn't violated any international legal principle. It has adhered to Article 11.1 of the VCDR based on two-pronged reasons.
 - i. Firstly, Canada has massive number of Diplomatic staff in India as compared to its counterpart
 - ii. Secondly, Canadian personnel have been continuously interfering in India's internal affairs.
 - Article 11 says that in the absence of specific agreement, as to the size of the mission, the receiving state may require that the size of a mission be kept within limits considered by it to be reasonable and normal, having regard to circumstances and conditions in the receiving state and to the needs of the particular mission
- **Has this demand for parity occurred in the past?**
 - Around 2017, Russia and USA also asked for each other's diplomats to be recalled over the principle of parity and reduced the presence of their missions.
- **Conclusion:**
 - It is thus clear that the recall of Canadian diplomats is in now way violation of the international law. Even in the scenario where recall seems to be unreasonable, it could still be justified as a valid countermeasure by India in response to security interference by Canadian diplomats and safety issues of Indian diplomats.

6) UNSC REFORMS

- **Why in news?**

- » With two major wars (Russia-Ukraine) and (Israel-Hamas) happening in last two years, UNSC's ability to ensure international peace and security is again being questioned (Nov 2023)

- **Example Questions**

- » What are the functions of United Nations Security Council? Why is there a consistent demand for reforms and expansion of UNSC? [15marks, 250 words]
- » Discuss the impediments India is facing in its pursuit of a permanent seat in UNSC. [10 marks, 150 words] [CSM 2015]

- **Important Quotes:**

- » "*The world has changed. Our institutions have not. We can't effectively address problems as they are if institutions don't reflect the world as it is.*": UN's Secretary General, Antonio Guterres.

- **Introduction**

- » The UNSC is one of the six principal organs of United Nations. It was formed immediately after World War - II with the prime responsibility of maintaining international peace and security.
 - It achieves this through investigating any dispute which may lead to international friction, regulating armament, peace keeping operations, international sanctions and authorization of military actions.
- » The Security Council has a special place among the UN organs as it is the only organ that has the powers to take binding decisions that member states have agreed to carry out (Article 25 of UN Charter).
- » Other crucial functions of UNSC include recommending admission of new members to UN and to recommend to the general assembly the appointment of secretary general and together with the assembly, elect the judges of the ICJ.

- **Membership**

- » The UNSC consists of **15 members**.
 - Of these **5 members are permanent with veto powers** (USA, UK, France, Russia and China) and **remaining 10 are non-permanent members** who are elected by UNGA (at least 2/3rd votes) on a regional basis to serve a **term of two years**. **Five non-permanent members** are elected every year.

- **Regional Groups from which non-permanent members come:**

- » African group - 54 - 3
- » Asia-Pacific group - 53 - 2
- » Eastern European - 23 - 1
- » Latin America and Caribbean - 33 - 2
- » Western European and other groups - 28 - 2

- **Elections: NP members chosen by regional groups - confirmed by UNGA.**

- » A member country needs to secure the votes of 2/3rd of the members present and voting at the General Assembly session (i.e. minimum 129 votes if all 193 member states participate).
- » **India** has so far been a non-permanent member of the UNSC **eight time**: 1950-51, 1967-68, 1972-73, 1977-78, 1984-85, 1991-92, 2011-12 and 2021-22.
- UNSC members are always present at UNHQ to meet at any time.
- **Presidency** held for a month by a member on rotational basis of English alphabet.
- **Why demands for reforms and Expansion at UNSC**
 - **Undemocratic**
 - Only a few countries are able to take many important decisions.
 - If we exclude China, the other 4 P-5 countries only contribute to 7% of the world's population.
 - **Anachronistic - changing global order.**
 - Since its inception, the global order has witnessed significant shift.
 - Number of countries have increased; we have shifted to a multipolar world; a population explosion (from 2.2 billion to nearly 8 billion)
 - Thus, current composition of UNSC represent the post WW-II realities and have not kept pace with the changing nature of the geopolitical scenario.
 - **Inequitable economic and geographical representation**
 - Economic powers like Japan, Germany, India and Brazil are not Part of P5.
 - UNSC's 75% work is focused on Africa, and still, they don't have any permanent membership.
 - **Regional Distribution of seats are also unfair.**
 - **Europe**, for instance, accounts for 5% of the world's population, but it still controls 33% of the seats in any given year.
 - Even for non-permanent seats, more than 50 Asia Pacific countries vie for 2 seats and around 30 west European and other groups have been allocated 2 seats.
 - **Too powerful**
 - **Weapons exporting countries at the helm.**
 - It hinders disarmament and somehow negatively impacts world peace and security.
 - **P-5 countries involved in a number of conflicts.**
 - e.g. US, Russia, China etc.
 - **Continuation of North-South Divide**
- **Demands for reforms on 5 key issues.**
 - » Categories of membership
 - » Veto power
 - » Regional representation
 - » Size of the enlarged council and its working methods
 - » Security council general assembly relationship

- **G-4** countries bidding for permanent membership of UNSC.
 - » **Germany** - among the largest contributors to UN, most well-functioning economy of Europe
 - » **Japan**
 - One of the largest contributors
 - Behaved impeccably in international forums since the UN got formed in 1945
 - » **Brazil** - 5th largest territory, most suitable to represent South American continent
 - » **India** - 2nd largest population
 - Largest average contributor to UN Peace Keeping force
- **Coffee Club /Uniting for Consensus**
 - » Italy, Spain, Argentina, Canada, Mexico, South Korea and Pakistan
 - » Opposed to G-4 becoming permanent members with a veto power
 - » Favors expansion of the non-permanent seats with regional representation.
- **Africa Group**
 - » Demands two permanent seats, because of historical injustices
 - » Council's agenda largely concentrated on the continent
- **L69 Group**
 - » It is a group of developing countries from Africa, Latin America and the Caribbean, Asia and Pacific (Small Island Developing States). They form a major bloc that is united by the common cause of achieving the lasting and comprehensive reform of the UNSC by expanding both permanent and non-permanent seats.
 - It currently has 32 members.
 - » The group derives its name from the draft document number "L.69" that the group had tabled in 2007-08, which led to the initiation of the Intergovernmental Negotiation (IGN) process.
 - » **Note:** India is a member of the grouping.
- **Reforms are difficult because of stringent provisions**
 - » **Bar on amending UN Charter has been kept very high:**
 - Reform requires the agreement of atleast two-third of UN member states (129/193) and that of all the P-5 members of UNSC enjoying the Veto right.
 - » **Inter-Governmental Negotiations (IGN) on Security Council Reform** has been going on since last 13 years. They have been working on various aspects of reform, including categories of membership, issues relating to the veto power and regional representation.
 - The IGN has been **extremely difficult**, contentious and complicated because of the **different groups, their views and different interests**. This has resulted into very little progress over the last 1 decade.
 - » Finally, the P-5 members inherently have been opposed to expansion of veto or permanent status. Those who already have power are always reluctant to share it.
 - For e.g., China has been blocking efforts to begin formal negotiations on UNSC expansion, saying that there is no need to rush through the reforms.

- **Why do India demand more permanent role at UNSC?/ India's Bid for UNSC:**
 - » Amongst all the aspirants who want to be permanent member of UNSC, India is the most vociferous one.
 - » India is **eminently suited for permanent UNSC membership by any objective criteria**, such as population, territorial size, GDP (3rd in terms of PPP), economic potential, Civilizational legacy, cultural diversity, political system (largest democracy) and past and ongoing contributions to UN Activities - especially to UN peacekeeping operations.
 - Largest average contributor to UNPKF
 - Elected 8 times in UNSC (1950-51, 1967-68, 1972-73, 1977-78, 1984-85, 1991-92, 2011-12, 2021-22)
 - » India is also a nuclear weapon state.
- **Advantages of permanent membership of UN**
 - » Better **protection of India's strategic interest** at UNSC
 - » Represent the interest of other developing countries.
 - » Contribute to world peace.
- **Challenges to India's UNSC membership:**
 - » **Difficulties of Inter-Governmental Negotiations** - Differences between various countries, regional rivalries etc.
 - » **Inherent opposition by P-5 countries** to expand the veto power
 - **China specially**, has always obstructed the idea of India's exclusion.
 - » **G-4** has also limited options for sole negotiations.
 - » **Resources allocated by India** at UN for diplomacy -> lack of enough number of staff; budgetary share of India is also not in top 20.
- Despite some of these challenges, GoI has accorded highest priority to its stand on getting a permanent seat in the expanded UNSC. To get international support needed, it has been actively raising issue in all important bilateral and multilateral forums. It has enhanced its engagement with the reform-oriented countries in the G-4; and with the L.69 Group - a cross regional group of countries from Asia, Africa and Latin America.
- **Conclusion:**
 - Reforms are also necessary to make the UNSC more legitimate, effective, and representative in character and also to correct historical injustices in South Asia, Africa and Latin America.



CURRENT AFFAIRS PROGRAM

PRE CUM MAINS 2024

DEC 2023: BOOKLET-3

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1. GENERAL STUDIES – 2

1) SAARC

- **Why in news?**
 - The year 2023 marked the 9th year since the last SAARC Summit (Sep 2023)
- **Past Year Questions** (only relevant ones)
 - i. "Increasing cross-border terrorist attacks in India and growing interference in the internal affairs of several member-states by Pakistan are not conducive for the future of SAARC (South Asian Association for Regional Cooperation)" Explain with suitable examples. [Mains 2016] [12.5 marks, 200 words]
- **Example Questions**
 - i. "Revival of SAARC is in the interest of the whole of South Asia" Elaborate. [10 marks, 150 words]
 - ii. What are the key objectives of SAARC? Why has it failed to achieve those objectives? [12.5 marks, 200 words]
 - iii. SAARC has been a case of 'Retarded Regionalism'. Discuss key causes and consequences for this. [15 marks, 250 words]
 - iv. "Power asymmetry and lack of common strategic thinking, make South Asia an unusually fragile strategic environment where genuine cooperation is impossible" Critically Analyze [12.5 marks, 200 words]
 - v. "Despite having historical, cultural and social bonds, the South Asia remains one of the most polarized and divided regions of the world" Discuss the key reasons. [12.5 marks, 200 words]
- **Important Quotes**
 - "I dream of a day, while retaining our respective national identities, one can have breakfast in Amritsar, lunch in Lahore and dinner in Kabul. That is how my forefathers lived. That is how I want our grandchildren to live": Former PM Of India Dr. Manmohan Singh
- **Introduction**
 - SAARC is a major Pan-South-Asia economic and geopolitical organization of eight countries located in South Asia. It was found in 1985 with **seven South Asian countries** - Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka and Maldives. The membership grew to eight when Afghanistan joined in 2007. It also has 8 observer countries including China.
 - Pakistan has proposed inclusion of China as full members. Myanmar is also interested in full membership.
 - It's headquartered in **Kathmandu, Nepal**.
 - The SAARC countries together consist of only 3% of the world's land area but, 21% of the world's population. Moreover, 40% of the world's poor live in the region.



- The SAARC is aimed at achieving two set of goals:
 - i. First, the immediate and non-political aims such as promoting welfare of people; accelerating economic growth, social progress and cultural development; and strengthening collective self-reliance to contribute to mutual trust and understanding among member nations.
 - ii. Second, relates to the long term, political objective of creating a **durable, stable and peaceful regional order**, strengthening cooperation with other developing countries and cooperating with international and regional organizations.
- Potential of SAARC grouping/ Why SAARC is significant?
 - Promoting Regional Cooperation
 - South Asia is one of the world's **least integrated region** and SAARC was expected to play a significant role in increasing this integration. That is why the founding principle of the SAARC was that *together South Asia had a greater chance of fighting its shared ills.*
 - Increasing intra-regional trade and investment: With 1/5th of the world's population, South Asia has abysmally low intra-regional trade (around 5%). There is a lot of scope for increasing investment, tourism and services and commodity trade. For e.g. in ASEAN (intra regional trade is of 25%).
 - Increasing connectivity
 - Physical Connectivity -> Roads, Shipping lanes etc.
 - Increasing cultural cooperation
 - Work around India-Pakistan tension to increase cooperation in the region
 - SAARC is in sync with India's neighborhood first policy. Successful SAARC will go a long way in helping India achieve this policy goal. It is the only grouping where all 8 south Asian countries come together.
 - Dealing with common threats in the region
 - For e.g. **terrorism** can be dealt more effectively if cooperation in SAARC is effective.
 - Tackling the growing influence of China
 - As part of its global expansionism, China is chipping away at India's interest in South Asia.

- According to a study by Brookings India, most South Asian nations are now largely dependent on China for imports despite geographical proximity to India.
 - **Nepal** is moving closer to China for ideational and material reasons.
 - **Bangladesh** is being wooed by China by offering of tariff exemption to 97% of the BD products. Similarly, China has intensified its ties with **Sri Lanka** through massive investments.
 - A unified South Asian Platform remains India's most potent countermeasure in dealing with this Chinese challenge.
 - In an era of **deglobalization**, improved connectivity and trade in South Asia can serve as the "Goldilocks option".
- **Summits**
 - » The first SAARC Summit took place in **Dhaka in 1985**, and there have been 18 summits since then.
 - » However, the organization hasn't had a smooth sail, with many summits getting postponed for political reasons, either bilateral or internal.
 - **18th SAARC summit** was held in Kathmandu in November 2014
 - **19th summit** was supposed to be held in 2016 in Pakistan, but the summit was boycotted by India and other SAARC countries on grounds of increasing cross border terrorism from Pak. **Since then, the SAARC summit has not been held**.
- **What has SAARC achieved? / Has SAARC been a failure?**
 - » SAARC had chalked out areas of cooperation. It has played an important role in easing trade barriers between the member countries. It is also credited for laying down the ground work for improved political ties, and for fostering closer socio-economic cooperation among its member countries.
- However, the **mismatch between SAARC's ambitions and achievements have been profound**.
 - » Various agreements and institutional mechanisms established under SAARC, has not been adequately implemented. For e.g. SAFTA was signed in 1994 and came into effect in 2006, but it is yet to be implemented. Similarly the motor vehicle agreement couldn't be signed in 2014 summit.
 - » There has been no major economic or political benefit that has been realized by SAARC. Thus analysts have termed its performance as a case of '**Retarded Regionalism**'.
 - » The intra-regional trade remains a meagre 5%.
 - » The cooperation of social and economic sector has been minuscule.
 - » The region still faces security challenges like terrorism, illegal trafficking etc.
 - » India's problems with Pakistan on terrorism, territorial claims, and on its role in blocking SAARC initiatives on connectivity and trade are well known.
- **Limitation of the SAARC Process / Factors which led to SAARC not being able to achieve much of cooperation:** A number of factors including the motives of SAARC's formation, its structure, it mandate, working methods, and the relationship among member states have all been responsible for making SAARC a 'Zombie' organization:
 1. **SAARC was an UNWANTED Child**
 - » **Negativity** is associated with SAARC since its origin

- India was initially reluctant to be part of SAARC as the body started as an attempt to counter India by other south Asian countries.
- Pak was also reluctant as it wanted to give up on its South Asian Identity and get more integrated with the Islamic world of West Asia. Moreover, it was worried about SAARC becoming an India dominated group.

2. Structural Problems

- One principle followed by SAARC is that no contentious bilateral issues are discussed, which pretty much rules out all key subjects.
- Other principle which SAARC follows is that all decisions will be taken care by consensus, which given the Indo-Pak rivalry, exacerbated by the entry of Afghanistan, rendered any agreement a stupendously difficult exercise.

3. Power Asymmetry between India and other member countries in terms of Geography, Economy, Military Strength, and influence in global arena make the smaller countries apprehensive. When one of the constituents is too big and powerful compared to the rest, it will naturally affect the progress of the cooperation. The smaller countries perceive India as "Big Brother" and fear that it might use the SAARC to pursue hegemony in the region. Smaller countries have therefore been reluctant to implement various agreements under SAARC.

4. Lack of trust and bilateral tensions among member nations - especially between India and Pakistan

- The organization have not been able to isolate itself from the ill-effects of India-Pak tension. In particular, the lingering Kashmir dispute has become a significant obstacle in regional integration.
- According to scholars like C Raja Mohan and Rajeev Sikri, the SAARC process has succumbed to the rivalry b/w India & Pak. As long as India and Pak relations doesn't improve, nothing can be done on SAARC.
- Further, territorial and water disputes between member countries hinder the cooperation in South Asia.

5. A failure in the area of security cooperation

- For instance - while cross border terrorism emanating from Pakistan is a major concern for India, Pakistan has failed to address this concern. This has become the key reason for no progress on SAARC.

6. Lack of dispute resolution mechanism

- SAARC doesn't have any arrangement for resolving disputes or mediating conflict which hampers consensus building and thus slows down the decision-making process.

7. Other Inherent weaknesses of SAARC: Political stability in member countries.

8. Good Steps which could not be properly implemented

- South Asia Preferential Trade Agreement (SAPTA) was signed in the 7th summit at Dhaka in 1993, but it has not yet been adequately operationalized.
- Other proposal to establish South Asian Food Reserve and South Asian Development Fund have also has not been implemented.
- Similarly, declaration on enhancing political cooperation and promotion of mutual trust and understanding reiterated in each summit have registered little success.

9. SAARC faces shortage of resources, and countries have been reluctant to increase their contributions.

- **Has the SAARC Lost its utility?**

» No, it has tremendous utility.

- But it has been held hostage by Pakistan. Any significant progress under SAARC was stymied by it and they have continuously vitiated the atmosphere by bringing in the bilateral issues which is not allowed by SAARC.

- **Future of SAARC:** An organization can only be useful if member states share the view that it meets, or at least has the potential to meet, their respective interests.

» **Way forward**

- **Deal with trust deficit:** Member countries need to put more attention towards developing trust towards each other which would set the basis for regional integration.
 - Along with official talks, track-2 diplomacy can be used for the purpose.
- **Take steps to re-initiate the process.**
 - This would take political will from all the countries as well as steps by Pakistan to control the terrorism emanating from its soil. .
- **Revive the process of South Asian Economic Integration:** Deeper regional economic integration will create greater interdependence with India acquiring the central role, which, in turn, would serve India's strategic interest.
- **Increased Connectivity:** Connectivity is prerequisite for the prosperity of the region.
 - Construction of the proposed BBIN corridor will be landmark step towards this.
 - Similarly, construction and development of ports will benefit SAARC as it benefitted EU in past.
- And if nothing works, India should look at enhancing regional cooperation by considering SAARC (minus Pakistan) as an option.
- **Deal with domestic challenges** which hinders cooperation in South Asia.
 - Divisive domestic politics with anti-Pak rhetoric and recurrent 'Bangladeshi migrant' rhetoric influence foreign policy in an undesirable manner. It dents India's soft power of being a liberal and secular democracy, which gives moral legitimacy to India's leadership in the region.

- **Conclusion**

- » Considering the limitations faced by SAARC for now, it is very natural for India to gravitate towards BIMSTEC, which acts as a bridge between South Asia and South East Asia. But in the process, the efforts put towards regional integration under SAARC should not be ignored. Crucial regional problems like terrorism, drug trafficking etc. have their origin in Pakistan and therefore a regional cooperation effort should include Pakistan.
- » **BIMSTEC cannot replace SAARC** for reasons such as lack of a common identity and history among all BIMSTEC members. Moreover, BIMSTEC's focus is on the Bay of Bengal region, thus making it an inappropriate forum to engage all South Asian nations.
- » India should view SAARC as a unit which has common future, and as a force-multiplier for India's ambition on the global stage.

2) BIMSTEC

- **Why in news?**

- » S Jaishankar attends BIMSTEC Foreign Ministers meet (July 2023)

- **Example Questions**

- » Discuss the significance of BIMSTEC in fostering regional cooperation and addressing common challenges in South Asia and southeast Asia. Suggest potential areas of improvement and measures needed to enhance the role of BIMSTEC in the evolving geopolitical landscape of the region. [15 marks, 250 words]
- » "BIMSTEC can be a game changer for growth and development of North-East India" Elaborate. [10 marks, 150 words]
- » Do you think BIMSTEC provides more potential for regional integration, including physical connectivity and economic cooperation when compared to SAARC? Give reasons [10 marks, 150 words]

- **Important Quotes**

- "For India, it (BIMSTEC) is a natural platform to fulfill our key foreign policy priorities of 'Neighborhood First' and 'Act East'": PM Modi

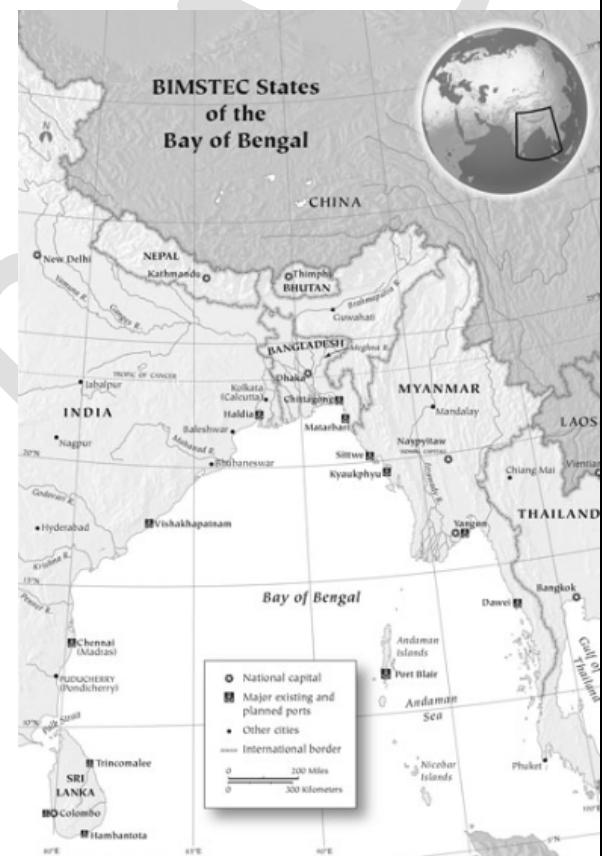
- **Intro**

- » BIMSTEC is a regional organization of 7 member states (Bangladesh, India, Sri Lanka, Thailand, Nepal, Bhutan and Myanmar) from South Asia and Southeast Asia that lie in littoral and adjacent areas of Bay of Bengal.

- » **Basic details** (Important for Prelims)

- It came into being on June 6, 1997 (as BISTEC - Bangladesh-India-Sri Lanka - Thailand Economic Cooperation) through the Bangkok declaration. It was later rechristened as BIMSTEC.
- It is headquartered in Dhaka.
- It is a unique link between South-Asia and South-East Asia. From the very beginning, it has been considered a powerful mechanism to promote opportunities for trade, investment and tourism between these two regions. Societies within BIMSTEC are pluralistic; our languages are rich and diverse, and we have a shared cultural heritage

- **The Objective** of the alliance is to harness accelerated growth through mutual cooperation in different areas of common interest by mitigating onslaught of globalization and by utilizing regional resources and geographical advantages.



- It is based on **two basic principles**.
 - i. To respect the principle of **sovereign equality, territorial integrity, political independence, non-interference in internal affairs, peaceful-coexistence and mutual benefits**.
 - ii. **Constitute an addition to and not be a substitute** for bilateral, regional or multilateral cooperation involving member states.

- **Key Areas of Cooperation**
 - Unlike many other regional groupings, **BIMSTEC is a sector driven cooperative organization**.
 - » It has identified **7 sectors** (earlier there were 14 sectors, but in the **fifth summit meeting** it was rationalized to 7 sectors).
 - Of these 7 areas, **Security and energy** is led by India. It includes under it the erstwhile independent sectors of '**Counterterrorism and Trans-National Crime**', '**Disaster Management**', and '**Energy**'.
 - **Other Areas** are - **Trade, Investment and Development** (Bangladesh); **Environment and Climate Change** (Bhutan), **Agriculture and Food Security** (Myanmar), **People to People Contact** (Nepal), **Science Technology and Innovation** (Sri Lanka) and **Connectivity** (Thailand)

- **BIMTEC's growth was hindered in the beginning because of:**
 - Lack of **political will and collective effort**.
 - South Asia's **focus on SAARC**
 - But, **with the decline of SAARC, BIMSTEC has emerged as a very important grouping for regional connectivity in the region**.

- **Significance of BIMSTEC for India**
 - **Regional Cooperation** (alternative to SAARC)
 - In the **absence of smooth functioning of SAARC**, the **groupings like BIMSTEC can take forward regional cooperation further**. Therefore, the **main motivation in reinvigorating BIMSTEC is not to counter Pakistan but to enhance regional cooperation**.
 - This regional cooperation can help us better deal with **common problems like terrorism, disasters, poverty etc.**
 - **Regional Connectivity - Also with Southeast Asia**
 - It acts as a **bridge between South and South East Asia** and represents a **reinforcement of relations among these countries**.
 - It acts as a platform for **inter-regional cooperation between SAARC and ASEAN countries**.
 - **Sync with India's foreign Policy**
 - It supports India's **Neighborhood first** and **Act East** policy.
 - **Developing North-East:**
 - BIMSTEC projects are crucial for **development of north-east India**. They will provide **better connectivity, increased economic opportunities, more jobs and thus will decrease the alienation of the region**.
 - Moreover, plans of **Mountain Economy** etc. will also help North-East India.
 - There are **economic similarities** between BIMSTEC countries
 - All 7 countries are **developing, highly growing economies**

- They have sustained average annual growth rates between 3.5% to 7.5% in recent years (exclude the COVID-19 year).
- **Countering China in the region**
 - BIMSTEC provides India an opportunity to push constructive agenda and counter China's investments in a collective way.

- **BIMSTEC has more potential than SAARC**

- In the past, India had spent more political capital and efforts to make SAARC work, than on BIMSTEC.
- However, now we have come to realize that BIMSTEC provides more potential for regional integration, including physical connectivity and economic cooperation than SAARC which is dominated by India and Pakistan and thus naturally hamstrung by tensions between the two countries.
- BIMSTEC has potential to be more successful as:
 - » **Better Cooperation and Trust:** Unlike SAARC, there is an attitude of cooperation, enthusiasm as:
 - There is no Pakistan to veto India's suggestions.
 - Member countries have generally cordial relationships, something patently missing among the SAARC countries.
 - » **Two influential regional players - no fear of domination by India**
 - Unlike SAARC BIMSTEC includes two major regional players - **India and Thailand.** This adds to the comfort of smaller neighbours by reducing the fear of dominance by one big power.
 - » **BIMSTEC countries have strategic interest in its growth:**
 - **Bangladesh** views BIMSTEC as a platform to position itself as more than just a small state on bay of Bengal.
 - **Sri Lanka** sees it as an opportunity to connect with Southeast Asia and serve as the subcontinent's hub for the wider Indo-Pacific region.
 - **Nepal and Bhutan** aim to connect with the Bay of Bengal region and escape their landlocked geographic positions.
 - **Myanmar and Thailand** want to connect more deeply with India to access its huge market.
 - **India** finds BIMSTEC as a tool for:
 - Increasing connectivity within south and southeast Asia. It is a natural platform to fulfil our key foreign policy priorities of 'Neighborhood First' and 'Act East'.
 - Pushing a constructive agenda to counter China's investment.
 - » **An opportunity to connect South Asia and ASEAN**
 - The BIMSTEC Is in sync with India's Act East policy and Thailand's Look West Policy. It also helps countries such as BD, Nepal and Bhutan to develop connectivity with ASEAN countries.
 - » **BIMSTEC provide more trade opportunities.**
 - The region include fastest growing economies in the world.

- Trade among the BIMSTEC countries have reached 6% in just a decade while it had hovered around 5% among SAARC countries since its inception.
 - » **Sector driven cooperation** allows better focus and less diversion.
 - » **More Chances of Expansion:** Sri Lanka has suggested inviting Indonesia, Malaysia and Singapore -> if this is done it would further lead to enhancement of the role that BIMSTEC can play.
 - » **Other members are also wary of China** and prefer India's benign characteristics.
- Therefore, it can be said that Bay of Bengal can emerge as vehicle of regional cooperation.
- India, which chafed at Pakistan's reluctance to allow progress under the SAARC framework, now has the opportunity to demonstrate that it can do a lot better in the Bay of Bengal.
- The initiative could range from coastal shipping, terrorism and from the development of underwater resources in Bay of Bengal to protecting the marine environment.
- **Limitations/Difficulties faced by BIMSTEC:** In spite of a lot of potential, some concerns still remain in BIMSTEC
 - **BIMSTEC doesn't have a lot of concrete achievement** in more than 25 years of BIMSTEC history.
 - A major failure relates to the continuing inability to produce a comprehensive FTA - 19 years after signing of the framework agreement in 2004.
 - There is a **too much flexibility in the conduct of its process.**
 - Summits have been infrequent.
 - A charter was finalized only recently - during 5th Summit in March 2022
 - **Only limited progress has been made in terms of connectivity:**
 - Lack of financial resources with the secretariat has hindered the performance of the group.
 - For greater regional connectivity, more financial resources are needed.
 - The movement towards development of the BIMSTEC Development Fund is minimal.
 - No Progress on Blue Economy has been made in the grouping.
 - Business chambers and corporate leaders are yet to be engaged fully with the activities of BIMSTEC.
 - Deterioration of relations between **Bangladesh and Myanmar** due to Rohingya issue is also hindering the progress in BIMSTEC.
 - Earlier, **lack of leadership was a major concern.** But since 2016, India has taken a number of initiatives to promote the grouping.
 - **5th BIMSTEC Summit**
 - » The 5th BIMSTEC summit was hosted by Democratic Socialist Republic of Sri Lanka in and from Colombo in hybrid mode on 30th March 2022.
 - Theme "**BIMSTEC - Towards a Resilient Region, Prosperous Economies, Healthy People**".
 - » **Key outcomes:**
 - BIMSTEC Leaders signed the **BIMSTEC Charter** and witnessed the signing of the **BIMSTEC Convention on Mutual Legal Assistance in Criminal Matters**, the MoU on the

Establishment of the BIMSTEC Technology Transfer Facility, and the MoU on Mutual Cooperation between Diplomatic Academies/ Training Institutions of BIMSTEC Member States.

- The summit saw considerable progress being achieved in the BIMSTEC connectivity agenda with the adoption of the '**Master Plan for Transport Connectivity**'.
- The summit also adopted the BIMSTEC Masterplan on Transport Connectivity, and the Rationalized Areas of Cooperation under BIMSTEC.
 - The 14 areas of cooperation under BIMSTEC have been rationalized to 7 areas of cooperation.
- » **The Chairmanship of BIMSTEC was handed over to Thailand from Sri Lanka at the Summit.**

- **1st ever Foreign Ministers' meeting of the Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation (BIMSTEC)**

- Held in Bangkok, Thailand in July 2023
- India was represented by our foreign minister Dr. S Jaishankar.
- The meet focused on strengthening resilience and coordination among BIMSTEC members, reflecting the challenges that we all confront today.

- **Key Progress made by BIMSTEC:**

- **Adoption of a BIMSTEC charter** in 5th Summit in 2022. This gives the grouping a legal status.
- **Rationalization of priority area** from 14 to 7
- **Pledging of funds** to the operational budget to ensure actionable policy measures can be undertaken.
- **Signing of memorandum** on technology transfer, diplomatic training, and a master plan on connectivity - all of which are of important for grouping's future as aspirational countries in a region that has already become the gravitational centre of global geopolitics.

- **Way forward:** The developments so far under BIMSTEC have been encouraging. But to maintain the momentum and to strengthen BIMSTEC as a sustainable platform, following steps should be considered:

- Keep BIMSTEC away from politics that bedeviled SAARC.
 - India must not fall in the trap of putting geopolitics over economic, reducing BIMSTEC into just another geopolitical weapon for isolating Pakistan.
 - India should lead BIMSTEC with much broader, inclusive vision driven by economic merits of cooperation.
- We also need to hold the future summits in a timely manner.
- Member states also need to commit significant resources to strengthen the organization.
 - India which is already the largest contributor to BIMSTEC needs to further increase its contribution.
- **Timely Delivery of Projects:** Complete the infra projects -> Kaladan Multi-modal Project, IMT trilateral highway in a timely manner.
 - **Improved Connectivity** (Physical, digital and people-to-people) should be the mantra for increased cooperation within BIMSTEC. With connectivity comes integration, cooperation and development.
- **Ensure Tangible outcomes** which will motivate countries to concentrate on BIMSTEC

- Finalize the FTA which is being discussed to further increase the economic cooperation in the region.
- Counter the impression that BIMSTEC is an India-dominated bloc, a problem that we have faced for long in SAARC.
- **Use People-to-People Engagement** in deepening relations between BIMSTEC countries. This can be done through:
 - Academic/ Education Diplomacy
 - Tourism Diplomacy
 - Festival Diplomacy
 - Health and Medical Diplomacy
 - Publication Diplomacy

- **Conclusion**

- The potential of BIMSTEC needs to be utilized to address the needs and requirements of the region, especially in the area of economic development. Given the fairly amicable relations between the member states of BIMSTEC, increasing its performance and its effectiveness is an achievable goal as long as countries exhibit enough political will and mutual respect.

3) WORLD BANK GROUP

- **Example Questions**

- a. What are the main functions of the World Bank Group? Explain the role of five different organizations which constitute the World Bank Group? [150 words, 10 marks]
- b. Discuss the organizations structure of World Bank. Why has India been clamouring for reforms? [250 words, 15 marks]

- **Introduction**

- WBG is a family of five international organizations that make leveraged loans to developing countries and work towards sustainable solutions to reduce poverty and build shared prosperity in developing countries.
- It is the largest developmental bank in the world and is also an observer at the United Nations Development Group (UNDG).
- It is one of the Bretton Woods organization.
- **History:**
 - It was founded in 1944 at the United Nations Monetary and Financial Conference or the Bretton Woods Conference, which was convened to establish a new, post-World War II international economic system.
 - It officially became operational in 1946.
 - **IMF and WB are called Bretton woods twins** as they were formed as a result of Bretton Woods Agreement.
- HQ: Washington D.C.

- **Goals/ Mission**

- Ending extreme poverty and building shared prosperity
- The five organizations which form part of WBG are: IBRD, IDA, IFC, MIGA, and ICSID.
 - a. **International Bank for Reconstruction and Development (IBRD)**
 - Provides debts financing on the basis of sovereign guarantees.
 - b. **International Development Association (IDA)**
 - Provides concessional financing (interest free loans or grants), usually with sovereign guarantees;
 - ('Soft loan Window' -> as it gives concessional loans)
 - It is one of the largest source of credit for the world's poorest countries.
 - c. **International Finance Cooperation (IFC)**
 - Provides various forms of financing without sovereign guarantees, primarily to the private sector
 - d. **Multilateral Investment Guarantee Agency (MIGA)**
 - Provides insurance against certain types of risk, including political risk, primarily to the private sector.
 - It thus encourages private sector to invest in foreign developing countries.
 - e. **International Centre for settlement of Investment Disputes (ICSID)**
 - It helps private investors and foreign countries to work out differences when they don't agree.
 - Many Bilateral Investment Treaties also provide ICSID mechanism for dispute resolution.
 - Note:
 - India is not a member of ICSID and considers the convention biased in favor of developed countries.
 - For e.g. the Chairman of ICSID is the Chairman of World Bank. The chairman appoints the arbitrators too
- **Membership:**
 - To become a member of the Bank, under the **IBRD Articles of Agreement**, a country must join the International Monetary Fund (IMF). Presently, IBRD has 189 members.
 - Note: Currently, all member of IMF are also members of IBRD.
 - Membership of **IDA, IFC and MIGA** are conditional on membership in IBRD.
 - # Members: IDA (173); IFC (185); MIGA (182); ICSID (185);
- **World Bank:** The term "world bank" generally refers to just the IBRD and IDA, whereas the term WBG refers to all five institutions collectively.
 - **IBRD and IDA focuses on developing countries** in areas such as human development, infrastructure, environment protection, large industrial construction project, and governance.
 - They provide **loans at preferential rates to member countries**, as well as grants to the poorest countries.
- **Decisions Making Process:**
 - The bank runs like a **giant cooperative**, where its members are shareholders and is operated for the benefit of those using its service. The **number of shares of each country** is based on roughly the size of its economy.

- The US, Japan, and China are the largest shareholders. (Sep 2021)
 - i. United States - 16.53%
 - ii. Japan - 7.79%
 - iii. China - 4.49%
 - iv. Germany - 4.49%
 - v. United Kingdom - 4.31%
 - vi. France - 4.31%
 - vii. India - 3.71%
 - viii. Italy - 3.17%
 - ix. Canada - 2.97%
 - x. Russia - 2.74%
- **A Board of Governors** represents the Bank's government shareholders. They are the ultimate policy makers in the WB.
- **24 Executive directors** deal with the daily functions of the bank including approving loans and guarantees, new policies, the administrative budget, country assistance strategy and borrowing and financial decisions.
 - » 5 Executive directors are from the five largest donors (US, Japan, Germany, UK and France)
 - » Remaining 19 executive directors represent the other member countries.
- **Need of Reforms:**
 - a. **Dominated by a few developed countries:**
 - b. **Doesn't represent the current economic picture of the world.**
 - c. Imposes "**free Market**" economic policy on developing countries as a condition for loans.
 - d. **Need for Capital Increase**
 - e. **Need of transparency** -> to ensure integrity, credibility and impartiality of the organization (e.g. recent data manipulation controversy)
- **Suggestion by G20 expert panel on strengthening Multilateral Development Banks (MDBs)**, such as WB, ADB (Oct 2023)
 - Shift from financing individual projects to prioritizing programs with sectoral focus and long-term transformation plan, as identified by National Government.
 - MDBs should focus on helping national governments create and operationalize their respective country platforms for the highest priority sustainable development goals (SDGs)
 - **MDBs** need to ramp up financing to \$390 billion by 2030 and private sector can play an important role here by reversing the current trend of "disappointingly low" private financial flows to EMDEs.
 - MDBs need to embrace partnership with private sector.
- **World Bank Group and India**
 - India is the largest client of the WBG.
 - India is member of 4/5 organs of WBG.
- **Reports:**
 - Global Economic Prospect

- Logistic Performance Index (last in 2018)
- Ease of Doing Business Index
 - Stopped due to data manipulation controversy.
- Human Capital Index

4) INTERNATIONAL MONETARY FUND (IMF)

- **Introduction**
 - » **Beginning**
 - The IMF also known as the Fund, was conceived at a UN conference in Bretton Woods, New Hampshire, United States, in July 1944. It formally came into existence in 1945, the IMF is governed by and accountable to 189 countries that make up its near-global membership.
 - **Note:** IMF and World Bank are two Bretton woods organizations.
 - **Headquarter:** Washington DC
- The **primary goal** of the IMF was to bring about International Economic Coordination to prevent competing currency devaluation by countries trying to promote their own exports.
 - » Eventually, **IMF evolved to be a lender of last resort** to governments of countries that had to deal with severe currency crisis.
- The **Organization's Objectives stated in the Articles of Agreement are:**
 - To promote international Economic Cooperation, International Trade, Employment and Exchange rate stability, including by making financial resources available to member countries to meet balance of payment needs.
- **How IMF promotes global Economic Stability**
 - » The IMF helps countries to implement sound and appropriate policies through its key functions of surveillance, technical assistance, and lending.
 - » **Surveillance**
 - IMF's mandate is to oversee the international monetary system and monitor the economic and financial policies of its 189 member countries. This surveillance takes place at the global level and in individual countries and regions.
 - **Consulting with member countries**
 - IMF monitors members' economies through regular - usually annual - consultation with each member country.
 - **Closely monitors global and regional trends**
 - Periodic reports : **The World Economic Outlook**, its regional overviews, **the Fiscal Monitor**, and the **Global Financial Stability Report**, analyze global and regional macroeconomic and financial developments.
 - » **Technical Assistance:** IMF provides advice and training on a range of issues within its mandate, including fiscal, monetary and exchange rate policies, regulation and supervision of financial systems; statistics systems; and legal framework.
 - » **Lending**

- Financial assistance to a member country which is experiencing financial difficulty. It can also support crisis prevention.
- A core responsibility of IMF is to provide loans to member countries experiencing actual or potential balance of payments problems.

- IMF Bailouts

- Why in news?
 - In March 2023, IMF confirmed \$3 billion bailout plan for Sri Lanka's struggling economy (March 2023)
 - IMF officials are also negotiating with Pakistan for \$1.1 billion bailout plan as the country faces a severe economic crisis.
- Why do nations seek IMF bailout?
 - To deal with major macro-economic risks:
 - For e.g. in case of both Sri Lanka and Pakistan, both countries have witnessed domestic price rise rapidly and steep depreciation in their currency.
- How does the IMF help countries?
 - It lends money, often in the form of special drawing rights (SDRs), to troubled economies that seek the lender's assistance.
 - IMF carries out its lending to troubled economies through a number of lending programs such as Extended Credit Facility; the flexible credit facility; the standby agreement etc.
- Criticisms of IMF Bailouts
 - IMF usually imposes conditions on countries before it lends any money to them. For e.g. a country may have 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. Sometimes IMF is also accused of influencing international politics.
- Supporters argue that without structural reforms bailout will not be successful.

- Where the IMF Gets its Money

- Most resources for IMF loans are provided by member countries, primarily through their payment of quotas.
- **Borrowings** provides a temporary supplement to quota resources and has played a critical role in enabling the fund to meet member's need for financial support during the global economic crisis.
- Concessional lending and debt relief for low income countries are financed through separate contribution based trust funds.

- Governance and Organization

- The IMF is accountable to the government of its member countries.
 - At the top of its organization structure is the **Board of Governors**, which consists of one governor and one alternate governor from each member country.
 - The Board of governor meets once each year at the IMF-World Bank Annual Meetings. Twenty-four of the governors sit on the **International Monetary and Financial Committee (IMFC)** and normally meet twice each year.

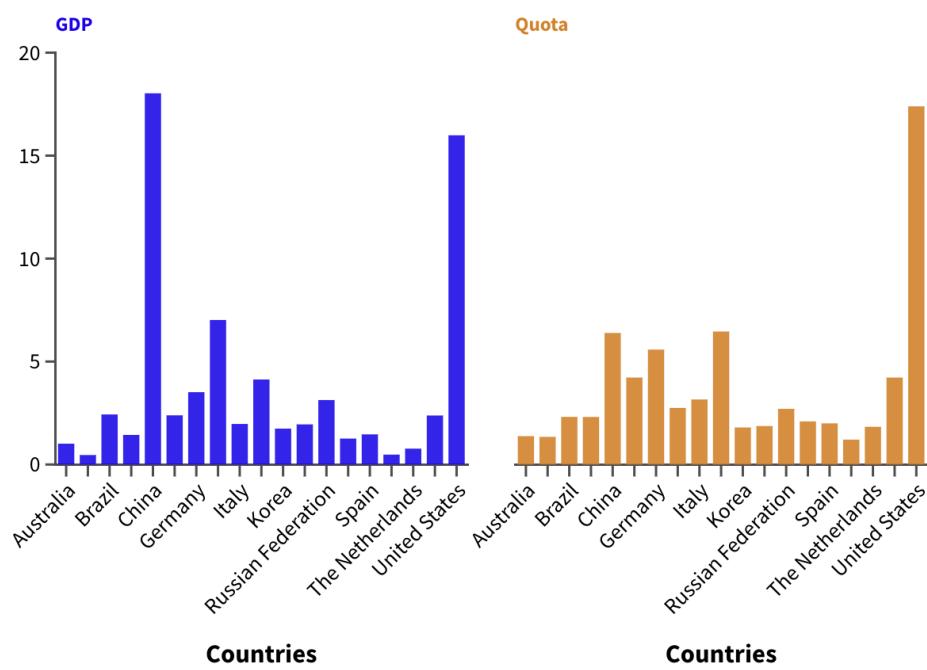
- The day-to-day work of IMF is overseen by its 24-member **Executive Board**, which represents the entire membership; this work is guided by the IMFC and supported by the IMF staff. From 2016, all members of the board are elected.
- **The Managing Director** is the head of the IMF staff and Chairman of the Executive Board and is assisted by four Deputy Managing Directors.

- **IMF Quotas**

- Quota subscriptions are a central component of the IMF's financial resources. Each member country of IMF is assigned a quota, based broadly on its relative position in the world economy.
 - A member country's quota determines its
 - Maximum financial commitment to the IMF
 - its voting power
 - Each IMF member's votes are comprised of basic votes plus one additional vote for each SDR 100,000 of quota.
 - The 2008 reforms fixed the number of basic votes at 5.502% of total votes.
 - iii. **Access to Finance:** The amount of financing a member can obtain from the IMF (its access limit) is based on its quota
- The current Quota formula is a weighted average of GDP (weight 50%), openness (30 percent), economic variability (15%), and international reserves (5 percent).
 - GDP is measured as a blend of GDP - based on market exchange rates (weight of 60%) and PPP exchange rates (40 percent).

Countries with IMF quotas (over 1%)

The 2023 meeting of World Bank & IMF in Morocco were expected to initiate a process whereby IMF quotas, which decide voting heft of countries, would be restructured.



- Quotas are denominated in Special Drawing Rights (SDRs), the IMF's unit of account.

- » India's quota is 2.76% and China's is 6.41%, while the U.S.'s quota is 17.46 % (translates to a vote share of 16.52%) giving it a unique veto power over crucial decisions at the IMF, many of which require a supermajority of 85%.
 - The largest member of IMF is the United States (current Quota, March 2017 : SDR 82.99 billion (US\$113 billion)
 - The smallest member is Tuvalu (Current quota, SDR 2.5 million (about US\$3.4 million).
- **How Quota Review works**
 - » The IMF's *Board of Governors conducts general quota reviews* at regular intervals (usually every five years) Any changes in quotas must be approved by 85 percent majority of total voting power, and a member's quota cannot be changed without its consent.
 - There are two main issues addressed in a general quota review:
 1. the size of an overall increase
 2. the distribution of the increase among the members.
- **Why periodic reviews are done?**
 - » **Maintaining adequacy of resource:**
 - In terms of member's balance of payment financing needs
 - IMF's ability to help meet those needs.
 - » **Reflect changes in the global economic status**
- **Ad hoc increases** outside general reviews do not occur often, but the increases in quotas for 54 member countries approved under the 2008 reforms are a recent example.
- **The 2010 Review and it's coming into effect in Jan 2016**
 - » The **2010 Quota and Governance reform** were approved by the IMF's Board of Governors in Dec 2010 and built on an earlier set of reforms that were approved by the Governors in April 2008.
 - » This was the **14th General Review of Quotas**
 - Reform package came into force in Jan 2016
 - » **Key outcomes of the 2010 reform**
 - Quota Reforms -> Doubling of Quota to SDR 477 billion; Shifting of quota to under-represented member countries and EMDCs.
 - This has made China the 3rd largest shareholder in IMF and (India, Brazil and Russia) have also come among the largest shareholders.
 - **Governance Reform**
 - All elected IMF's Executive Board (Board Reform Amendment)
 - » **Implications**
 - Increase the financial strength of the IMF.
 - Fund will better meet and represent the needs of its members in a rapidly changing global environment.
 - It is a major step towards better reflecting in the institution's governance structure and increasing role of dynamic emerging market and developing countries.
 - This will reinforce the credibility, effectiveness, and legitimacy of the IMF.
- **IMF Quota and Governance: Need for reforms**
 - **Need for Reform**

- Given the unequal voting power mechanism, IMF doesn't always serve the interests of poor and developing countries, hence require two sets of reforms:

1. Need for Quota Reforms

- To give more say to developing nations in the activities of the multi-lateral organizations.
- To reflect the changes in economic realities, especially with regard to increasing prowess of the developing nations.
- To increase the financial capability of IMF.

2. Need for governance Reform.

- To make it more representative

- Some IMF members have become frustrated with the pace of governance reform, as the balance of economics and geopolitical power has shifted, becoming more dispersed across the world, particularly with the emergence of China and India.

- Key changes agreed to in 2019 Agreement.

- » The 15th Quota Review is currently underway.
- » IMF has agreed to maintain its funding at \$1 trillion but has postponed changes to its voting structure.
 - This deal is a compromise with the U.S., the fund's largest shareholder, which has resisted changes to the organization's voting structure as well as increase in its permanent resource base.
 - The IMF quotas will now be reviewed before the end of 2023.

A) SDR (UNDERSTAND FOR PRELIMS)

- The SDR is an international reserve asset, created by IMF in 1969. It operates as a supplement to the existing money reserves of member countries.
- Why was SDR needed? Under Bretton Woods, the international supply of two key reserve assets - gold and US dollar - proved inadequate for supporting the expansion of world trade and financial development that was taking place. Therefore, international community decided to create a new international reserve under the auspices of IMF.
- The IMF uses SDRs for internal accounting purposes.
- The value of SDR is calculated from a weighted basket of major currencies, including the U.S. dollar, the euro, Japanese Yen, Chinese Yuan and British Pound.
 - The makeup of SDR is re-evaluated five years. The current makeup of the SDR is represented by the following table:

Currency	Weights Determined in the 2015 Review	Fixed Number of Units of Currency for a 5-Year Period Starting Oct. 1, 2016
U.S. Dollar	41.73	0.58252
Euro	30.93	0.38671
Chinese Yuan	10.92	1.0174
Japanese Yen	8.33	11.900
Pound Sterling	8.09	0.085946

- **Which currencies can be included in SDR baskets?**

- Currencies of "members or monetary unions whose exports had the largest value over a five-year period and have been determined by the IMF to be freely usable."
- The **SDR interest rate (SDRi)** provides the basis for calculating the interest rate charged to member countries when they borrow from the IMF and paid to members for their remunerated creditors position in the IMF.
- The IMF member countries are entitled to get a loan from IMF's SDR Account. This loan amount is upto 200% of the member's quota with the IMF. It is also known as **Paper Gold**.
 - In this arrangement IMF doesn't lend directly. It is the member countries, who are in a strong position, lend their SDR holdings to member countries who are in problems for balance of payment.



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DEC 2023: BOOKLET-4

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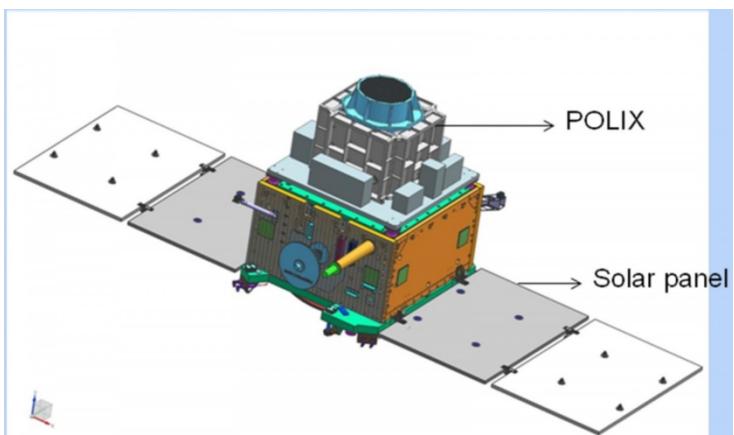
1. GENERAL STUDIES – 3: S&T UPDATES

1) SPACE: CHANDRAYAAN-3 PROPULSION MODULE RETRACES STEPS BACK TO EARTH'S ORBIT (DEC 2023)

- **What happened?**
 - Scientists have brought the propulsion module (PM) of Chandrayaan 3 mission back into earth orbit.
 - This was not part of original mission plan. It utilized the logistics advantage of near perfect mission, especially the availability of more than 100 Kg of fuel.
- **How was this achieved?**
 - ISRO performed maneuver to raise the orbit of the PM around the moon (from 150 km to 5,112 kms)
 - Second maneuver targeted an earth orbit of 1.8 lakh X 3.8 lakh km.
- **Significance:**
 - This experiment prepares ISRO for future missions, especially the ambitious Lunar Sample Return Mission.
 - Through this ISRO has been able to understand what is involved in the “planning and execution of trajectory and maneuvers to return from Moon to Earth”

2) SPACE: XPOSAT

- **Why in news?**
 - India (ISRO) set to launch its first X-Ray Polarimeter Satellite (Nov 2023)
- **More Details**
 - XPoSat will be a specialized science mission that will study the polarization of X-Rays in space.
 - The mechanization of polarization of radiation gives away the nature of its source, including the strength and distribution of the magnetic field and the nature of radiation around it.
 - XPoSAT will carry two scientific payloads in a low earth orbit.



- The **Primary Payload (POLIX) (Polarimeter Instrument of X-Rays)** will measure the polarimetry parameters (degree and angle of polarization) in medium X-ray range of 8-30 KeV photons of astronomical origin.
- The **XSPEC (X-Ray Spectroscopy and Timing)** payload will give spectroscopic information in the energy range of 0.8 – 15 keV.
 - The **POLIX** payload is developed by the Raman Research Institute (RRI), Bangalore, with support from ISRO centres.
 - The **XSPEC** payload is developed by the UR Rao Satellite Centre (URSC), ISRO.
- **Need:** The emission mechanisms from various astronomical sources such as blackhole, neutron stars, active galactic nuclei, pulsar wind nebulae etc. originates from complex physical processes and are challenging to understand.
- **The Polarimetry measurement adds two more dimension to our understanding**, the degree of polarization and the angle of polarization and thus is an excellent diagnostic tool to understand the emission processes from astronomical sources.
- **International Trend in Space-Based X-Ray Polarimetry**
 - Internationally, space-based x-ray polarimetry is gaining importance.
 - The **Imaging X-Ray Polarimetry Explorer (IXPE)** mission, launched on Dec 09, 2021, represents NASA's inaugural space-based endeavor, focused on scrutinizing X-Ray Polarization across various celestial bodies.
 - **Note:** XPoSAT energy range of 8-30 keV for polarization measurement is complimentary to IXPE energy range of 2-8 KeV. Therefore, XPoSAT and IXPE spacecrafts will collectively probe different emission mechanisms and physics for bright x-Ray sources. Their coordinated observation will provide a wide window in the energy range of 2-30 KeV for polarimetric observations for bright X-Ray sources.

3) SPACE: PSYCHE MISSION

- **Example Questions:**
 - Launched on 13th October 2023, Psyche Mission has been much in news since then. What are the key goals of the mission? What potential benefit does it hold for human race? [10 marks, 150 words]
- **About Psyche Asteroid:**
 - Psyche is one of the asteroids in the asteroid belt. What makes the asteroid unique is that it appears to be the exposed nickel-iron core of an early planet, one of the building blocks of our solar system.
- **About Psyche Mission:**

- The *Psyche Mission* is a NASA space mission launched on 13th Oct 2023 to explore origin of planetary cores by orbiting and studying the metallic asteroid Psyche in 2029. The mission consists of Psyche Aircraft.

▫ **Significance:**

- **Understanding the Core of a Planet:** Deep within rocky terrestrial planets – including Earth – scientists infer the presence of metallic cores. But these remain unreachably far below the planets' rocky mantles and crusts. Psyche offers a unique window into the violent history of collisions and acceleration that created terrestrial planets.
- **Science Goals include:**
 - Understand a previously unexplored building block of planet formation: Iron cores.
 - Look inside terrestrial planets, including Earth, by directly examining the interior of a different body, which otherwise couldn't be seen.
 - Explore a new type of world made of metal (and not of rock and ice)
- **Science Objectives:**
 - Understanding Psyche – Whether it is a core, or if it is an unmelted material, relative ages of psyche's surface etc.
- **Deep Space Optical Communication (DSOC):** The Psyche mission is also testing a sophisticated new laser communication technology that encodes data in photons at near-infrared wavelength (rather than radio waves) to communicate between a probe in deep space and Earth.

▫ **Conclusion:**

- Overall, the Psyche mission will not only explore the Psyche Asteroid, but it will also unlock a deeper understanding of earth and our solar system

4) SPACE: DEEP SPACE OPTICAL COMMUNICATION

- **Why in news?**
 - » NASA's Deep Space Optical Communication Demo sends, receives first data (Nov 2023)
- **Example Questions:**
 - » Discuss the significance of NASA's Deep Space Optical Communication (DSOC) experiment for future space exploration. [10 marks, 150 words]
- **Need of Deep Space Optical Communication:**
 - » **Low bandwidth of radio frequency communications:** Future space missions are going to require higher bandwidth of communication as they will need to transmit higher volumes of science data, images, videos etc.

- » **Higher frequencies (shorter wavelengths)** which can carry more data suffer from the problems of getting blocked by atmosphere, and **higher scattering** when it is contacted with any interference.
- **NASA's Psyche Spacecraft** is on its way to **Psyche asteroid** and will reach there by **2029**. But in between it is involved in **experiments related to Deep Space Optical Communication (DSOC)**.
- **Primary Objective of DSOC** is to give tools and technology to future NASA initiatives to communicate at much higher bandwidth.
- **Demo:**
 - » DSOC has achieved '**first light**' sending data via laser to and from far beyond the Moon for the first time.
 - » NASA's DSOC experiment **has beamed a near-infrared laser encoded with test data from nearly 16 million kms away** – about 40 times further than the Moon is from Earth – to the Hale Telescope at Caltech's Palomar Observatory in San Diego County, California. This is the **farthest ever demonstration** of optical communication.
- **Key features:**
 - » It is pioneering the use of **near-infrared laser signal for communication with spacecraft**.
 - » **Its bandwidth is more than 10 times higher** than the state of art radio-telecommunication system of comparable size and power. This enables **higher resolution images, larger volumes of science data, and streaming of videos**.
- **Advantages:** Higher Bandwidth, faster data transmission, improved image resolution, reduced power consumption, potential for streaming video and real-time communication
- **How were the limitations of high frequency communication overcome?**
 - » **Extremely precise pointing**: To achieve this, the **transceiver aboard the spacecraft needs to be isolated from the craft's vibration**.
 - » **Compensating for movements of spacecraft and Earth**: The targeting has to **adjust for this continuous movement**.
 - » **Extracting information from weak signal**: Since the signal will travel several million kms, the received signal will be very weak. **New Signal processing tools** have to be utilized to **extract precise information from the communication**.
- Psyche spacecraft is the **first to carry a DSOC transceiver** and will be testing high bandwidth optical communications to Earth during the first two years of the spacecraft's journey to the main asteroid belt.
- Achieving the first light is **one of many critical DSOC milestones in the coming months, paving the way toward higher-data-rate communication**.
- **Has Space based optical communication happened in past?**

- » In 2013, NASA's Lunar Laser Communications Demonstration tested record breaking uplink and downlink rates between Earth and the Moon using similar technology.
 - » **But DSOC** is taking optical communication to Deep Space, paving the way for high-bandwidth communication far beyond the Moon and over 1,000 times farther than any optical communication test to date.
- **Significance:**
- » The DSOC holds the key for future space missions. As humans travel deep into space, they would want fast way of sending and receiving large amount of data from earth.
 - » It would pave the way for high data rate communications capable of sending scientific information, high-definition imagery, and streaming video in support of humanity's next giant leap: Sending humans to Mars.
- **Conclusion:**
- » While some challenges remain, the DSOC's potential for faster, richer space communication illuminates the path forward for future deep space missions.
- **Useful Video:** <https://youtu.be/VsKgYmQS-Kw?si=4HhQDlcTEyH8Xqfw>

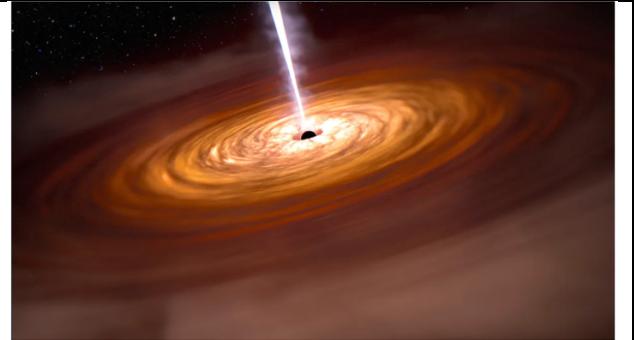
5) BLACK HOLES

- **Why in news?**
 - » Ferocious black holes reveal 'time dilation' in early universe (July 2023: Source: The Hindu)
 - » Spotting black holes (Sep 2023: Source – The Hindu)
- **What is a Black Hole?**
 - » A Black hole is a place in space where gravity pulls so much that even light can't get out. This strong gravity is because matter has been squeezed into a tiny space. This can happen when a star is dying.
 - » Since, no light is emitted from them, they are invisible.
 - » They are generally detected by telescopes by analyzing the behavior of stars that are very close to this black hole.
 - » **How large is a black hole?**
 - A black hole can be as small as an atom (but having the mass of a mountain) and they can be very large as well.
 - Stellar is a kind of blackhole whose mass is around 20 times the mass of sun. There are many many stellar blackholes in our Milky Way Galaxy.
 - "Supermassive" are the largest black holes. These black holes have masses that are more than 1 million suns together. Every large galaxy contains a supermassive blackhole at its

center. The Supermassive blackhole at the center of the **Milky Way galaxy** is called **Sagitarrius**. It has a mass of 4 million suns and would fit inside a very large ball that could hold a few million earths.

Quasars: Quasars are a subclass of active galactic nuclei (AGNs), extremely luminous galactic cores where gas and dust falling into a supermassive black hole emit electromagnetic radiation across the entire electromagnetic spectrum. They are among the brightest objects in the Universe.

Note: All Quasars are AGN, but not all AGN are Quasar



» The boundary of black hole is called **event horizon** which acts as one way towards the black hole and allows nothing to get out of it.

- **Singularities and Blackhole**

» In 1915 Karl Schwarzschild noticed that Einstein's then new-general theory of relativity predicted the existence of strange objects known as "singularities". They were places where his new equation describing gravity seemed to go haywire. Inside them there was a bizarre place where time stopped, and space became infinite. Over the years evidence have piled up explaining that singularities do exist in our universe as black holes.

- **Spotting black holes: How do we identify blackholes?**

» A blackhole is identified by the gravitational force it exerts on nearby stars.

- If the unseen companion happens to be a black hole, then because of its high gravity it will start pulling matter off the surface of the visible star. This matter start falling towards the blackhole in a characteristic spiral path. In the process it also emits X-Rays which can be detected from earth.
- From the observed orbit of visible star one can determine the lowest possible mass of the black hole.

- **Recent Updates about Blackholes**

A) SCIENTISTS HAVE DISCOVERED OLDEST BLACK HOLE YET (NOV 2023)

- A study published in Nov 2023 have confirmed that supermassive blackholes existed at the dawn of the universe. NASA's JWST and Chandra X-Ray Observatory have teamed up to confirm this observation.

- Given the age of the Universe is 13.7 billion years old, the age of this black hole is 13.2 billion years. Further, this blackhole is whopper – 10 times bigger than the black hole in our milky way galaxy. It is believed to weigh from 10% to 100% the mass of all the stars in its galaxy.
- **How was it formed?**
 - » The researchers believed that the black hole was formed from colossal clouds of gas that collapsed in a galaxy next door to one with stars. The two galaxies merged, and the black hole was formed.
- **Role of Chandra X-Ray Observatory:** The fact that Chandra X-Ray detected it confirms without doubt that it is a black hole. With X-rays you discover the gas that is being gravitationally pulled into the black hole, sped up and it starts glowing int the X-Ray.
- This one is considered quasar since it is actively growing, and the gas is blindingly bright.

B) FEROIOUS BLACKHOLES REVEAL TIME DILATION IN EARLY UNIVERSE (JULY 2023)

- Scientists have used observation of a ferocious class of black holes called quasars to demonstrate “time dilation” in the early Universe, showing how time then passed only about a fifth as quickly as it does today. The observation stretches back to about 12.3 billion years ago, when the universe was roughly $1/10^{\text{th}}$ of its present age.
- **Quasars were used as a “clock”** in the study to measure time in the deep past. The researchers used observations involving the brightness of 190 quasars across the universe dating to about 1.5 billion years after the Big Bang even that gave rise to the Cosmos. **They compared the brightness of these quasars at various wavelengths to that of quasars existing today**, finding that certain fluctuations that occur in a particular amount of time today did five times more slowly in the most ancient quasars.

6) NEUTRINO PARTICLES

- **Introduction**
 - » Neutrinos are one of the fundamental particles which make up the Universe. It is a fermion. They are similar to electrons but without any charge.
 - » Neutrinos are affected by weak subatomic force of much shorter range than electromagnetism and are therefore able to pass through great distances in matter without being affected by it.
 - Neutrinos interact very weakly with most of the things - trillions of them pass through every human body every second without anyone noticing.
 - » **A neutrino spin** always points in the opposite direction of its motion, and until a few years ago, neutrinos were believed to be massless. It is now generally believed that the phenomenon of neutrino oscillations requires neutrinos to have tiny mass.
 - » **Three types of neutrinos are known**, there are strong evidence that no additional neutrinos exist, unless their properties are unexpectedly very different from the known types.

- » Each type or flavor of neutrino is related to a charged particle (which gives the corresponding neutrino its name). Hence, the "electron neutrino" is associated with the electron, and two other neutrinos are associated with heavier version of electrons called muon and the tau.
- » The table below list the known types of neutrinos (and their electrically charged partners)

Neutrino	n_e	n_m	n_t
Charged Partners	Electron (e)	Muon (m)	Tau (t)

- **How are neutrinos formed?**
 - » Neutrinos are produced copiously in nuclear reactions in the Sun, stars, and elsewhere.
 - » Majority of neutrinos in the vicinity of earth are from the nuclear reactions in the Sun.
 - » They are formed on earth when unstable atoms decay, which happens in the planet's core and nuclear reactors.
- **Active Research Areas**
 - » Large neutrino detectors
 - Measure the neutrino masses and determine the precise values for the magnitude and rates of oscillations between neutrino flavors.
- **Motivation for research**
 - » Neutrino's low mass and neutral charge mean that they interact weakly with other particles and fields. This feature of weak interaction interests' scientists because it means neutrinos can be used to probe environments that other radiation (such as light or radio wave cannot penetrate)
 - Thus, Neutrinos can be used to probe the Universe, areas beyond our Solar system and phenomenon like Supernova.
 - » They can also enhance the understanding of basic physical laws as it provides a tool to study the structure of nucleons (protons and neutrons)

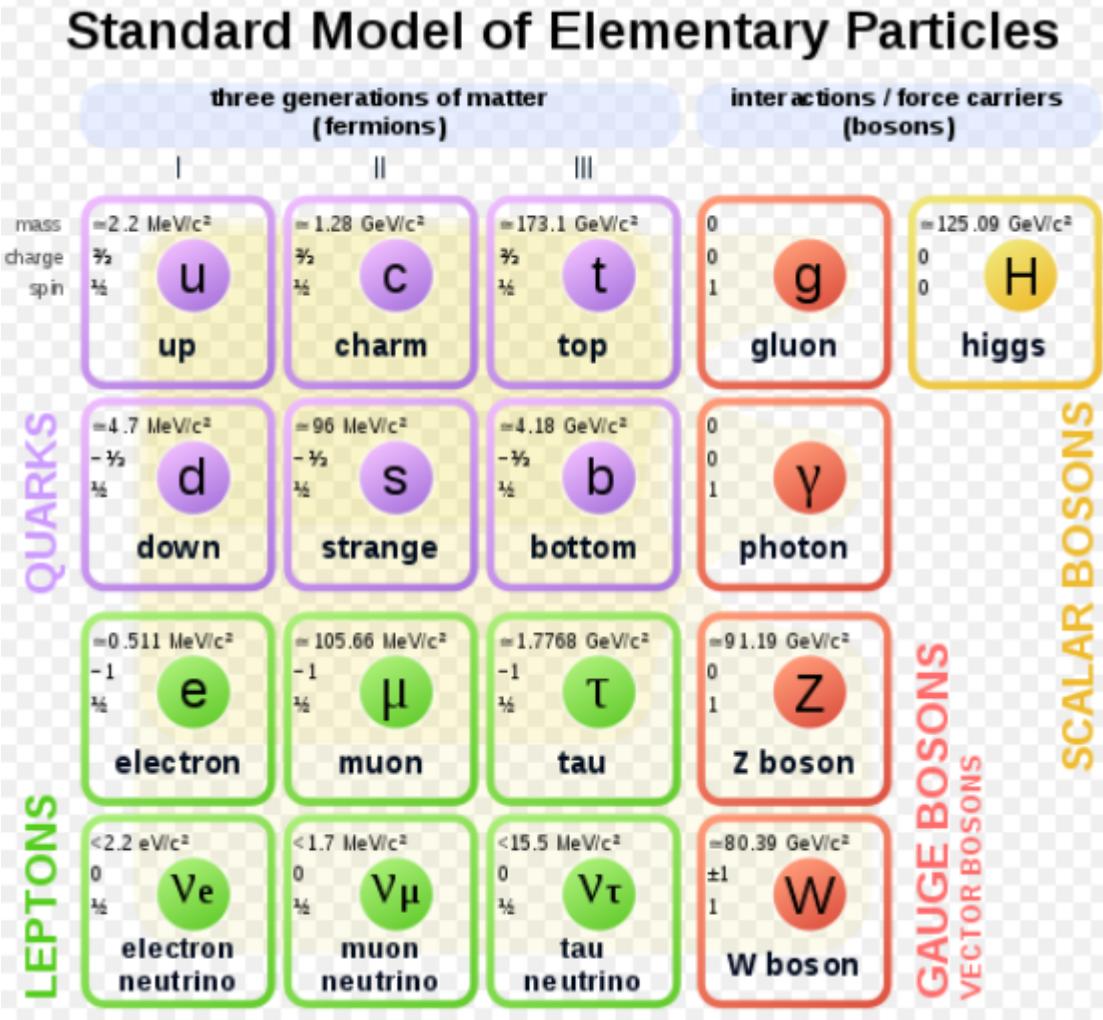
A) INDIAN NEUTRINO OBSERVATORY (INO) PROJECT IN THENI, TN

- It is a Rs 1600 Crore Science Project conceived nearly 20 years ago and can put India on the world map in the field of Neutrino Physics. It will house a massive iron detector which will be placed more than a Kilo meter below the surface of the earth. With a weight of nearly 50,000 tonnes, it will be the largest particle detector in the world.
 - » The project is led by TIFR and has more than 25 top research institutions in the country as collaborators.
- Setting up of this opportunity would mean revival of a lost opportunity for India because in 1965 pioneering Indian Scientists at the Kolar Gold Field (KGF) observatory were among the first in the world to discover the traces of atmospheric neutrinos. With the closure of KGF mines in 1990s, experimental research on neutrinos came to an end in India.
- The project will be jointly supported by the Department of Atomic Energy and The Department of Science and Technology.

- Issue Associated with INO: Environment Clearance (Matter pending in the SC)
- Useful Video:
 - » [India based Neutrino Observatory A Mega Science Project](#)



B) NOTE: STANDARD MODEL OF PARTICLE PHYSICS



C) IN A FIRST, SCIENTISTS SEE NEUTRINO EMITTED BY THE MILKY WAY (JUNE 2023)

- For the first time, scientists have seen neutrinos originating from the central disk of the Milky Way. It was achieved with the help of IceCube Experiment. They detected high-energy neutrinos in pristine ice deep below Antarctica's surface, then traced their source back to locations in the Milky Way - the first time these particles have been observed arising from our galaxy.
- About IceCube Experiment:
 - » For the past 10 years, an array of small light sensors drilled into Antarctic ice has been detecting neutrinos as they zip through our planet. IceCube is an actual cube of these sensors, a km long on each side, that was sunk 1.5 and 2.5 km deep in the ice. In this translucent medium, the sensors pick up tiny flashes of so-called Cherenkov radiation that forms when a vanishingly rare neutrino hits the ice and creates a shower of secondary particles.
- Significance:
 - » The experiment established the galaxy as a neutrino source.
 - » Milky Way neutrinos may help scientists understand the origin of high-energy particles known as cosmic rays, which kick off the formation of neutrinos.

7) HEALTH: FLU

A) INFLUENZA A VIRUS

There are four types of Influenza viruses: A, B, C, and D. Influenza A and B viruses cause seasonal epidemics of diseases.

Influenza A viruses are the only influenza viruses known to cause flu pandemics (i.e. global epidemics of flu diseases)

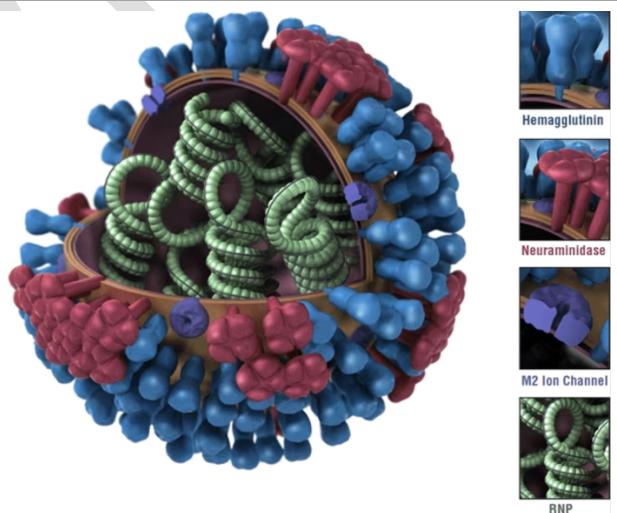
Influenza A virus is the only species of the genus *Alphainfluenzavirus*. It is an RNA virus.

Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus: hemagglutinin (H) and neuraminidase (N).

- There are 18 hemagglutinin subtypes (H1 - H18) and 11 different neuraminidase subtypes (N1 - N11)

More than 130 influenza A subtype combinations have been identified in nature, primarily from birds, there are potentially many more influenza A subtypes combinations given the propensity of virus "reassortment".

Reassortment is a process by which influenza viruses swap gene segments. It can occur when two influenza viruses



infect a host at the same time and swap genetic information.

- The influenza A virus subtypes that have been confirmed in humans, ordered by the number of known human pandemic deaths, are:
 - » H1N1 caused Spanish Flu in 1918 and the 2009 swine flu pandemic.
 - A variant of H1N1 was responsible for the Spanish Flu pandemic that killed some 50 million to 100 million people worldwide in 1918 and 1919.
 - » H2N2 caused "Asian Flu" in the late 1950s.
 - » H3N2 caused Hongkong Flu" in the late 1960s.

B) SWINE FLU

- Swine Flu is a respiratory disease caused by **influenza A viruses** that infects respiratory tract of pigs and result in barking cough, decreased appetite, nasal secretion, and restless behavior; the virus can be transmitted to human.
- The first case of **influenza A H1N1** was reported in Mexico in **April 2009**. Since then this infection has affected almost all the countries of the world.
 - » **The Virus**
 - Investigators decided to name it **H1N1** flu since it was mainly found infecting people and exhibits two main surface antigens, **H1 (hemagglutinin type 1)** and **N1 (neuraminidase type 1)**. The eight RNA strands from novel H1N1 flu have one strand derived from human flu strains, two from avian (bird) strains, and 5 from swine strains.
 - Most common virus causing swine flu is **H1N1** but the flu virus can sometimes also come from other subtypes such as **H1N2, H3N1, and H3N2**. Since 2017, H3N2 is becoming a dominant strain.
 - » **Cross Species infections** (swine to humans, humans to swine) etc. have mostly remained local and haven't caused national or worldwide infections in either pig or humans.
 - » **Transmission to humans:**
 - Most common way for humans to catch swine flu is through **contact with an infected pig** (not through properly cooked pork)
 - Swine flu is transmitted from **person to person** by **inhalation or ingestion of droplets containing virus from people sneezing or coughing**.
 - » **Symptoms**
 - **Similar to most influenza infections:** - fever, cough, nasal secretion, fatigue and headache.
 - » **Prevention and cure**
 - **Vaccination** is the best way to prevent or reduce the chances of becoming infected with influenza virus
 - **Two antiviral agents, zanamivir (Relenza) and oseltamivir (Tamiflu)**, have been reported to help prevent or reduce the effects of swine flu if taken within 48 hours of the onset of symptoms.

C) AVIAN INFLUENZA: BIRD FLU

- **Intro**
 - Bird flu (Avian Influenza) is caused by influenza A viruses.
 - Only viruses of the H5 and H7 subtypes are known to cause the highly pathogenic form of the bird diseases.
 - Most avian influenza virus don't infect humans; however, some such as A(H5N1) and A(H7N9), have caused serious infections in people.
 - Recently, China reported that H10N3 has also infected humans.
 - **There are several subtypes of Avian Influenza**
 - **AH5N1** is the most common virus causing bird flu, or avian influenza. It is largely restricted to birds, and often fatal (**high pathogenicity**) to them. It can sometimes cross over to other animals, as well as human.
 - According to WHO, the H5N1 was first discovered in humans in 1997 and has killed almost 60% of those infected. Though, it is not known to transmit easily among humans, the risk remains.
 - **A-H7N9**: It was reported in China in 2013. An outbreak of H7N9 strain killed around 300 people in 2016 and 2017.
 - **Risk Factors for human infections**
 - The primary risk factor for human infection appears to be direct or indirect exposure to infected live or dead poultry or contaminated environments, such as live bird markets.
 - **Impacts**
 - Outbreaks of AI in poultry may raise global public health concerns due to their effect on poultry population, their potential to cause serious disease in people and their pandemic potential.
 - Can impact local and global economies and international trade.
 - **Note**
 - There is no evidence to suggest that the virus can be transmitted to humans through properly prepared poultry or eggs.

D) NISHAD

- The **National Institute of High Security Animal Diseases (NISHAD)** of ICAR is a premiere institute of India for research on exotic and emerging pathogens in animals.
 - It came into existence on 8th Aug 2014 as an independent institute under ICAR, from its original status as High Security Animal Disease Laboratory (HADSL), a regional station of Indian Veterinary Research Institute (IVRI).
- **Recent updates:**
 - 'Inactivated low pathogenic avian influenza (H9N2) vaccine for chickens', developed by scientists of ICAR-NISHAD, Bhopal was transferred to various private companies. (Dec 2022)

E) THE EUROPEAN UNION IS EXPERIENCING THE LARGEST BIRD FLU OUTBREAK IN EUROPE: REPORT BY EUROPEAN FOOD SAFETY AUTHORITY (EFSA) (2022 AND 2023)

More than 50 million birds culled between Oct 2021 to Sep 2022

F) FIRST CASE OF AVIAN FLU FOUND IN ANTARCTIC REGION (OCT 2023)

- Avian flu has been detected for the first time in Antarctic region and has raised concerns for birds and mammals which feed on these bids.
- **Which type?**
 - Highly Pathogenic Avian Influenza (HPAI) was detected in brown skua (a predatory seabird) populations on Bird Island, South Georgia, making it the first known case in the Antarctic region.
- The ongoing pandemic of HPAI H5N1 was first reported in 2022 in northern hemisphere. In July 2022, outbreaks were reported in northern hemisphere's wildlife, especially seabirds.
- Later in 2022 and 2023, HPAI H5N1 spread rapidly in south America and eventually to Antarctic and sub-Antarctic region.
- **Risk Assessment:**
 - Sea-Gulls and Skuas are the most threatened avian group. They are followed by bird's prey such as hawks and carcasses, terns and shorebirds.
 - Among marine mammals, fur seals and sea lions are reportedly most vulnerable, followed by southern elephant seals and dolphins.



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1. GENERAL STUDIES – 3: S&T UPDATES

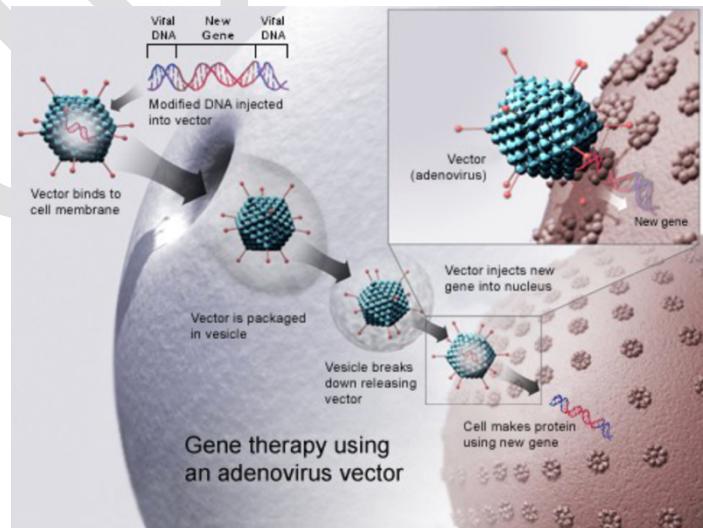
1) GENE THERAPY

- Example Questions

- » Gene therapy is gaining popularity in developed countries to treat various types of rare genetic disorders. Describe briefly what gene therapy is and what advantages it has over other treatments? How are National Guidelines for Gene Therapy Product development and Clinical Trials, 2019 going to contribute to the gene therapy development in the country. [250 words, 15 marks]

- Introduction

- **Gene therapy** refers to the process of introduction, removal or change in the content of an individual's genetic material with the goal of treating the disease and a possibility of achieving long term cure.
 - For e.g. UK recently approved **Casgevy**, a gene therapy production which genetically replaces the defective genes which are responsible for causing sickle cell anaemia.
 - **Gene Therapy Products (GTPs)** include the mechanisms to deliver nucleic acid components by various means for therapeutic benefit to patients. They include entities that are used for things like gene augmentation, gene editing, gene silencing, synthetic or chimeric gene augmentation etc.



- Advantages of promoting gene therapy

- **Permanent result may be a possibility:** Once the faulty genetics are replaced by the correct genes, the positive impact may be long lasting, sometimes permanent too.
- **Gene therapy is the only option** for the treatment of several genetic diseases.
- **High burden of rare genetic diseases in India:** Around 7% of India's population suffers from rare genetic diseases. Gene therapy can prove to be a turning point in treatment of such genetic diseases.
- **Worldwide market for the gene therapy products** is expected to go to \$250 billion by 2025.

- **Steps taken by India:**
 - » **National Guidelines for Gene Therapy Product Development and Clinical Trials – Released by ICMR in Dec 2019**
 - Aims to ensure that gene therapies are introduced in India and clinical trials for gene therapy can be performed in an ethical, scientific and safe manner.
 - Provides for general principles for developing gene therapy products (GTPs) for any human ailment.
 - Provides a framework for all areas of GTP production including pre-clinical testing, clinical administration, human clinical trials, as well as long term follow ups.
 - They apply to all stakeholders involved in the field of gene therapy including researchers, clinicians, oversight/regulatory committees, industry, patient support groups and any other involved in GTP development or their application in humans and their derivatives.
 - The guidelines will serve as a roadmap for those in the field trying to develop gene and cell therapies and will thus contribute to accelerating the development of advanced therapeutic options
 - » ICMR has also proposed setting up of task force to promote gene technology research in the country.
- **Concerns/Limitations/ Challenges associated with Gene Therapy:**
 - » **Technical Challenges:**
 - Unwanted immune response; gene therapy targeting wrong cells; the delivery viruses may mutate and become harmful.
 - » **Affordability issues:**
 - Gene therapy products are very expensive (for e.g. gene therapy for sickle cell anaemia recently approved in UK costs approx. \$2 million)
 - **Absence of local manufacturing capacity** leads to most GTPs needing to go to another country for processing which also increases the cost.
 - » **Ethical Challenges**
 - For e.g. creation of GM babies using germline gene editing by a Chinese scientist attracted global criticism and fueled debate on ethical concerns regarding applications of gene therapy technologies.
 - **Playing God** debate.
- **Way Forward:**
 - » **Policy Interventions** are needed to improve infrastructure of biotechnology research in the country.
 - » **Promoting PPP** in the gene therapy sector can increase the amount of required investments.

- » **Capacity building of healthcare professionals** to deliver gene therapy products once developed.
- » **International Collaboration** for tech-transfer, knowledge sharing etc.
- » **Awareness Generation:** Here community engagement will be crucial to promote screening for genetic disease.
- » **Continue to explore and promote alternatives**, such stem cell transplant wherever possible to develop complementary alternatives.

- **Conclusion:**

- » Gene therapy acts as a beacon of hope for crores of patients in India suffering from rare genetic diseases. Therefore, it is important that through various policy intervention and international collaboration more R&D in the field is promoted and gene therapy products which are not only of very high quality but also affordable.

2) SICKLE CELL ANAEMIA

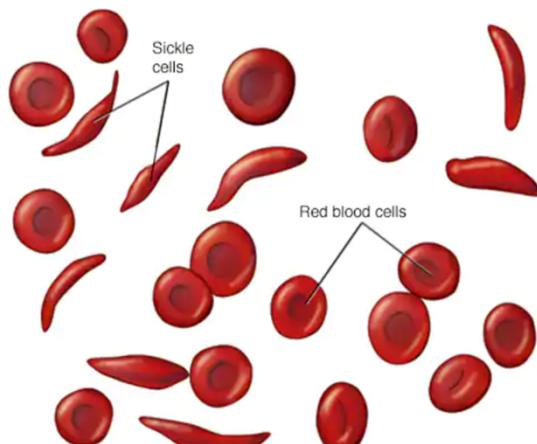
- **Why in news?**

- » The first therapy based on gene editing technology Crispr-Cas9 for Sickle cell disease and thalassemia has been approved in UK (Nov 2023)

About Sickle Cell Anaemia:

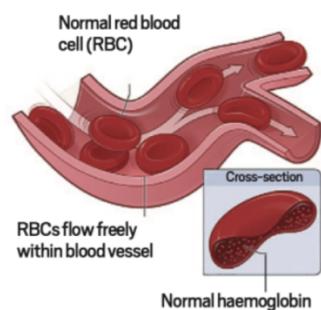
It is one of a group of inherited disorders known as Sickle Cell Diseases. It affects shape of the red blood cells which carry oxygen to all parts of the body.

RBCs are usually round and flexible so that they move easily through the blood vessels. But, in sickle cell Anaemia, some of the RBCs are shaped like sickle and also become rigid and sticky. This slows or blocks blood flow.

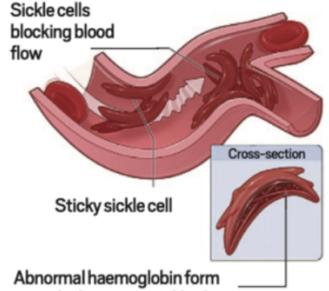


IMPACT ON RED BLOOD CELLS

Normal red blood cells



Abnormal, sickled, RBC (sickle cells)



US National Institutes of Health (NIH)

Note: Both Sickle Cell Anaemia and thalassemia are caused by errors in the gene for haemoglobin, a protein in the red blood cells that carry oxygen to organs and tissues.

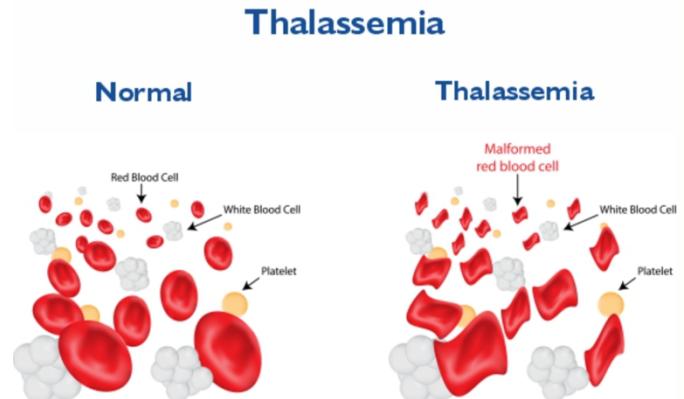
Symptoms: Anaemia -> fatigue; Episodes of extreme pain called pain crises; Swelling of hands and feet; delayed growth and puberty; Vision problems etc.

- **Treatment:**
 - No cure (except bone marrow transplant)
 - UK has recently approved a gene therapy for the treatment of sickle cell anaemia.
- **The UK Drug Regulator, in a landmark breakthrough, in Nov 2023 approved a gene therapy for the cure of sickle cell disease and thalassemia.**
 - This therapy is called **Casgevy**. It is the first licensed therapy in the world based on gene editing technology CRISPR-CAS9. This therapy edits the faulty gene that leads to these blood disorder, potentially curing person for life.
- **How does the therapy work?**
 - The therapy uses the patient's own blood stem cells, which are precisely edited using Crispr-Cas9. A gene called BCL11A, which is crucial for switching from foetal to adult is targeted in the therapy.
 - Foetal haemoglobin, which is naturally present in everyone at birth, doesn't carry the same abnormalities as adult haemoglobin. The therapy uses the body's own mechanisms to start producing more of this foetal haemoglobin, alleviating the symptoms of the two conditions.
- **How is the therapy prepared and given:**
 - **Casgevy** is one time treatment for which the doctor has to first collect blood stem cells from the bone marrow using a process called apheresis - used to filter out the blood for different components. The cells are then sent to the manufacturing site where it takes about six months for them to be edited and tested.
 - **Then the edited cells are then transplanted.** Before this doctor gives a conditioning medicine for a few days to clear the bone marrow of other cells that will be replaced by modified cells.
 - **The patient has to stay in hospital for at least one month** so that the edited cells take up the residence in bone marrow and start making RBCs with normal haemoglobin.
- **Side effects** from the treatment are similar to those associated with autologous stem cell transplants, including nausea, fatigue, fever and increased risk of infection.
- **Key challenges of the treatment:**
 - » **Very Costly:** it is estimated that the therapy will cause around \$2 million per patient, which is in line with other gene therapies.
 - » **Absence of local manufacturing technology:** This means that the harvested blood stem cells have to be sent across countries.
 - » **Preventing the misuse of CRISPR-CAS9:**

- **Situation in India:**
 - An estimated 30,000 - 40,000 children in India are born with this disorder every year. Thus, India has one of the highest burdens of sickle cell anaemia in the world.
- **Steps taken by India:**
 - In Budget 2023-24, a Mission to Eliminate Sickle Cell Anaemia by 2047 was announced. It entails awareness creation, universal screening of 7 crore people in the age group of 0-40 years in affected tribal areas, and counselling through collaborative efforts.
- **Way Forward:**
 - **Identify people suffering from Sickle Cell Anaemia:** Awareness creation; universal screening of people in the age group of 0-40 years in affected tribal areas; counselling through collaborative efforts.
 - **Replicate the success of this therapy in India while keeping the cost affordable.**
 - **Create an environment for development** of various gene therapy productions using CRISPR CAS9
 - More funds to various research institutions
 - Improving infrastructure of research labs etc.
 - **Strengthen regulatory framework** of Gene Therapy Products (GTP) in India to prevent its misuse.
- **Conclusion:**
 - Gene Therapy can play a very important role in achieving India's mission of eliminating Sickle Cell Anaemia by 2047.

A) THALASSEMIA

- Thalassemia is an inherited blood disorder in which the body makes an abnormal form of hemoglobin.
- If both of your parents are carriers of thalassemia, you have a greater chance of inheriting a more serious form of disease.
- The disorder results in excessive destruction of RBCs, which leads to anemia.
- **Treatment Option**
 - » Blood Transfusion
 - » Bone Marrow transplantation
 - » Medication and supplements
 - » Possible surgery to remove spleen or gallbladder.
- **Situation in India**



- » India is the thalassemia capital of the world with 40 million carriers (highest in the world) and over 1,00,000 patients (Majors) under blood transfusion every month. It is the most common genetic blood disorder that is prevalent in India.
 - » People suffering from the disease are unknowingly transferring on this genetic disorder to their children.
 - Around 10,000 births of Thalassemia major are taking place every year.
 - » Most of the thalassemia treatment takes place in private sector with out-of-pocket expenses.
 - » The 2021 policy and associated benefits haven't been operationalized yet.
- **World Thalassemia Day**
- It is observed on May 8 every year to commemorate Thalassemia victims and to encourage those who struggle to live with the disease.
 - The day was created by Thalassemia International Federation (TIF) in 1994.
 - **Theme for 2023:** "Strengthening Education to Bridge the Thalassemia Care gap"

3) RARE DISEASES

- **Introduction**
 - » A rare disease is a health condition of low prevalence that affects a small number of people compared with other prevalent diseases in general population.
 - They generally include genetic diseases, rare cancers, infectious tropical diseases, degenerative diseases etc.
 - » The most common rare diseases recorded in India are Haemophilia, Thalassemia, sickle cell anaemia, primary immuno-deficiency in children, auto-immune diseases, Lysosomal storage disorders such as Pompe disease, Hirschsprung disease, Gacher's disease, Cystic fibrosis etc. These diseases may be impacting around 70 million people from India, 50% of which are children.
- **Why special focus is needed for Rare diseases / Need of a separate policy on Rare Diseases**
 - » **High cost of treatment** or no treatment > not affordable for most of the citizens -> health insurance generally excludes rare diseases.
 - Available are primarily expensive because pharma companies are not interested in R&D as the number of patients for each disease is very less (Orphan Drugs)
 - As per WHO, only 5% of the identified rare diseases have treatment.
 - » **Difficult to diagnose.**
 - » **Early screening generally doesn't happen** because of lack of awareness among primary care physicians, lack of adequate screening and diagnostic facilities etc. There are very few medical professionals who can deal with these diseases
 - » Currently there is inadequate insurance cover and treating practitioners are lacking management practices.
- **National Policy for Rare Diseases, 2021**
 - » MoH&FW came up with the policy in March 2021.

- It 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 by Department of Health Research, MoH&FW as convenor.
 - It envisages creation of a national hospital based registry of rare diseases so that adequate data is available for definition of rare diseases and for R&D.
 - It focuses on early screening and prevention through primary and secondary healthcare infrastructure such as H&W Centres and District Early Intervention Centres (DEICs) and through counselling of high risk parents.
 - Screening will also be supported by NIDAN Kendras set up by the DBT.
 - The policy aims to strengthen tertiary health care facilities for prevention and treatment of rare diseases through designating 8 health facilities as **Centre of Excellence** and these CoEs will also be provided one-time financial support of upto Rs 5 crores for upgradation of diagnostic facilities.
 - **Provision for financial support:** The policy was amended in May 2022. It now provides a financial assistance of upto Rs 50 lakh for treatment of rare diseases of all categories.
 - » In the original policy, a financial support of upto Rs 20 Lakhs was provided under the Umbrella Scheme of Rashtriya Arogya Nidhi for treatment of those rare diseases that require a one time treatment (disease listed under Group 1 in the rare diseases policy)
 - 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 so collected will be utilized by CoEs for treatment of all three categories of rare diseases as first charge and then the balance financial research could also be used for research.
- **Performance of the policy (Critical Analysis) (Jan 2023)**
- » LS MP Varun Gandhi have written to Union Health Minister and have said that more than 4,000 identified patients of rare diseases - mostly children - are yet to receive the Rs 50 lakh financial assistance for treatment guaranteed by the Union Government under the National Policy for Rare diseases, 2021.
 - More than 10 children who were awaiting treatment have already lost their lives.
 - » The 10 CoEs constituted under the policy are yet to seek financial assistance (crowdfunding) for patients with rare diseases.
- **Key Issues:**
- » Implementation challenges.
 - » Cost Effectiveness of interventions for rare disease vis a vis other health priorities
 - » the sharing of expenditure between central and state governments.
 - » **Other issues** (about gene therapy - already discussed)

4) ANTI-MICROBIAL RESISTANCE

- Why in news?
 - » Genes fuel antibiotic resistance in Yemen Cholera Epidemic (Sep 2023)
 - The Cholera outbreak in Yemen, which began in 2016, is the largest in modern history and anti-biotic resistance has become widespread among V. cholerae bacteria since 2018.
 - A study has found the presence of a new plasmid - a small, circular DNA molecule - in V. cholerae from late 2018 to the bacterial strain behind the epidemic. This plasmid introduced genes encoding resistance to multiple clinically used antibiotics, including macrolides (such as azithromycin).
- Example Questions:
 - » Antimicrobial resistance is a multi-driven problem and only a multi-pronged approach can be helpful in tackling the scourge. Elaborate [10 marks, 150 words]
- Introduction:
 - » Antibiotic resistance occurs when an antibiotic has lost its ability to effectively control or kill bacterial growth; in other words, the bacteria becomes "resistant" and continue to multiply in the presence of therapeutic levels of antibiotic.
- Why do bacteria become resistant to antibiotic?
 - » **Natural Phenomena: Evolution** - Selective pressure for the survival of resistant strains of bacteria.
 - » **Human Action:** Current higher levels of antibiotic resistant bacteria are attributed to the overuse and abuse of antibiotics.
- How do bacteria become resistant?
 - » Some bacteria are naturally resistant to certain type of antibiotics.
 - » However, bacteria may also become resistant in two ways :
 - By Genetic Mutation
 - By acquiring resistance from another bacterium.
- Why India is vulnerable to Anti-biotic resistance?
 - » **India is the largest consumer of anti-microbials globally** and the use of **last resort anti-microbials like cephalosporins is soaring.**
 - **Easy availability and overuse** of anti-biotics is the most important factor: Over the Counter Availability; Irrational Use; over-prescription by doctors
 - For e.g. Children often receive multiple courses of antibiotic every year since the viral infections are recurrent. This makes them more vulnerable to anti-microbial resistance.
 - » **Poor Health Sector** -> improper treatment -> Development of anti-biotic resistance
 - Further, exposure to subtherapeutic levels of anti-microbials or non-adherence to prescribed medications has also been cited as a driver of AMR
 - E.g.: in case of TB

- » Increasing and completely unregulated use of antibiotic in Agriculture, live stocks and Poultry sector.
 - Amount of antibiotics used in the farm animal and food industry is three to four times more than those used by humans.
 - For instance, Colistin is extensively used in veterinary practices as a growth promoter. This leads to generation of colistin-resistant bacteria in poultry and fresh water fish.
- » **Poor Sanitation conditions** -> More diseases -> More use of medicines -> More AMR development
- » Unchecked discharge of effluents by the pharmaceutical industries -> high concentration of pharmaceutical substances are found in surface and ground water systems near production facilities -> anti-biotics cause development of anti-microbial resistance in environment.

- **Impact of increasing anti-microbial resistance**

- » **Damage to Public Health:**
 - In 2019, drug-resistant superbugs killed about 1.27 million people globally - a toll more than HIV/AIDs or malaria - and according to the UN estimates, the number could reach 10 million by 2050.
 - Demands complicated treatment pattern, with longer stay in hospitals -> increase in cost of treatment.
 - Stronger antibiotics which are used after the first line of drugs fail generally have toxic side effects
 - Resistance also emerging for second line of drugs (e.g. XDR-TB emerging)
 - Without functional anti-microbials to treat bacterial and fungal infections, even the most common surgical procedures, as well as cancer chemotherapy, will become fraught with the risk of untreatable infections.
 - All this is compounded by the fact that no new class of anti-biotics have made it to the market in the last three decades, largely on account of inadequate incentives for their development and production.
- » **Economic damages** due to AMR can be equivalent to what 2008-09 economic shocks resulted into: UN Report
- » **Environmental Damages**
 - Extensive amount of anti-biotics lead to development of AMR in some micro-organisms. It impacts the microbial biodiversity and thus the environmental balance needed.

- **Steps that government has taken and Steps that we further need to take**

- **National Policy for Containment of Antimicrobial Resistance, 2011**
- Guidelines for appropriate antibiotic usage which have revised Schedule H drugs to make over-the-counter availability of certain antibiotics nearly impossible
- Programs such as Red Line Campaign
- Sanitation campaigns such as Swatch Bharat Mission etc.
- National Surveillance system for AMR (April 2017)
- **National Action Plan on Antimicrobial Resistance (April 2017):** Focused on enhancing awareness, strengthening surveillance, improving rational use, promoting research and supporting neighboring countries.

- **What more could be done**

- **Strengthen healthcare services** -> early detection; high quality medicines, complete treatment.
- **Strengthening infection prevention and control in health care facilities and farm**
- **Proper Implementation** of National AMR resistance action plan should get high priority, towards tackling drug resistance.
 - » Efficient utilization -> Following WHO's '**Access, Watch and Reserve**' strategy.
 - » Strict implementation of various drugs control regulation and increasing the fine for over the counter sale of drugs.
 - » Import and Export policies of food and feed should strictly regulate the anti-biotic use.
- **Proper regulation of livestock sector** to reduce the use of anti-biotics there.
 - » Improve biosecurity and ensure that harmful pathogenic organisms are not present at the farm.
 - » Promote vaccination over drugs
 - » **Developing and Using Alternatives**
 - **Botanical products with anti-microbial properties:** Extracts from turmeric, ginger, pepper and garlic are effective anti-microbial and can be added to the feed to control bacteria.
 - Use of **Probiotics and Prebiotics**
 - Using Seaweed extracts for improvement of immunity and additional physiological performance among aquaculture animals.
 - **Using enzymes** instead of antibiotics as growth enhancers. For e.g. enzymes like proteases, amylases, cellulase, esterase, lipase etc. are intended to enhance the availability of nutrients and help nutrient absorption in the digestive system.
 - **Phage therapy** (i.e. using Bacteriophages in aquaculture)
 - **Irradiation of food crops**
 - » DAHD should develop standard treatment guidelines to reduce misuse of anti-biotics.
 - » Bring a law to regulate manufacturing and sale of poultry feed laced with anti-biotics.
- **Regulating pharmaceutical industry effluents** -> strengthening BWM rules and improving its strict implementation.
- **Tackling AMR in Environment**
 - » Come up with a technical guidance to contain AMR from waste and environment.
 - » Shift to safer manufacturing practices for pharma to ensure reduced wastage and discharge in environment.
- **More Research** in the field of Anti-biotic resistance and coming up with safe mechanism to treat these AMR diseases
 - » **A multi-sectoral \$1 billion AMR Action Fund** was launched in 2020 to support the development of new anti-biotics. Similar steps to allocate more resources for AMR research would be required.
- **International Collaboration** should increase.
 - » All UN member states should phase out the use of anti-microbial on the WHO's highest priority list as growth promotion agents.
 - » Trade of anti-biotics must be regularized for therapeutic purpose only with strict legalized medical prescription and supervision.
- **Increased focus on awareness** generation among common people against the need of excessive use of anti-biotics.
- **Develop new varieties of anti-biotics:**

- » Since developing new anti-biotics is expensive and requires a few years at least, a developing country like India needs to jump start in-house development of new anti-biotics through PPP. Government agencies like ICMR and CSIR, along with DBT, DST can also work with global partners like Global Antibiotic Research Development Partnership (GARDP) etc.

- **Conclusion**

- » The world can't contain anti-microbial resistance unless stakeholders from all sectors such as human and animal health, environment, crops, food and drug come forward to act. **One-Health action** is must to slow down AMR chronic.

5) NUCLEAR ENERGY

- **PYQ:** With growing energy needs should India keep on extending its nuclear energy program? Discuss the facts and fears associated with nuclear energy
- **Introduction:**
 - » Energy security means consistent availability of sufficient energy in various forms at affordable prices. When a country moves ahead on the path of development, it is necessary to utilize every energy resource available in the country.
 - » Currently, nuclear energy makes up about 3% of India's energy sources
- **Advantages of Nuclear Energy:**
 - Least carbon footprint** (lesser than renewable energy)
 - The threat of climate change and environmental pollution are likely to constraint the use of fossil fuels
 - Cost of nuclear power**
 - The cost of nuclear power plants is pretty competitive to other fossil versions
 - Quantity of waste generated** is also very less
 - Potential of self sufficiency**
 - India has huge reserves of thorium which if properly utilized will reduce the dependency of India on foreign country
 - Depleting fossil fuels and import dependency:** India is currently drawing around 63% of its total energy from thermal sources. A significant part of this is imported.
 - Limitations of Renewable Energy**
 - Renewable energy are subject to vagaries of weather; they are land intensive; dependence on import technology; energy storage handicaps;

- Renewable energy is inevitable and nuclear option should be retained as insurance.

» Limitations

- a) Safety concerns in light of recent disasters
- b) Nuclear waste disposal is a big concern
 - India still doesn't have a credible waste disposal policy.
- c) Potential of developing nuclear weapons
- d) Security concerns
 - Nuclear power plants can be favorite targets for terrorist organizations. If this happens it may cause irreversible damage to people living in the region and the ecosystem.
- e) India is dependent on other countries both for raw material and technology
 - Our future potentially depends on third stage of nuclear program.
- f) Ecological concerns
 - Nuclear plants are generally set near the coast as it requires a lot of water.
 - It is going to put pressure on coastline as India's western coastline is home to fragile ecology of western Ghats.
- g) Long gestation period
 - Till now only more than 20 plants are operational. There are long gestation periods which increases the cost of plants significantly.
- h) More safeguards -> more costly
 - Post Fukushima disaster, the cost of per unit energy has gone up. This has led to concerns regarding the cost viability of nuclear power plants.

» Way Forward

- **Adopt National Policies that advance the deployment of nuclear reactor technologies:** As we know that India's total energy demand is expected to cross 800 GW by 2032, it is very important to utilize all possible options available and nuclear energy is one of the most important of those options.
- We need to develop a fledging domestic nuclear industry which will reduce our dependence as well as help us in reducing the gestation period of the plants.

- In light of the limitation's association with nuclear energy, stress should be laid on **cautious development, safety precautions in operation and disposal of wastes**. But development of nuclear energy can't be stonewalled in the light of such concerns.
- Establish a harmonized international regulatory system coordinated by the IAEA.
- Encourage multinational Cooperation on permanent disposal of spent fuel



CURRENT AFFAIRS PROGRAM

PRE CUM MAINS 2024

DEC 2023: BOOKLET-6

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1. GENERAL STUDIES – 3: S&T UPDATES

1) COMPUTER AND IT: WEB BROWSERS – HOW DO THEY WORK

Why in news?

- » How do web browser work? (Dec 2023: Source - TH)

Definition:

- » A web browser is software that allows you to find and view websites on the Internet. They translate code into the dynamic webpage that forms the backbone of our online experience.

Different Browsers over the years:

- » In 1990, the English Computer Scientist Tim Berners-Lee introduced the concept of World Wide Web and with it came the first web browser, also known as WorldWideWeb.
- » The next watershed moment was Mosaic browser in 1993. It was developed by US National Centre for Supercomputing Application. It introduced the concept of displaying images alongside text. It revolutionized our interaction with the web and made internet visually engaging.
- » In 1994 came the Netscape Navigator and it became the most popular browser of its time. It brought features like bookmarks and user-friendly URL bar. It simplified the navigation and made the web more accessible.
- » Late 1990s saw the period of the 'Browser Wars'. Microsoft's Internet Explorer (IE) and Netscape Navigator were the primarily contenders. This competition led to a lot of innovation in various browsers. But, by 2,000 IE emerged as undisputed leader mostly on the back of the success of Windows operating system which generally shipped with IE as default browser which most of the people used. But this monopoly also led to stagnation and lack of innovation.
- » In 2004-05, this monopoly was broken with the arrival of Mozilla's Firefox. Firefox was developed by a community of volunteers and was based on open-source principles. It introduced groundbreaking features like tabbed browsing, and pop-up blocking. It also allowed users to extend their personal browsers with add-ons.
- » In 2008, Google launched Chrome, which swiftly gained in popularity for its speed and minimalist design. It also revitalized the browser market and encouraged innovation across the board.
- » Today, the most popular browsers are Google Chrome, Firefox, Microsoft's Edge and Apple's Safari.

How do Browsers work?

Modern web browsers have multiple core components, each of which is a complex technology in itself.

A) REQUEST AND RESPONSE

- When you enter a website's address (in the form of Uniform Resource Locator (URL)) into your browser's address bar (or when you click a link), you set in motion a sequence of digital communication. The browser sends a request to a server, asking for the contents of the specific web browser you're interested in. This request travels through a network of servers, like

dispatching a letter through a series of post offices. Upon reaching the server, the request is received and processed.

- The server then formulates a response containing the information (or data) required to construct the web pages. This response embarks on its journey back to your browser, carrying the digital blueprint for the page you requested.

B) DECONSTRUCTING THE RESPONSE

- The response from the server is an amalgam of various files. Typically, these files have information encoded in three languages: HTML, CSS, and JavaScript. Each set of information plays a pivotal role in shaping the final presentation of the web page.
- **HTML (Hyper Text Markup Language)** provides the architectural blueprint of webpage. It defines structure of the webpage, outline elements like headings, paragraphs, images, and links. HTML is the foundation on which browser construct a visual layout.
- **CSS (Cascading Style Sheets)** imparts style and aesthetics to the HTML structure by controlling attributes like color schemes, fonts, spacing, and positioning. CSS ensures that webpages come with its unique identity.
- **JavaScript** is a dynamic engine, making webpages interactive and responsive. It allows interactive elements like pop-ups, forms, animations, and Realtime updates, creating an engaging user experience.

C) RENDERING

- With HTML, CSS and JavaScript in hand, a browser begins the process of rendering. This involves deciphering the HTML to understand the structural arrangement, applying CSS for stylistic finesse, and executive JS to infuse interactivity.
- The process is remarkably swift, assembling the final webpage and presenting it to user in a cohesive and visually appealing manner in much less than a second, depending on the amount of data.
- **Rendering engines** are in themselves a key piece of technology that enables screens to display graphics.

D) MANAGING DATA

- Browsers serve as adept custodians for your digital footprint, so they also implement instruments like **cookies** and **cache** to enhance your online experience.
- **Cookies** are small snippets of data stored on your computer by websites you visit. They retain information such as login status, site preference, and shopping cart content. This allows you to navigate seamlessly, without having to re-login to a site when you close and reopen it in a short span of time.
- **Cache** is a repository of frequently accessed files. When you revisit a webpage, the browser checks its cache to see if it already has a copy of the required files. If so, it retrieves them from the cache itself rather than re-downloading them from the server.

E) SECURITY

- Web browsers use an array of security measures to protect your data as they fly between your computer to various servers, via the internet, and even when they're stored on your computer. They

do this by using **encryption protocols**, such as **HTTPS**, to create secure tunnels for data exchange shielding the information from prying eyes.

- Browsers also use warning systems to alert you about potentially malicious websites, preventing inadvertent exposure to threats.

Future of Internet Browsers:

- As technology hurtles forward, web browsers evolve in tandem. They are embracing new technologies like **Web Assembly**, a format that enables near-native performance within the browser environment.
- Support for VR and AR experience is also on the horizon, promising immersive online interactions.
- Privacy features are being bolstered, providing users a greater control over their digital footprint.

Conclusion:

- **Web browsers** are the unsung heroes of our digital endeavors, translating code into the dynamic web pages that form the backbone of our online experiences.

2) HEALTH: GENERIC MEDICINES

- **Why in news recently?**
 - » On Aug, 2023, the National Medical Council (NMC) directed all doctors to prescribe only generic names and not brand names which led to protest. Following the Indian Medical Association's protest, the NMC has withdrawn the order on 'generic prescribing' since Aug 23, 2023.
 - **Why the protest?**
 - Doctors trust certain brands
 - The control over which brands to take will go to chemist shops.
- **Example Questions**
 - » "Generic medicines can play a key role in making India's health sector affordable". Discuss. [15 marks, 200 words]
- **What is a generic drug?**
 - » Generic drug is a low cost version of pharmaceutical drug that is equivalent to a brand-name product in dosage, strength, route of administration, quality, performance and intended use.
 - » They usually enter market after patent protection of the original drug expires.
- **Note:** Broadly Medicines can be of three types:
 - » **Branded:** These are still on patent
 - » **Branded Generic:** Off-Patent and Generic, but nonetheless produced by a reputed company, with a brand.
 - » **Generic:** Off-Patent, and unbranded.
- **Government's attempt in promoting generic drugs**
 - » National Medical Council (NMC) has directed all doctors to prescribe generic names and not branded names.

- » But this order was withdrawn after protest from Indian Medical Association.
- » Making it mandatory for all chemists to display generic medicines prominently
- » **Pradhan Mantri Bhartiya Janaushadhi Pariyojna (PMBJP)** was launched by Department of Pharmaceuticals, Ministry of Chemical and Fertilizers, Government of India as a direct market intervention scheme in 2008.
 - » As of Jan 2023, **9,000 Jan Aushadhi Kendras** are functional across the country.
 - The government has set up a target to increase the number of Jan Aushadhi Kendras to 10,000 by March 2024.
 - It offers 1759 medicines, and 280 surgical devices covering all major therapeutic groups.

- **Advantages**

1. **Affordable healthcare:** Generic medicines are cheaper as it doesn't include manufacturer's marketing cost, cost spent on prescribing doctors etc.
2. **Breaks the doctor-pharma nexus:** The existing nexus leads to prescription of only the brand of companies which gives some kick-backs to doctors.
 - » **Reduce unnecessary prescription:** This is resorted to by doctor if pharma companies are paying them
3. **Promotes domestic pharma companies** as India is a world leader in generic drug manufacturing.
4. **Difficult for quacks to function** as non-qualified people may find it difficult to know generic names

- **Limitations**

1. **Quality concerns**
 - » Concerns about lack of uniformity in the quality of generic versions.
 - » Studies have shown that many generic versions don't work.
 - » Doctors trust and prefer well-established brands.
2. **Erode doctor-patient relationship**
 - » As by prescribing generic drugs, doctor refuse to take responsibility for clinical outcomes.
3. **Low profit margins for retailers**
 - » Retails pharmacists, in turn, have little incentive in stocking and selling low price generic medicines since they have lower profit margins.
4. **Shortage**
 - » Though, there are more than 9,000 Jan Aushadhi Kendras, the reach of traditional medical stores is very high and they primarily deal in non-generic versions.
5. **Difficult for common person to understand**, especially the multiple salt names in a FDC.
6. **May discourage big pharma companies to launch their new medicines in India**

- **Way forward**

- » **Improved Quality** through improved regulation of pharma sector.
 - Human Resource issues like shortage of drug quality inspectors has to be tackled in a fast track manner.
- » **Increasing Production and Availability:** Increasing the penetration of Jan Aushadhi Kendras.
- » **Allow pharmacist to substitute for alternative:** Laws for enabling substitution of generic and branded equivalents by pharmacists need to be introduced.
- » **Prohibit Branding for out of patent drugs**

- » **Increased awareness** on generics needed among consumers, pharmacists
- » **Short names for generic FDCs** (officially approved trade names) will also ensure that doctors don't write out the generic names of their multiple constituents.
- » **Improving government health facilities** would contribute to more coverage of government hospitals in overall health coverage and government hospitals can promote generic better.

- **Conclusion**

- » Overall, generic prescribing is a good move in the right direction and will have several positive ramifications for healthcare in India. However, like everything, successful implementation would require a series of enabling steps at different levels from production to prescription and from Quantity to Quality.

A) PRELIMS SCHEMES: PRADHAN MANTRI JAN AUSHADHI YOJANA (PMJAY)

- **Intro:**
 - » **Pradhan Mantri Bhartiya Janaushadhi Pariyojna (PMBJP)** was launched by Department of Pharmaceuticals, Ministry of Chemical and Fertilizers, Government of India as a direct market intervention scheme in 2008.
- It aims to make quality generic medicines available to all at affordable prices through Jan Aushadhi Stores (JAS) opened in each district of the states.
 - » First Jan Aushadhi Store (JAS) was opened at Amritsar Civil Hospital in 2008.
- Other key focus of the scheme is to create awareness and demand for generic medicine
- **Incentives given:**
 - » The scheme provides an excellent opportunity of self-employment with suitable and regular earnings.
 - » An incentive of Rs 5,00,000 is provided to the Jan Aushadhi Kendras as financial assistance and one time additional incentive of Rs 1 lakh (as reimbursement for IT and infra expenditure) is provided to Jan Aushadhi Kendra opened in North-Eastern India, Himalayan state, island territories, and backward areas identified by NITI Aayog as aspirational districts or if opened by women entrepreneurship, Ex-Serviceman, Divyangs, SCs and STs.
- As of Jan 2023, 9,000 Jan Aushadhi Kendras are functional across the country.
 - » The government has set up a target to increase the number of Jan Aushadhi Kendras to 10,000 by March 2024.
 - It offers 1759 medicines, and 280 surgical devices covering all major therapeutic groups.

3) HEALTH: NEGLECTED TROPICAL DISEASES (NTD)

- **WHO Definition:**
 - » NTDs are a diverse group of 20 conditions that are mainly prevalent in tropical areas, where they mostly affect impoverished communities and disproportionately affect women and Children.
 - The epidemiology of NTDs is complex and often related to environmental conditions.

- They are caused by variety of pathogens - viruses, bacteria, protozoa, and parasitic worms (helminths).
- Which are the diseases included in NTDs:
 - » Buruli Ulcer, Chagas Disease, Dengue & Chikungunya, dracunculiasis (Guinea-worm disease), echinococcosis, foodborne trematodiases, human African trypanosomiasis (sleeping sickness), leishmaniasis, leprosy (Hansen's disease), lymphatic filariasis, mycetoma, chromoblastomycosis and other deep mycoses, onchocerciasis (river blindness), podoconiosis, rabies, scabies, and other ectoparasitoses, schistosomiasis, soil-transmitted helminthiases, snakebite envenoming, taeniasis/cysticercosis, trachoma, and yaws and other endemic treponematoses.
- Note:
 - » 'Noma' is the latest addition to WHO's list of neglected tropical diseases (Dec 2023)
- These diseases are contrasted with the "big three" infectious diseases (HIV/AIDS, tuberculosis, and malaria), which generally receive greater treatment and research funding.
- Jan 30: World NTD Day
 - » In May 2021, the delegates at the 74th World Health Assembly unanimously adopted a proposal to declare Jan 30 as 'World NTD Day'.
- WHO's new roadmap for 2021-2030 calls for three strategic shifts to end NTDs:
 - » From measuring process to measuring impact.
 - » From disease-specific planning and programming to collaborative work across sectors.
 - » From externally driven agendas reliant to programmes that are country-owned and country-financed

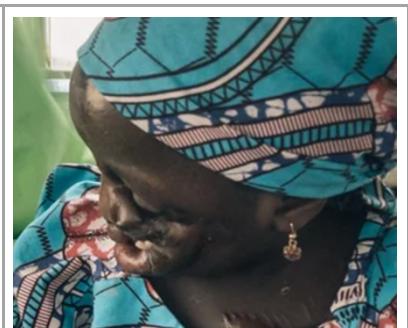
A) NOMA DISEASE

It is a severe gangrenous disease of the mouth and face. It primarily affects young children (between the ages of 2 years to 6 years) in regions of extreme poverty.

It starts as an inflammation of gums, which, if not treated early, spreads quickly to destroy facial tissues and bones.

Cause: Evidence indicate that NOMA is caused by bacteria found in the mouth. There are multiple risk factors associated with the disease. It includes malnutrition, weakened immune system, infections, and extreme poverty. If the child is malnourished and has recently been sick with an infectious disease, such as measles or chickenpox, they are at more risk for developing noma.

It is not contagious but tends to strike when the body's immune system is weak.



NOMA is sometimes called the 'Face of Poverty' as it is a social marker of extreme poverty and malnutrition.

Significance of Including NOMA in the NTD's list:

- Amplify global awareness.

Impact: It can be fatal and may also cause severe disfigurement for survivors.

Treatment: It involves antibiotics, advice and support on practices to improve oral hygiene with disinfectant mouth wash and nutritional supplements. In case of early diagnosis, proper wound healing without long-term consequences may take place. In severe cases, surgery may be necessary.

Cases are mostly found in sub-Saharan Africa. Some cases are also reported from Americas and Asia.

Accurate estimation of the number of noma cases is challenging due to rapid progression of the disease and the associated stigma.

- Catalyze research, stimulate funding and boost efforts to control the disease through multisectoral and multi-pronged approaches.

4) HEALTH: HIV

- Why in news?

- » Hopes dashed as last HIV vaccine trial in Africa for his decade ends in failure (Dec 2023: Source - DTE)
- » The WHO has released new scientific and normative guidance for human immunodeficiency virus (HIV) at the 12th International AIDS Society Conference on HIV Science on July 23, 2023.

- Practice Question:

- » Highlight the current state of HIV/AIDs in India. Critically evaluate the effectiveness of National AIDS Control Program in addressing the challenges of HIV/Aids in the country. Give recommendations for strengthening the program's response in the context of India. [15 marks, 250 words]

- Introduction:

» About virus:

- » HIV are two species of Lentivirus (genus) of Retroviridae family. The virus first emerged in 1920 in Kinshasa (then Leopoldville), Belgian Congo.
- » The Human Immunodeficiency **Virus (HIV)** targets the immune system and weakens people's surveillance and defence systems against infections and some types of cancers.
 - » As the virus destroys and impairs the function of the immune cells, infected individuals gradually become immunodeficient. Immune function is typically measured by CD4 cell count.
 - » The most advanced form of HIV infection is acquired immunodeficiency syndrome (AIDS), which can take from 2 to 15 years to develop depending on individual. It is defined by developments of certain cancers, infections, or other severe chemical manifestations.

- **Note:** CD4 cells are a type of white blood cells that play a major role in protecting your body from infection. They send a signal to activate your body's immune response when they detect "intruders" like the viruses or bacteria.

- **Transmission**

- » Exchange of a variety of body fluids - blood, breast milk, semen and vaginal secretion
- » **Note:** Individual can't be infected through ordinary day to day contact such as kissing, hugging, shaking hands, sharing food or water etc.

- **Behaviours or conditions which can put individual on risk:**

- » Unprotected sex (including anal)
- » Having other STDs like syphilis, herpes, chlamydia etc.
- » Use of contaminated needles, syringes etc. while injecting medicines or drugs.
- » Unsafe blood transfusion and medical procedures
- » Infected mother to unborn child.

- **Diagnosis**

- » **Three types of tests:**

- **Antibody test:** By detecting presence or absence of antibodies to HIV in blood; **most commonly used test.**
 - When someone is infected with HIV, the immune system produce proteins called anti-bodies, and they are directed against the unique proteins of HIV. Though, these antibodies are not able to eliminate the virus, but they serve as a marker to show that someone is infected with HIV.
- **RNA (viral load) test (RT-PCR)**
- **A Combination test**
 - It detects both antibodies and viral protein called p24 (antibody-antigen test, or HIV Ab-Ag test).
 - P24 forms part of the core of the virus (an antigen of the virus).

- **Prevention**

- » **Avoid risk behaviours** (i.e. use condoms, test and counsel for HIV and STIs, Voluntary medical male circumcision, using only sterile injecting instruments)
- » **Antiretroviral (ART) use for prevention.**
 - **ART as Prevention** - If an HIV positive person adheres to an effective ART regimen, the risk of transmitting the virus to their uninfected sexual partner can be reduced by 96%.
 - **Pre-exposure prophylaxis (PrEP) for HIV negative partner:** Oral PrEP of HIV is the daily use of ARV drugs by HIV uninfected people to block the acquisition of HIV.
 - **Post Exposure prophylaxis for HIV (PEP):** PEP is the use of ARV drugs within 72 hours of exposure to HIV in order to prevent infection. PEP includes counselling, first aid care, HIV testing, and administering of a 28-day course of ARV drugs with follow up care.
- » **Drug releasing Vaginal Ring Cap:** To prevent HIV-AIDS in Women
 - The ring is made of flexible silicon matrix polymer. The woman inserts it into the vagina, where it, over the course of a month, **releases the antiretroviral drug dapivirine**. It has to be changed after 28 days.

- **Treatment**
 - » HIV can be suppressed by combination ART consisting of 3 or more ARV drugs. ART doesn't cure HIV infection but controls viral replication within a person's body and allows an individual's immune system to strengthen and regain the capacity to fight off infection. With ART, people living with HIV can live healthy and productive lives.
- **Stem Cell Therapy to treat HIV** have shown success:
 - » In 2022, a US patient was reported cured of HIV after stem cell transplant. By July 2023, six persons had been cured by this method.
 - » In the first five cases, the treatment teams specifically looked for donors with CCR5 delta 32 mutation. It is associated with lower risk of HIV.
 - People who inherit CCR5 delta 32 mutation from both parents don't have the receptors which are used by HIV virus to enter the cells. Those who inherit the mutation from one of the parents have fewer receptors and are less likely to get infection.
 - Only 1% of the people on earth carry 2 copies of CCR5-delta 32 mutation.
 - » **Why can't stem cell transplant become routine treatment for HIV?**
 - Finding matching donor for all 40 million patients would be impossible.
 - The CCR5 delta 32 mutation occurs mostly in Caucasians whereas most of the cases are in the African continent.
 - Further, stem cell transplant is a complex process and comes with its own risks.
- **SDG Goal 3.3:** To achieve the end of AIDS by 2030 i.e. zero new infection by 2030.
- **Global Situation of HIV:**
 - » **Successes Achieved in HIV Response:**
 - As per UNAIDS, in 2022, 39 million people globally were living with HIV, of whom 29.8 million were accessing ART.
 - Coverage of ART has become 4 times of the number in 2010.
 - **New Cases:** Around 1.3 million people got newly infected with HIV in 2022 - which is 59% lower from the peak in 1995.
 - It is possible to end AIDS by 2030: UNAIDS
- **WHO response**
 - » WHO is cosponsor of the United Nation Program on Aids (UNAIDS). Within UNAIDS, WHO leads activities on HIV treatment and care, HIV and tuberculosis co-infection, and jointly coordinate with UNICEF the work on the elimination of mother to child transmission of HIV.
- **Vaccination Efforts:**
 - » **Hopes Dashed as last HIV vaccine trial in Africa for this decade ends in failure** (Dec 2023)
 - The study, known as PrEPVacc, was led by African researchers with support from European Scientists.
 - They were testing two different vaccine regimes on about 1500 volunteers in Uganda, Tanzania, and South Africa.

- After, multiple other high-profile trials failed in the past, PrEPVacc researchers were quite optimistic and had described the latest study as the final trial of the decade.
- **HIV situation in India**
 - » More than 2 million people in India live with HIV.
 - HIV Epidemic has an overall decreasing trend in the country with estimated annual new HIV infections declining by 37% between 2010 and 2019.
 - » **Success in controlling AIDS**
 - 2015 HIV estimates results reaffirm the country's success story in responding to HIV/AIDS epidemic. India has **successfully achieved 6th Millennium Development Goal (MDG6)** of halting and reversing the HIV epidemic.
 - » **Emergence of three north Eastern States as new HIV Hotspots:** **Mizoram** (1.19%), Nagaland (0.82%), Meghalaya (0.73%), Tripura (0.56%) and Manipur (0.47%)
 - Reasons: Injecting Drug Users and Unsafe Sexual Practices.
- **Steps taken by government of India in recent times to Reduce HIV transmission**
 - **National Aids Control Program** was launched in 1992 and its four phases have been completed so far. It is a central sector scheme.
 - » It has been extended for five years (1st April 2021 to 31st March 2026)
 - » It is a comprehensive program for prevention and control of HIV/AIDS in India.
 - » Under this, ART Centres run by National AIDS Control Office (NACO) provide lifetime free medicines, diagnostic kits and other essentials for those in need.
 - **National Aids Control Organization (NACO)**, under MoH&FW, provides leadership to HIV/AIDS program.
 - **HIV & AIDS Prevention and Control Act 2017** provides a legal framework for protecting the rights of HIV positive people.
 - Implementation of 90:90:90 strategy adopted by UNAIDS
 - **Other steps** include - Multimedia campaigns; Red ribbon clubs in colleges; training and sensitization program for SHGs; etc;
- **Challenges in successful implementation of HIV prevention Programs**
 1. **Lack of Capital**
 - Funding that India and other developing countries had been getting from developed countries for HIV control has come down
 - Health budget is way below the requirement of 4% (NHP targets 2.5%)
 2. **Stigma Associated and lack of awareness**
 - It creates a big problem as HIV positive people don't come out for treatment and further accidentally contribute in promotion of the infection
 3. **Shortage of Medicine**
 - There have been complaints about shortage of medicine stockpile related to HIV/AIDS.
 4. **Increasing drug abuse**
 - Increasing drug abuse in various parts of the country can become a factor for increasing spread of HIV.

5. Lack of sex education at school level

- It prevents early education of children regarding prevention of sexually transmitted diseases.

- Way Forward for India to deal with HIV

- » **More Resources/Funding:** More funds allocation for health sector, specially HIV/AIDS.
 - Affordable and accessible health care facilities.
 - Better drug procurement policy to get the adequate quantity in affordable price.
 - Here Tamil Nadu Model which goes for mass procurement from manufacturers can be a way forward
- » **Sex education** in schools would ensure that adolescents and young adults are aware of all the precautions to be taken
 - Reducing stigma and discrimination will lead to early detection and control.
- » **Fight drug addiction:** Focus on injectable drug users is needed to preventing any alarming rise of HIV in this group
- » **Increases focus on target groups:**
 - Improved focused on vulnerable groups
 - Sex workers
 - Transgenders
 - Truck Drivers
 - NACO study shows that 2.5% of truck drivers in India are suffering from HIV
 - They are also bridge population as they play a key role in transmission
 - Special focus on high prevalent states.
- » **Integrated Approach for a more comprehensive treatment:** HIV/AIDs patient should also be provided mental health support, legal support etc, other than being given free services under NAIDS.

5) HEALTH: NON-SUGAR SWEETNERS (NSS)

- What are non-Sugar Sweeteners?

- » Non-Sugar Sweeteners (NSS) or Non-Nutritive Sweeteners (NNS) are substances used in place of sweeteners that have sugar (sucrose) or sugar alcohols. They have negligible or zero calories because, unlike sugar, they don't get broken down by the body into products that provide energy or calories.
- » They are used as table top sweeteners as well as in food items marked as 'Sugar Free', 'Diet' etc.
- » They are of primary **two types - i) Artificial, ii) Natural**
 - **Artificial:** These NSS are prepared in laboratories. Examples include Aspartame, Saccharine, Acesulfame-potassium, Sucratose, Neotame (derived from aspartame), Advantame (derived from aspartame) etc.
 - **Natural:** These are extracted from plants (e.g. Stavia, Thaumatin, Monk Fruit etc.)
- » All the six artificial NSS and 3 natural NSS are approved by the US Food and Drug Administration. India's FSSAI has also approved all of them (except Advantame, and Mon Fruit).

- Why are they used?

- » **TO reduce consumption of sugar** (which has led to global rise in diabetes and obesity).

- **Market:**
 - » As per a report by global market consultancy The Business Research Company the market for these NSS was worth **\$20 billion in 2022** and it is expected to reach about **\$30 billion by 2027**.
- **Criticisms:**
 - i. Little Evidence to substantiate the benefits of NSS in controlling diabetes and obesity.
 - ii. Growing body of research says that these NSS may lead to cardiovascular diseases, cancers, and type-2 diabetes.
 - For e.g. WHO in its July 2023 guidelines have classified Aspartame as "possibly carcinogenic to humans".
- **Way Forward:**
 - » **Experimental Studies:** More detailed experimental studies should be conducted to bring more clarity on the health impact of NSS.
 - » **FSSAI** should update its standards based on these artificial sweeteners.
 - » **Citizens** should also avoid artificial products unless it's very necessary. We need to go for a more natural way of life which is not only healthy but also more sustainable.

A) PRELIMS FACTS: ASPARTAME

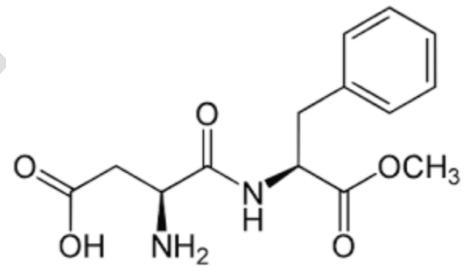
Aspartame is an artificial sweetener which was invented in 1965 and has been in use in USA since early 1980s.

It is a compound of carbon, hydrogen, nitrogen, and oxygen with chemical formula **C₁₄H₁₈N₂O₅**.

It is among the most popular sugar substitute used in the world.

Several Studies have highlighted problems associated with Aspartame:

- The **WHO** analyzed some 1,300 studies, and cited the following three, to declare aspartame "possibly carcinogenic to humans" -
 - > European Journal of Nutrition, 2016; Cancer Epidemiology, 2022; Cancer Epidemiology, Biomarkers & Prevention, 2022;



- **WHO has placed aspartame in Group 2B.** This group consist of those substances which are possibly carcinogenic.
- **Details about various Groups:**
 - » **Group-1: Carcinogenic:** These substances have shown sufficient evidence in humans and animals to be treated as carcinogenic. It includes tobacco smoking, alcohol consumption, Solar Radiation, ionizing radiation.
 - » **Group-2A: Probably Carcinogenic:** Limited evidence in humans but sufficient evidence in animals. It includes insecticide DDT, Red Meat, Night Shift Work, Emission from high temperature frying etc.
 - » **Group-2B: Possibly Carcinogenic:** Limited evidence in humans or sufficient evidence in animals. It includes aspartame, gasoline engine exhaust, heavy metal lead;
 - » **Group-3: Not classified as carcinogen:** Inadequate evidence in humans and in animals. It includes coffee, Mercury, Paracetamol, crude oil etc.

B) CONCEPTUAL CLARITY: UNDERSTANDING HOW DIABETES MAY BE CAUSED BY NSS

- **How Sugar causes diabetes:**
 - » Under normal circumstances, glucose in the blood signals pancreas to make insulin, which then enters the blood. Insulin, in turn, helps sugar enter the body's cells so it can be used for energy.
 - » **When a person consumes high levels of sugars**, the pancreas pumps out more insulin to get blood sugar into cells. If this continues, the carefully orchestrated process goes haywire. The body's cell stops responding to all that insulin and become insulin resistant even if pancreas keep making more insulin to try to get the cells to respond. Eventually the pancreas gives up and stops releasing insulin, and blood sugar continues to spike, leading to diabetes.
- **How Non-Sugar Sweeteners may cause diabetes?**
 - » Pancreases react similarly to sugar and NSS as it can't differentiate between the two. As a result, they release insulin, increasing their levels in the blood. Subsequently cells become resistant to insulin and pancreas become overworked and stop producing insulin.

6) BIOTECHNOLOGY: GM INSECTS: NEW GUIDELINES

- **Practice Questions:**
 - » Discuss various applications of Genetically Engineered (GE) insects. Evaluate the various risks associated with the introduction of such insects and suggest measures to ensure sustainable and safe usage of GE insects [15 marks, 250 words]
- **A genetically modified (GM) insect** refers to insects whose DNA has been engineered through various genetic engineering tools like CRISPR CAS9.
- Various GE insects are available globally today. The **development and application of GE insects** offers applications in various fields:
 - » **Improving Human Health:**
 - » **Vector Management** in human and livestock health: GE mosquitoes for e.g. can be designed to carry genes that limit their ability to transmit diseases such as dengue, malaria etc.
 - » **Reduction in use of chemicals** -> Maintenance and improvement of both human health and environmental health.
 - » **Food Security:**
 - » **Management of crop insect pests:** Insects can be genetically engineered to carry traits that reduce the population of agricultural pests.
 - For e.g. introducing sterile males can help control pest population.
 - » **Increased food production:** **Protein production** for healthcare purposes; **honey production** etc.
 - Engineering honeybees to make better-quality and/or quantities of honey can contribute to reduced imports and may facilitate exports.
 - » **Improvement in beneficial insects** like pollinators, predators, parasitoids etc.

- » **Economic Application:**
 - » Other than improved agri production, improvements in productive insects (e.g. silkworm, lac insect) etc can promote economic growth.
 - E.g. GE silkworms can produce finer and/or cheaper silk, affecting prices and boosting sales.
- » **Fighting pollution and ensuring environmental sustainability:**
 - » Reduction in use of chemical will contribute to reduced pollution and environmental sustainability. Similarly, improved pollinators can contribute to biodiversity production.
 - » Some GE insects can be used as bio-indicators to monitor pollution or detect some specific substance in environment.
- **Some Concerns:**
 - » **Ecological Risk:** Once introduced in the environment, it's very difficult to contain these insects. And if some future problem emerges, it would be difficult to control.
 - » **Unforeseen health implications** when these GM insects interact with humans.
 - » **Bioweapons:** GE insects may be used to produce bioweapons.
 - » **Regulatory challenges:** Government guidelines like Guidelines for Genetically Engineered insects; National Guidelines for Gene Therapy Product Development and Clinical Trials' have similar ambiguity.
 - » **Ethical concerns:** GE insects raise a question – “If human being should act as God” and make changes in the living organisms around it.
- **Way Forward:**
 - » **Updating policies and guidelines** to remove any ambiguity and defining clear purpose and goals of GE insects.
 - » **Increased R&D and better Regulatory Oversight:** Increasing the capacity of DBT and other associated institutions to promote for R&D in the development and evaluation of GE insects.
 - » **Effective Monitoring and Evaluation:** A robust monitoring and post-release evaluation mechanisms will be needed to track the impact of GE insects on health, biodiversity, and the ecosystem.
 - » **International Collaboration** through bodies like FAO on understanding the impact of GE insects and sharing the best practices and technology.
 - » **Stakeholder Engagement:** Participation of all the stakeholders including citizens, scientists, farmers, doctors etc in understanding the need of GE insects, their development and associated risks can give diverse perspective to decision making.
- **Conclusion:**

GE insects have the potential to solve a number of problems associated with health, food security and environment. But the expansion of their usage should be synchronized with comprehensive risk assessment, robust regulatory framework and inclusive stakeholder engagement

A) GUIDELINES FOR GENETICALLY ENGINEERED (GE) INSECTS: RELEASED BY DBT IN APRIL 2023

- The guidelines provide procedural roadmaps for those interested in creating GE insects.
 - » It intends to help Indian researchers navigate regulatory requirements.
 - » The guidelines are harmonized to guidance from WHO on GE mosquitoes.
- But **experts have identified some issues with the guidelines:**
 - » **Uncertainty of Purpose:** The guidelines don't specify the purpose for which GE insects may be approved in India. It only provides regulatory procedures for R&D on insects with some beneficial applications.
 - » **Uncertainty for Researchers:** The guidelines are applicable only to research and not to confined trials or deployment.
 - Government authorities will also have to closely follow the deployment of these insects. Once deployed, the GE insects can't be recalled, and unlike GM foods, they are not amenable to individual consumer choice.
 - » **Uncertainty of Ambit:** The guidelines offer SOPs for GE mosquitoes, crop pests, and beneficial insects – but what 'beneficial' means, in the context is GE insect is not clear.



CURRENT AFFAIRS PROGRAM

PRE CUM MAINS 2024

DEC 2023: BOOKLET-7

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1) ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

» Intro

- Artificial Intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs which can complete tasks that typically require human intelligence.
 - » With the **explosion of available data and expansion of computing capacity**, the world is witnessing rapid advancements in AI, ML, and deep learning.
- Machine learning is a science that involves **development of self-learning algorithms**. Machine learning uses statistics (mostly inferential statistics) to develop self-learning algorithm. It is a type of artificial intelligence.
 - » **Note:** All Machine Learning is AI, but not all AI is machine learning
 - » For e.g., symbolic logic (rules engines, expert systems, and knowledge graphs) as well as evolutionary algorithms and Bayesian statistics could all be described as AI, and none of them are machine learning.
 - » In Machine Learning the computer program should learn from experience "i.e., given data" such that the overall performance on doing a certain task increase.
 - i. Input data
 - ii. Model Training
 - iii. Output

- Applications of Artificial Intelligence and Machine Learning

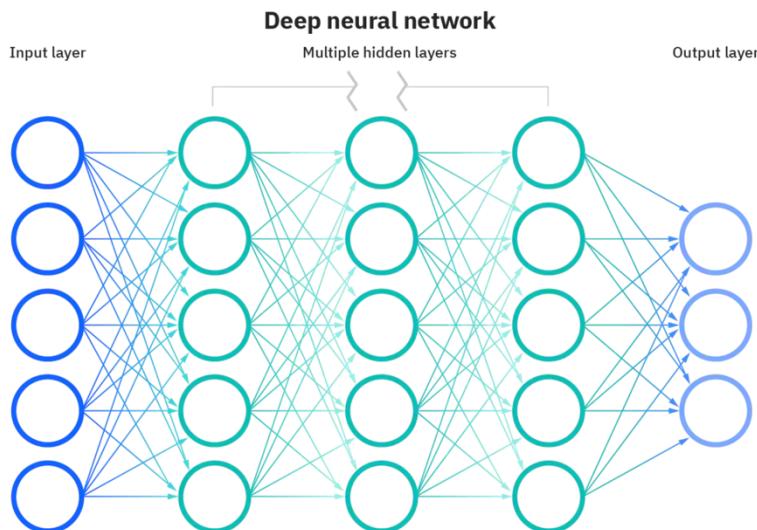
- Advertisements, Online shopping suggestions etc.
- Spam filtering
- Search engines
- Fighting Black Money (e.g., Project Insight of India)
- Space Exploration (e.g., identifying exoplanets from pictures)
- Health Sector (e.g., identifying cancerous lumps, development of new medicines/molecules etc, early detection and prevention of diseases).
 - E.g., a Bengaluru based startup has developed a non-invasive, AI-enabled technology to screen for early signs of breast cancer.
 - For COVID-19, AI enabled chatbot was used by MyGov for ensuring communications.
- Developing new materials (E.g. Google Deepmind predicted the structures of 2 million new materials)
- Education (e.g., Personalized learning through adaptive tools; customizing professional development courses etc.)
- Agriculture: AI enabled solutions for water-management, crop insurance, and pest control are also being developed. Technologies like image recognition, drones, and automated intelligent monitoring of irrigation systems can help farmers kill weeds more effectively, harvest better crops, and ensure higher yields.

- ICRISAT has developed an **AI-power sowing app**, which utilises weather models and data on local crop yield and rainfall to more accurately predict and advise local farmers on when they should plant their seeds
- **Disaster Management:** An AI-based flood forecasting system has been deployed in Bihar and is now being deployed throughout the country. It gives warnings 48 hours earlier about impending floods.
- **Improve Ease of Doing Business**
- Natural Language Processing (NLP)
- Image Processing (Facial Recognition)

2) ADVANCEMENTS IN MACHINE LEARNING

A) NEURAL NETWORKS

- Neural network, also known as Artificial Neural Network (ANNs) or simulated neural networks (SNNs), are a subset of machine learning and are at the heart of deep learning algorithms. Their name and structure are inspired by the human brain, mimicking the way biological neurons signal to each other.
- A neural network can fine tune its output based on the feedback given to it during stages of training.
- ANNs consist of node layers, containing an input layer, one or more hidden layers, and an output layer. Each node, or artificial neurons, connects to another and has an associated weight and threshold. If the output of any individual node is above the specified threshold value, that node is activated, sending data to the next layer of the network. Otherwise, no data is passed along the next layer of the network.



- **Note:** ANN also rely on training data to learn and improve their accuracy over time.
- **Neural Networks vs. Deep Learning:**
 - Terms are sometimes used interchangeably. ‘Deep’ in deep learning is just referring to the depth of layers in a neural network. A neural network that consists of more than three layers –

which would be inclusive of the inputs and output – can be considered a deep learning algorithm. A neural network that only has two or three layers is just a basic neural network.

B) DEEP LEARNING

- Deep learning is a machine learning technique that teaches computers to do what comes naturally to humans: learn by example. In deep learning, a computer model learns to perform classification tasks directly from images, text, or sound. It can achieve state of art accuracy, sometimes exceeding human-level performance. Models are trained by using a large set of labeled data and neural network architecture that contain many layers.
- Most deep learning methods use neural network architecture, which is why deep learning models are often referred as Deep Neural networks. The term deep usually refers to number of hidden layers in the neural network.
- **Where is it being used today?**
 - » **Automated Driving:** Automotive researchers are using deep learning to automatically detect objects such as stop signs and traffic lights. In addition, deep learning is used to detect pedestrians, which helps decrease accidents
 - » **Aerospace and Defence:** Deep learning are used to identify objects from satellites that locate areas of interest and identify safe or unsafe zones for troops.
 - » **Medical Research:** To detect cancer
 - » **Industrial Automation:** Improve work safety around heavy machinery by automatically detecting when people or objects are within an unsafe distance of machines.
 - » **Electronics:** Used in automated hearing and speech translation. For e.g., home assistance devices that respond to your voice and know your preferences are powered by deep learning applications.

3) GENERATIVE AI

ABOUT CHATGPT:

It is an artificial intelligent tool developed by **OpenAI**.

OpenAI is a research institution and company that focuses on developing AI intelligence technology in a responsible and safe way. It was founded in 2015 by a group of entrepreneurs and researchers, including **Elon Musk, Sam Altman, and Greg Brockman**.

- ChatGPT is based on Generative Pre-trained Transformer Architecture. It is trained on massive amount of text data from the internet. It used 570 GB of text data mined from the internet. It is a type of neural network and was first introduced in 2017 in a paper titled “Attention is all you need”. A neural network can fine tune its output based on the feedback given to it during stages of training. This allows the model to better understand the context and meaning of the input and to generate conversational response.
- **ChatGPT** is more than a chatbot. You can even ask it to write a program or a software application. It can do creative work like writing a new story or poetry. It can answer scientific concepts and answer any question that needs factual answer.

- It is fine tuned to provide **conservative responses**, as against essay-type content. It is because the neural network behind it has been additionally trained on **conversational transcripts with human feedback**.
- In addition to the conversational nature of the tool, the **creative generative capability is very appealing**. ChatGPT can become a **powerful pedagogy** tool on any topic to anyone, because we can instruct it to “explain it to me like I am a six-year-old”. It can explain in simple terms anything from **philosophy** to cooking recipes, including **new recipes of its own**.
- **It is a Language Model** (rather than a chatbot) that can produce text that sound like human response in a conversation setting.
- It is also a **Neural Network**

GOOGLE BARD

- Google's Generative AI model

ABOUT GOOGLE GEMINI (DEC 2023)

- Google GEMINI is a new multimodal general AI model, which the tech giant calls its most powerful yet.
- It is now available to users through Bard, some developer platforms, and even the new Google Pixel 8 Pro phones.
- The flexible AI model comes in **three sizes** – Ultra (yet to be released), Pro, and Nano – is being seen as google's answer to ChatGPT, which has been ahead of the game so far when it comes to generative AI.
- Google claims that GEMINI Ultra is the first model to outperform human experts on massive multitask language understanding (MMLU), which uses a combination of 57 subjects such as math, physics, history, law, medicine, and ethics for testing both world knowledge and problem-solving abilities.
- **So, IS GEMINI better than ChatGPT 4?**

Hard to say now. But it does seem to be more flexible. Its ability to work with videos and on devices without internet, gives it some edge.

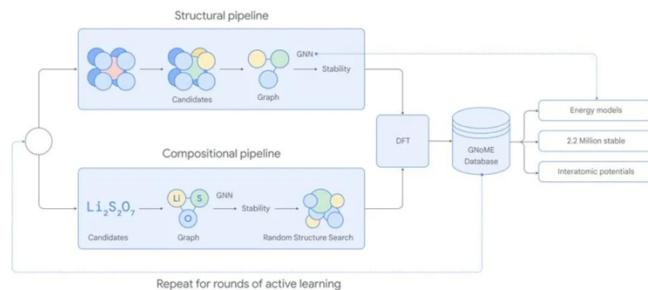
Some Concerns:

- Teachers are unhappy about it as they feel that it can be used to turn in plagiarized essays which could be hard to detect for invigilators. Recently, New York City's Education department banned ChatGPT in its public schools.
- **Skilled white collar jobs** like that of computer programmers in the IT sector is at threat.
- **India's IT services-based exports** may get impacted.

Way Forward (Class discussion)

4) GOOGLE DEEPMIND'S AI BREAKTHROUGH

- **How are new materials discovered in Chemistry?**
 - » New stable materials are generally discovered by the practitioners of solid-state chemistry through a process of trial and error that involves making small tweaks to known material or by fusing elements together. This is an expensive and time-consuming process.
 - » **In last decades**, experimentation by humans has resulted in the discovery of the structures of some 28,000 stable materials, which are listed in the Inorganic Crystal Structure Database, the largest database of identified materials.
- **What happened?**
 - » Google DeepMind AI Tool known as Graph Networks for Material Exploration (GNOME) has successfully predicted the structures of more than **2 million new materials**. This was done with the help of AI.
 - » While these materials will still need to undergo the process of synthesis and testing, DeepMind has published a list of 381,000 of the 2.2 million crystal structure that it predicts to be most stable.
- **How does GNOME actually work?**
 - » GNOME is a state of art graph neural network model or GNN, where the input data for the model takes the form of a graph that can be likened to connections between atoms.
 - » GNOME was trained using active learning, a technique to scale up a model first trained on a small, specialized dataset. Developers can then introduce new targets allowing machine learning to label new data with human assistance. This makes the algorithm well suited to the science of discovering new materials, which requires searching for patterns not found in original dataset.
 - » **GNOME uses two pipelines to discover low energy (stable materials).**
 - The **structure pipeline** creates candidates with structures similar to known crystals.
 - The **composition pipeline** follows a more randomized approach based on chemical formulas.
 - The output of both the pipelines are evaluated using established Density Function Theory (DFT) calculations and those results are added to the GNOME database, informing the next round of active learning.



- **Significance:**
 - » **Drastic increase in the number of 'stable materials' known to mankind by ten-fold.**

- DeepMind claims its current research is equivalent to nearly 800 years of knowledge, given that 3,80,000 of its stable predictions are now publicly available to help researchers make further breakthrough in materials discovery teams.
- » **The breakthrough** has huge implications for sectors such as renewable energy, battery research, semiconductors, and computing efficiency which have been looking for new material to improve the efficiency in the sector.

5) EU DEAL ON AI

- **Why in news?**
 - » EU has reached a landmark agreement to regulate AI (Dec 2023)
- **Need of Regulating AI:**
 - » **Generative AI systems** like OPENAI's CHATGPT have raised fears about the risks the rapidly developing technology poses to jobs, privacy and copyright protection and even human rights.
- **EU has adopted the world's first law on regulating AI** in Dec 2023.
 - » The EU Parliament will now vote on the proposed act early next year (i.e. in 2024), but with the deal done, it's just a formality.
- **What does the EU law propose?**
 - » The law regulates the use of Artificial Intelligence (AI).
 - » It includes safeguards on the use of AI within the EU, including clear guardrails on its adoption by law enforcement agencies.
 - The deal includes strong restrictions on facial recognition technology, and on Using AI to manipulate human behaviour.
 - Government can only use real-time biometric surveillance in public areas only when there are serious threats involved, such as terrorist attacks.
 - » **Provision for strong penalties:** The deal threatens stiff financial penalties for violations of up to 35 million euros or 7% of a company's global turnover.
 - » **Consumers** have been empowered to launch complaints against any perceived violations.
 - » The legislation also proposes to be "a launch pad for EU start-ups and researchers to lead the global AI race".
 - The act works as a unique legal framework for the development of AI you can trust. It will help in development of technology which doesn't threaten people's safety and rights.
- **Significance:**
 - » Strong and Comprehensive rules in EU can set a powerful example for many governments considering regulations.
 - » **AI Companies** who follow these regulations in EU are also expected to extend some of these protections in other jurisdictions.
- **Comparing EU's approach with other regulations:**
 - » EU has taken a tougher stance which segregates AI as per use case scenario based primarily on the degree of invasiveness and risk;

- » UK has seen regulation on the other end of the spectrum with a '**light-touch**' approach that aims to foster innovation in this nascent field.
 - » USA's approach lies in between that of EU and UK.
- **Leadership in tech regulation:**
- » Over the last decade, Europe has taken **decisive lead** over the US on tech regulation.
 - EU has enforced the landmark **GDPR (General Data Protection Regulation)** since **May 2018**. It is an overarching law focused on privacy and requires individuals to give explicit consent before their data can be processed and is now a template being used by over **100 countries**.
 - EU has also passed a pair of sub-legislations – the **Digital Services Act (DSA)** and the **Digital Markets Act (DMA)**. These take off from GDPR's overarching focus on the individual's right over her data.
 - DSA focuses on issues like hate speech, counterfeit goods etc.
 - DMA has defined a new category of "dominant gatekeeper" platforms and is focused on non-competitive practices and abuse of dominance by these players.
 - » On AI, though, the **US has made an attempt to take a lead** by way of the new White House Executive Order on AI, which is being offered as an elaborate template that could act as a blueprint for every other country looking to regulate AI. In Oct 2022, USA released a blueprint on an AI Bill of Rights – seen as a building block for the subsequent executive order

6) GPAI AND UPDATE

- **Why in news?**
 - » Global Partnership on AI (GPAI) members unanimously adopt New Delhi Declaration on AI (Dec 2023)
- GPAI is an international and multi-stakeholder initiative to guide the **responsible development and use of AI**, grounded in human rights, inclusion, diversity, innovation, and economic growth.
 - » This is also a first initiative of its type for evolving better understanding of the challenges and opportunities around AI using the experience and diversity of participating countries.
 - » It consists of **29 members** (28 countries and EU).
 - **Note:** India is a member. China, a major techpower is not a part of the grouping.
- **Beginning:** The partnership was proposed by Canada and France in 2018 G7 Summit, and was officially launched in June 2020.
- It is supported by a Secretariat hosted by OECD, Paris.
- **Dec 2023 Meeting:**
 - » India hosted the summit and will also chair GPAI in 2024.
 - » This summit was important as it was the first summit after the explosive release of ChatGPT.
 - » The GPAI has unanimously adopted 'New Delhi Declaration'.
 - » **Key Highlights of the New Delhi Declaration:**
 - It underscores the need to mitigate risks arising from the development and deployment of AI systems.

- It flagged concerns emanating from such systems including misinformation, unemployment, lack of transparency, and fairness, protection of IP and personal data and threat to human rights and democratic values.
- It also promotes equitable access to critical resources for AI innovation including computing and high quality diverse data sets.
- It also says that global framework for the use of AI should be rooted in democratic values and human rights; safeguarding dignity and well-being; ensuring personal data protection; the protection of IPR etc.
- Members also agreed to support AI innovation in the agriculture sector as a new 'thematic priority'.

» **Significance:**

- The declaration attempts to find a balance between 'innovation' and the 'risk associated with AI subsystems'.
- The New Delhi Declaration is very significant for India, which has batted for a collaborative approach towards building AI systems as it looks to push its model of digital public infrastructure (DPI) across the world.
- Besides, access to computing capabilities from member nations will also boost India's plan of building a sovereign AI system which will in turn counter dominance of handful of foreign companies in this space.

» **How this international cooperation can increase:**

- **Make GPAI more inclusive:** By making more developing countries join GPAI.

» **Other steps that India can take for better regulation of AI sector**

- **Statutory Authority:** TRAI has recommended setting up of a domestic statutory authority.
- **International Collaboration:** Collaboration with international agencies and government of other countries to form a global agency for the "responsible use" of AI.

Conclusion: The GPAI's commitment ensures that AI serves as a transformative force, providing clear and accountable guidelines to enable millions worldwide while upholding rights, safety, and security standards.

7) INDIA: PROMOTION OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

- **India has been ranked second on the Stanford AI Vibrancy Index** primarily on account of its large AI-trained workforce.
- In 2018, NITI Aayog launched **National Strategy for Artificial Intelligence** detailing core strategies and recommendations of promoting the use of AI in key areas of governance.
- **Five Key Sector identified by NITI Aayog** to focus its efforts towards implementation of artificial intelligence (AI) to serve societal needs.
 - » **Healthcare:** increased access and affordability of quality healthcare
 - » **Agriculture:** enhanced farmers income, increased farm productivity and reduction of wastage
 - » **Education:** Improved access and quality of education
 - » **Smart Cities** and infrastructure

» **Transportation**

- CBSE has integrated AI in the school curriculum to ensure students passing out have basic knowledge and skills of data science, machine learning and Artificial intelligence.
- **Responsible AI for Youth** – A National Program for the youth launched by MEITY – Launched in May 2020
 - The program is designed to reach out to students from Government schools pan India and provide them with opportunity to become part of the skilled workforce in an inclusive manner.
 - It is open to students of classes 8 - 12 from Central and State government-run schools (including KVS, NVS, JNV) from across the country - all 28 States and 8 Union Territories.
- **National Education Policy 2020** provides for setting up of the **National Research Foundation**, which should boost research in AI.
- **RAISE (Responsible AI for Social Empowerment) 2020**
 - It is a first of its kind, global meeting of minds on Artificial Intelligence to drive India's vision and roadmap for social transformation, inclusion and empowerment through Responsible AI.
 - It was organized by GoI through MEITY and NITI Aayog.
- India joins **Global Partnership on Artificial Intelligence (GPAI)** as a founding member to support the responsible and human centric development and use of AI (July 2020)
- **MEITY** launches National AI Portal of India – www.ai.gov.in (May 2020)
 - The portal has been jointly developed by the MEITY and IT Industry.
 - National E-Governance Division of MEITY and NASSCOM from IT Industry will jointly run the portal.
 - It will be a one stop digital platform for AI related developments in India, sharing of resources such as articles, startups, investment funds in AI, resources, companies and educational institutions related to AI in India.
- **Key Pain Points challenges** involved in the implementation of Artificial Intelligence in India
 - i. **Human Resource Shortfall** in terms of number of AI experts including PhDs.
 - ii. **Lack of trained professionals:** Only around 4% of Indian AI professionals are trained in emerging technologies such as deep learning.
- **Way Forward**
 - » **Promote More R&D in AI**
 - Better facilities at HEIs
 - More academia-Industry collaboration
 - » **Human Resource Development: Rejuvenate Higher Education Sector for AI**
 - Come up with a clear-cut action plan for rejuvenating Higher education system for development of AI
 - Dealing with **faculty shortage** by increasing attractiveness of Indian HEIs for highly qualified PhDs and experienced faculties (salaries, infrastructure, recognitions etc.)
 - » **AI-Startups** should be encouraged through tax breaks, reduced compliance burden and increased support from R&D institutions.
 - » **Institutional commitment** to excellence, politically open environment and the motivation of individual researchers to unlock the potential of AI will, in long run success of AI in a country.
 - » **Strong, high tech regulatory framework** to deal with problems which may be created by **deep fakes** etc.

- **Conclusion:** India, with its “AI for ALL” strategy, a vast pool of AI-trained workforce and an emerging startup ecosystem, has a unique opportunity to be a major contributor in AI-driven solutions that can revolutionize healthcare, agriculture, manufacturing, education and skilling.

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1. GENERAL STUDIES-2

1) DECRIMINALIZATION OF MEDICAL NEGLIGENCE?

- **Why in news?**
 - Bhartiya Nyaya Samhita has kept the punishment for medical negligence lower than the punishment for causing death by other kinds of negligence (Dec 2023)
- **Introduction**
 - As per the **Section 106(1)** of the Bhartiya Nyaya (Second) Sanhita (BNSS), doctors will continue to face a two year imprisonment and/or fine if convicted. This is lesser than the Sanhita's recommended punishment of five years for other cases of death by negligence (for e.g. by rash driving).
 - **Note:** The maximum imprisonment of doctors with this amendment remains the same as it was under IPC section 304A - upto 2 years of imprisonment or fine or both.
 - Medical negligence has not been clubbed with other accidental deaths where punishment has been kept higher.
- **Need of lower punishment for medical negligence:**
 - Doctors shouldn't be punished for honest mistakes and negligence is a complex issue in medical field and therefore this shouldn't be clubbed with other kinds of negligence.
 - It will also reduce harassment of doctors from frivolous lawsuits and harassment.
 - It will ensure that doctors will be able to provide care without fear of persecution and patients can be assured of quality care.
- **Criticisms:**
 - Critiques argue that doctors should be more careful, and the scope of negligence should be lesser here.
 - Owing to the "power imbalance" in the doctor-patient relationship, an act of negligence on the part of the doctor calls for a lower punishment but a higher one.
- **Way Forward**
 - **Consult all stakeholders** including patients.
 - **Need for comprehensive data** - to understand the extent of negligence and extent of harassment.
 - **Blanket exemption** will not be a good idea as honest mistakes can be decriminalized, but carelessness needs to be punished.

2. GENERAL STUDIES-3

1) ECONOMY: INDIA'S INCLUSION IN JP MORGAN'S GOVERNMENT BOND INDEX – EMERGING MARKET (GBI-EM)

- In Sep 2023, JP Morgan Chase & Co. announced that it will add Indian government bonds into the GBI-EM Index.
- India's weight is expected to reach the maximum weight threshold of 10% in the GBI-EM Global Diversified and approximately 8.7% in the GBI-EM Global Index.
- **The process of inclusion** is set to commence on June 28, 2024, and will span a duration of ten months. These 10 months will see an incremental increase of 1% in India's index weighting, ultimately reaching an allocation of 10%.
- As per JP Morgan, around 23 IGBs with a combined national value of \$330 billion are considered eligible. All these bonds fall under the "fully accessible" category for non-residents.
- **Impact:**
 - » **Increased foreign Investment** in India's debt market.
 - It will also lead to increased passive investment by various index tracking funds.
 - Moreover, it can also be a trigger for other financial institutions to include India in their index.
 - For e.g. the foreign funds have already started pouring money into government bonds with their investments in the fully accessible category more than doubling to Rs 1.28 lakh crore by Dec 2023 (from around 60K crores last year).
 - » **Reduction in government bond yield** as more money will be available now. This will reduce government's cost of borrowing and thus will lead to ease of fiscal deficit.
 - » It will also deepen bond markets in India.
 - » It will also lead to improved BoP condition and appreciation of rupee.
- **Impact: Negative:**
 - India may get exposed to global market fluctuations, as it will be subject to shifts in sentiments, economic conditions, and policies in major economies, influencing the bond prices and yields.
- **Conclusion:** India's inclusion in JP Morgan's GBI-EM index is yet another shining example of India's growing importance in the world economy. And the benefits of index inclusion outweigh the associated risks linked to such index inclusion.

2) ECONOMY: GIG ECONOMY AND GIG WORKERS

- **Why in news?**
 - » In Oct 2023, in response to a delegation of Gig Workers Association, the CM of Delhi, Arvind Kejriwal announced that the government would certainly address the concerns of the gig workers and even legislate if the need arises.
- **Example Questions**

- » Discuss the key promises and perils of increasing gig economy and gig workforce in India [10 marks, 150 words]
- **About Gig Economy:**
- » A **gig economy** is a free market system in which temporary positions are common and organizations hire independent workers for short term commitments. The term "gig" is a slang word for job that lasts a specified period of time.
 - » According to Ministry of Labour and Employment, "a gig worker is a person who engages in income-earning activities outside of a traditional employer-employee relationship, as well as in informal sector"
 - **Gig workers** can be classified into platform and non-platform workers.
 - Platform workers are those whose work is based on online software apps or digital platforms, while non-platform gig workers are generally casual wage workers, working part time or full time.
- **Factors behind rise in Gig Economy:**
- » **A rapidly expanding service sector-Startup ecosystem:** Startups, including some celebrated unicorns like Ola, Uber, Zomato, and Swiggy, have emerged as a major driver of the gig economy in India. They hire contractual freelancers in both skilled and unskilled jobs to reduce cost.
 - » **The unconventional work approach of millennials, Gen Y & Gen Z**
 - » **COVID-19 Pandemic** led to many people losing their fixed jobs
 - » **Fast clipped emergence of free lance platforms**
 - » **Various other advantages** (see details below)
- **Advantages of Gig Economy/ Bright Side of Gig Economy**
- » **For Employees:**
 - **Employment opportunities:** As per NITI aayog, more than 75 lakh workers are engaged in gig economy in 2020-21, and this is expected to go to 23.5 million by 2029-30.
 - **Independence and flexibility** offered by the gig economy to choose projects and work hours has attracted millions of people to join the gig workforce.
 - **Additional income:** To impoverished population (particularly the jobless, women, and students)
 - » **For Enterprise:**
 - **An efficient and speedy go-to-market solution** that allows them to offload core business functions on demand while removing hurdles like fixed costs, long recruitment cycles, and other compliance.
 - **It improves productivity** by reducing idle and unproductive time.
 - It also offers **agility to enterprises**, making it easy to scale up or down to meet business requirements.
 - » **For Consumers**
 - Cost effective, high quality services (for e.g. Urban Company, Ola, Zomato etc.)
 - » **Benefit for overall economy:**
 - Increased labor force participation and contributes to reduction in unemployment.
 - Skilled work force such as make-up artists can find business without setting up a physical shop.

- **Key Highlights of NITI Aayog's Report: 'India's Booming Gig and Platform Economy'**
 - **Size of workforce:** In 2020-21, the gig workers constituted 2.6% (7.5 million) of the non-agricultural workforce and by 2030 they would constitute 6.7% (23.5 million) of non-agricultural workforce.
 - **Skill Levels:** As per the report, around 31% workers are in low skilled jobs; 47% of the gig work is in medium skilled jobs, and 22% work is in high skilled jobs.
 - **Female Labour Force Participation** in India has remained low (between 16% - 23%) in last few years.
 - Why? -> Structural barriers such as less access to education and skilling opportunities.
 - **Other key issues faced by workers in Gig Economy:** While platform companies have created avenues of employment, it has often been marred by:
 - **Contractual (non-permanent) work:**
 - » **No Social Security:** They don't have benefits like paid sick and casual leaves, travel and housing allowances, and provident fund saving among others.
 - **Poor Service Conditions:**
 - » Low wages, Opaque payment calculations, increasing commission deductions etc.
 - » Lack of possibility of upward mobility within an organization
 - » Gig economy can bring loneliness. It would be especially true for designers, copywriters etc. working on their laptops from home.
 - The labor codes are vague about social protection for unorganized workers.
 - » The new **Code on Social Security** of 2020 replaced all existing laws on the subject. Gig workers find a place as unorganized sector workers in this code but the actual security cover remains vague and implementation of the code remains poor.
- **Other Concerns:**
 - Traditional players like (non-app based taxi service providers) are not able to survive in this cut-throat competition environment.
- **Key Recommendations of NITI Aayog**
 - **Extending Social Security for gig and platform workers:** Extend social security measures such as income support, paid sick leave, insurance and pension plans to people working for platform economies like Swiggy, Zomato, Ola and Uber.
 - Such plans and policies may be uniquely designed by a firm, in partnership with insurance companies, or could be designed and offered in collaboration with the government, as envisaged under the Code on Social Security, 2020.
 - **Skill Development for platform jobs:** Platform led models need to be created for skilling purposes.
 - **Social Inclusion:** Niti Aayog has recommended fiscal incentives, like tax rebates or start-up grants, for companies with about 1/3rd of their workforce as women or people with disabilities.
 - **Business should have Higher share of female managers and supervisors** in the organization to ensure that communication to workers doesn't perpetuate gender stereotypes.

- **'Platform India Initiative'** - on the lines of Startup India Initiative: This should be built on the pillars of accelerating platformisation by simplification and handholding, funding support and incentives, skill development, and social financial inclusion.
- **Self-employed individuals** - selling regional and rural cuisine, street food etc., may also be linked to platforms so that they can sell their produce to wider markets in towns and cities.
- **RAISE Approach for operationalizing the Code on Social Security (CoSS), 2020:**
 - Recognize the varied nature of work to design equitable schemes.
 - Allow augmentation of social security through innovative financing mechanism
 - Incorporate, while designing schemes, the specific platforms, factoring the impact on job creation, platform businesses and workers
 - Support workers to subscribe to government schemes and welfare programs through widespread awareness campaigns
 - Ensure benefits are readily accessible to workers.

- **Conclusion:**

- Long term solution lies in creation of more better paying, secure jobs. But, at the same time there is need to ensure minimum wages, and social protection for gig and other organized workers who constitute the bulk of Indian workforce

A) THE RAJASTHAN GIG AND PLATFORM WORKERS (REGISTRATION AND WELFARE) ACT, 2023

- **The act provides for every platform worker to have a unique id** that would anchor all future benefits for them.
- **Welfare Fund:** The act levies a fee on every transaction as a source of revenue for the welfare fund.
- **Tripartite Welfare Board:** The act creates a tripartite welfare board made up of government, companies and workers to administer the fund.
 - » A tripartite board administered fund with the revenue source being the company, serves as an inoculation against corrupt rogue unions from striking deals because the fund can never come under just a single company's control nor the control of any one party.
 - » This is based on Hamal model of Maharashtra.
- **Information sharing to ensure transparency:** The act makes it mandatory for companies to give control over transaction level data as it requires the data to reside in a government-controlled database with an information system/app frontend through which workers have access to data.

3) S&T: DEEP OCEAN MISSION (DOM)

- **Practice Questions:**
 - » Discuss the key pillars of Deep Ocean Mission (DOM). Examine how the DOM will contribute towards India's sustainable economic growth [10 marks, 150 words]
- **Introduction:**
 - » Deep Ocean Mission is India's quest to explore and harness the depths of the ocean.
 - One of its components is Samudryaan Mission which is aimed to develop an indigenous, self-propelled manned submersible to carry **3 human beings** to a **water depth of 6,000 meters in the ocean** with a suite of scientific sensors and tools for deep ocean exploration.

- » DOM is being implemented by **Ministry of Earth Science** and was approved by the union cabinet in 2021 at a cost of **Rs 4,077 crores** over a five year period (2021-22 to 2025-26).
- The mission has six pillars:
 - i. Development of technologies for **deep sea mining and a manned submersible** to carry three people to a depth of 6,000 meters in the ocean. The submersible will be equipped with **suit of scientific sensors, tools, and an integrated system for mining polymetallic nodules from the central Indian Ocean.**
 - ii. Development of **ocean climate change advisory services**, involving an array of ocean observations and models to understand and **provide future climate projections.**
 - iii. Technological innovations for the **exploration and conservation of deep-sea biodiversity.**
 - iv. Surveys and exploration aimed at **identifying potential sites of multi-metal hydrothermal sulphides mineralization** along the Indian ocean mid-oceanic ridges.
 - v. Harnessing **energy and freshwater** from the ocean
 - vi. Establishing an **advanced Marine Station for Ocean Biology**, as a hub for nurturing talent and driving new opportunities in ocean biology and blue technology.
- DOM is one of the **nine missions under the PM's Science Technology and Innovation Advisory Council (PMSTIAC)**. It is imperative that DOM supports the blue-economy priority area, blue trade, and blue manufacturing in India.
- Various institutions involved in achieving the objectives of DOM:
 - » MoES institutes, especially the **Centre for Marine Living Resources and Ecology (CMLRE)**, **Indian National Centre for Ocean Information Services (INCOIS)**, **National Centre for Coastal Research (NCCR)**, **National Centre for Polar and Ocean Research (NCPOR)** and **National Institute of Ocean Technology (NIOT)** will **collaborate with other national institutes and academia to achieve the objectives outlined in DOM**, albeit with well-segregated responsibilities
- Progress:
 - » The **National Institute of Ocean Technology (NIOT)**, an autonomous institute under MoES, has been entrusted with the **mandate of developing indigenous technologies to address engineering challenges associated with exploring and utilizing ocean resources.**
 - Matsya6000 is the **deep ocean submersible designed to accommodate a crew of three members (aquanauts)**. It boasts of an **operational endurance of 12 hours**, which is extendable to 96 hours in the event of an emergency.
 - Progress:** The **design of Matsya6000** has been completed.
 - Now tests will start, with a **depth of 5,000 meters** which will eventually be expanded for a **depth of 6000 meters**.
 - » NIOT has also successfully conducted **deep-sea locomotion trials on the seabed** at a depth of **5,270 meters** using India's underwater mining system, '**Varaha**'. The trial was able to **collect the polymetallic modules from the ocean bed during the trial**. This milestone is a **step towards future exploration and harvesting of deep sea resources**.



- **Why the target of 6000 meters depth?**
 - » **Polymetallic modules**, which contain precious metals like copper, manganese, nickel, iron, and cobalt, are found approximately 5,000 m deep.
 - » **Polymetallic sulphides** occur at around 3,000 m in the central Indian Ocean.
 - » **Therefore**, India's interest spans to depths of 3,000 m to 5,000 m. By equipping ourselves with the ability to explore upto a depth of 6,000 meters, we can effectively cater to both the Indian EEZ and the Central Indian Ocean.

- **Key challenges of India's DOM:**
 - » **High Pressure in Deep Ocean**: Operating under such high pressure requires the use of meticulously designed equipment crafted from durable metals or materials. Electronics also find it difficult to function under this high pressure.
 - » **Landing on the Ocean bed is another challenge**. It is due to incredibly soft and muddy sea bed.
 - » **Extracting minerals** will also require a lot of energy as they will have to be pumped to the surface.
 - » **The difficulty of propagation of EM waves** make it difficult to rove remotely operated vehicles.
 - » **Visibility** poses another challenge as negligible light reaches a depth of 6,000 meters.

- **Where does India stand in comparison to other countries?**
 - Countries such as USA, Russia, China, Japan, and France have already achieved successful deep ocean crewed mission. India is poised to join the rank of these nations.

- **Way Forward:**
 - » **Focus on Environment Sustainability**: The extraction of resources should be sustainable and should only minimally hamper the deep ocean ecosystem.
 - » **International Collaboration** can be crucial in understanding the key challenges and their resolution from the countries which are already doing deep ocean exploration.
 - » **Focus on training human resources** which would be specialized to work in the deep ocean systems.

- **Conclusion:**
 - » **DOM** with its focus on research and development, deep sea mining, biodiversity conservation and climate studies embodies the very essence of scientific zeal that India needs to move towards Atmanirbharta.

4) INTERNAL SECURITY: TERRORISM IN JAMMU AND KASHMIR

- **Why in news?**
 - The Army is moving in additional troops to the Rajouri-Poonch sector after a spate of attacks on security personnel and increased activity by Pakistan origin terrorists who have created hideouts in thick forests close to LoC (Dec 2023)

- **Practice Question:**
 - Highlight the key emerging trends of the insurgency situation in Jammu and Kashmir. Discuss the measures that need to be taken to deal with the emerging challenges [15 marks, 250 words]

- **Introduction:**
 - In 2019, the GoI abrogated Articles 370 and 35A in a bid to end radicalization, separatism, and terrorism.
 - Various counter-terrorism measures have been successful:
 - » Pakistan's proxy war networks have been neutralized.
 - » The overground workers (OGW) have been dismantled.
 - » Infiltration has been reduced to a trickle.
 - » Increased crackdown on terror funding has made things difficult for terror groups operating within the valley, especially in south Kashmir.
 - » Terror recruitment has dipped:
 - In the first 9 months of 2023, only 25 individuals joined terrorist groups, which is significant decline compared to 143 in 2019 and 100 in 2022.
 - » Increase in surrenders due to invigorated surrender and rehabilitation policy.
 - It has also led to several youth giving up militancy quietly.
 - » Fast paced developed in J&K.
- **Key emerging trends in the issue of Insurgency in J&K:**
 - **Relative Peace in the Kashmir Valley**: In recent times, the Kashmir zone - the traditionally volatile area - is relatively quiet.
 - **Increased terrorist strikes outside the Kashmir Valley**:
 - » Unable to face security forces in urban environment, terrorists are choosing dense forests to engage with security forces.
 - It's the Pir Panjal (south) in Jammu sector which has emerged as a hub of terrorism.
 - This is particularly visible since 2020, when terrorist groups shifted their operations from the valley to the forested areas of Poonch and Rajouri in the Pir Panjal ranges.
 - » Terrorists are adopting guerrilla tactics - Target the security forces and then go back to dense forests and regroup for another attack.
 - » By striking outside the Kashmir valley, they are trying to depict the inclusivity of their resistance and are promoting the rhetoric of being influential even outside the valley. This is an attempt to keep terrorism alive and maintain international focus on Kashmir.
 - **Emergence of Virtual Terrorist Groups** which ostensibly has no antecedents.
 - In last three years, groups like the Resistance Front (TRF), Jammu Kashmir Ghaznavid Force, and People's Anti-Fascist Front (PAAF) have come to the fore. These are nothing but organizations for LeT and other terrorist outfits. TRF for instance uses the funding channels of LeT.
 - These groups have adroitly used social media platforms like X, Telegram, Facebook to push their narrative and propaganda, primarily focusing on issues like the alleged conspiracy to turn Kashmir valley into Muslim-Minority region.
 - **More well-trained and tech savvy militants**: This is evident in the way militants are able to cover their tracks.
 - For e.g. terrorists are not using their own communication system but are dependent on the phones of locals.

- **Israel-Hamas conflict** can intensify terrorist radicalization in the region and in other parts of the country.
 - » Pan-Islamic and Pakistan based terrorist organizations are weaponizing the deluge of footage from the Gaza strip.
- **Why has terrorist presence and activity shifted to the Poonch-Rajouri sector?**
 - » **Abrogation of Article 370** has also made Kashmir less conducive to separatist trends.
 - » **Kashmir's strong and layered counter-infiltration (CI) and counter terrorism (CT) grid** makes planning of proxy operations difficult.
 - » **Weaknesses in Poonch Rajouri Sector:**
 - **Chequered history of local support** to terrorists: For e.g. the security agencies are facing the problems of disinformation.
 - **The treacherous terrain of Rajouri and Poonch districts** gives the terrorists **impunity**, and they need not seek a mass support based for survival.
 - **Shifting out of security forces**: In 2020, after the Galwan clash, several companies of Rashtriya Rifles were moved from the hinterlands of Poonch, Rajouri etc.
 - **Poor Informers Network**: New officers who have shifted to the region, didn't work as hard as they should in cultivating an informers' network.
- **2023 Terrorist Incidents in J&K:**
 - Militants ambushed truck of security forces in Poonch on 20th April 2023; In May 2023, five army personnel were killed in an explosion in a forested area in Rajouri.
 - In Sep 2023, encounter in Anantnag lead to loss of four lives, including three senior security forces officials.
 - **Ambush on 21st Dec 2023 of security forces near Dera Ki Gali (DKG)** resulted in four soldiers being killed in action. The attack was claimed by the banned People's Anti-Fascist Front (PAFF), an offshoot of Pakistan backed Jaish-e-Mohammed.
- **Way Forward:**
 - **Strong operations** should be conducted in the lower reaches of the Pir Panjal with drone support.
 - **Strengthen public outreach** to build confidence and trust among civilians as was done in the Kashmir valley.
 - Mistakes like alleged death of civilians in military custody should also be dealt in a transparent manner to build trust.
 - **Inclusive development** throughout J&K.
 - The general focus on Kashmir valley has led to the Rajouri-Poonch region being at a disadvantage in terms of development funds, implementation of government programs, infrastructure development, etc.
 - **Indian agencies** need to step up their vigil in monitoring the renewed radicalization drive by the terrorist masterminds and their well-resourced benefactors.
 - **Other steps discussed with the terrorism topics:**
 - **Strengthening border infrastructure**
 - **Countering terrorism politically and diplomatically**
 - Raising the issue on international forums to isolate countries sponsoring terrorism.
 - Working towards resolving the Kashmir dispute through political negotiations.

- Strengthening Police (having a counter-terrorism cell)
- Role of educational institutions, religious institutions and Civil Society

- Conclusion:

- In the current context of receding footprint of militancy in J&K, the fight against the terrorist has to enter a decisive phase with bold and imaginative initiatives. The security forces need to set different parameter of success to include non-kinetic means, as part of a whole-of-government approach.

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3. PRELIMS FACTS

1) CULTURE: INTANGIBLE CULTURAL HERITAGE/ MASTERPIECE OF THE ORAL AND INTANGIBLE HERITAGE OF HUMANITY

- **Why in news?**
 - » Garba dance from Gujarat becomes the 15th cultural item from India to make it to UNESCO's Intangible Cultural Heritage List (Dec 2023)
- **About Intangible Cultural Heritage**
 - » An intangible cultural heritage is a practice, representation, expression, knowledge, or skill as well as instruments, objects, artifacts, and cultural spaces that are considered by UNESCO to be part of a place's cultural heritage. It is sometimes called the living cultural heritage.
 - » It focuses on intangible aspects of culture.
- **About Convention for the Safeguarding of the Intangible Heritage, 2003**
 - » It is an international treaty signed in 2003, acknowledging that cultural heritage is more than tangible places, monuments and objects. It also encompasses traditional and living expressions.
- **Intergovernmental Committee of UNESCO's 2003 Convention**
 - » The Intergovernmental Committee of the 2003 Convention consists of 24 members and is elected in the General Assembly of the Convention according to the principle of equitable geographical representation and rotation.
 - » **Core Functions** of the Committee:
 - Promoting the Objective of the Convention
 - Providing guidance on best practices
 - Making recommendations on measures for safeguarding of intangible cultural heritage.
 - » The committee also examines the requests submitted by State Parties for the inscription of intangible heritage on the lists as well as proposals or programs and projects.
 - » India has been elected as a member of the Intergovernmental Committee of UNESCO's 2003 Convention for the Safeguarding of the Intangible Cultural Heritage for the 2022-26 cycle.
 - In the past India has served as a member in two stints - 2006 - 2010 and 2014-18.
 - » The elections took place during the 9th general assembly of the 2003 Convention held at UNESCO headquarters, Paris, from 5th to 7th July 2022.
- **India** ratified the convention in Sep 2005.
- **Intangible Cultural Heritages of India:** So far, 15 Intangible Cultural Heritage (ICH) elements from India have been inscribed till date on the UNESCO's List of the Intangible Cultural Heritage of Humanity.
 - » **How is an element included in this list?**
 - Nomination by a state party. (In India, Ministry of culture has appointed the Sangeet Natak Akademi, as nodal office for matters relating to preparation of the nomination dossiers for UNESCO).
 - » **Elements inscribed from India so far include:**

S.No.	ICH Element	Year of Inscription
1	Tradition of Vedic chanting	2008
2	Ramlila , the traditional performance of the Ramayana	2008
3	Kutiyattam , Sanskrit theatre	2008
4	Ramman , religious festival and ritual theatre of the Garhwal Himalayas, India	2009
5	Mudiyettu , ritual theatre and dance drama of Kerala	2010
6	Kalbelia folk songs and dances of Rajasthan	2010
7	Chhau dance	2010
8	Buddhist chanting of Ladakh : recitation of sacred Buddhist texts in the trans-Himalayan Ladakh region, Jammu and Kashmir, India	2012
9	Sankirtana , ritual singing, drumming and dancing of Manipur	2013
10	Traditional brass and copper craft of utensil making among the Thatheras of Jandiala Guru, Punjab, India	2014
11	Yoga	2016
12	Nawrouz , Novruz, Nowrouz, Nowrouz, Nawrouz, Nauryz, Nooruz, Nowruz, Navruz, Nevruz, Nowruz, Navruz	2016
13	Kumbh Mela	2017
14	Durga Puja in Kolkata	2021
15	Garba of Gujarat	2023

2) PLACES IN NEWS: SIERRA LEONE

Geography: It is a country located on the southwest coast of West Africa. It shares the southeastern border with Liberia and the northern half of the country is surrounded by Guinea. It has tropical climate, with diverse environments ranging from Savanna to rainforests.

Religion: Muslims constitute 75% of the population. Christian are minority but quite influential.

Capital: Freetown.



What led to Coup attempt in Sierra Leone? (Dec 2023)

- In Nov 2023, unidentified gunmen targeted the **Wilberforce military barracks** and several police stations and correctional centres in Freetown, Sierra Leone. It was considered a coup attempt.
- Key issues in Sierra Leone:
 - a. **Political Instability:** This instability has been there since June 2023, when President Julius Maada Wonie Bio was re-elected. Opposition have claimed that elections were manipulated.
 - b. **Economic instability:** Inflation (upto 50%); Poverty (more than 50% of population); unemployment
 - C. **Police aggression:** For e.g. the Aug 2022 riots left six police officers and 27 protestors dead.

3) PLACES IN NEWS: MOUNT MERAPI

About Mount Merapi: It is the most active volcano of Indonesia and have erupted regularly since 1548. It is located on Java Island. It is a stratovolcano whose height is 2,930 miles.

It is located at a subduction zone, where the Indo-Australian Plate is subducting under the Sunda Plate.

It is also **one of the 16 Decade Volcanoes**

About Decade Volcanoes

- The Decade volcanoes are 16 volcanoes identified by the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) as being worthy of particular study in light of their history of large, destructive eruptions and proximity to populated areas.
- The **Decade Volcanoes project** encourages studies and public-awareness activities at these volcanoes, with the aim of achieving a better understanding of the volcanoes and the dangers they present, and thus being able to reduce the severity of natural disaster.
- They are called decade volcanoes because the project was initiated in the 1990s as part of the United Nations - sponsored International Decade for Natural Disasters Reduction.



Dec 2023 Eruption:

Mount Merapi erupted again and killed at least 11 hikers. This eruption sent hot ash and other volcanic debris three kms into sky.

About IVCEI

It is an **international NGO** that focuses on research in volcanology, efforts to mitigate disasters, and research into closely related disciplines, such as igneous geochemistry and petrology, geochronology, volcanogenic mineral deposits, and the physics of the generation and ascent of magmas in the upper mantle and crust.

4) ECONOMY: BANKING: DSIBS

- **Why in news?**
 - » RBI releases 2023 list of DSIBs (Dec 2023)
- **Introduction**
 - » D-SIBs means the bank is **too big to fail** i.e. their failure would be **significant disruption to the essential services** they provide to the banking system and the **overall economy**.
 - » According to RBI, these banks have become **systematically important** due to their size, cross jurisdictional activities, complexity and lack of substitution and inter-connection. Banks whose assets exceed **2% of the GDP** are considered part of this group.
 - » **An additional common equity requirement** has to be applied to DSIBs.
 - » Too big to fail indicates that **in case of distress government is expected to support these banks**. Due to this perception, they **enjoy certain advantages** in funding/investment.
- **Beginning of DSIB-Framework:**
 - » The RBI issued the **framework for dealing with D-SIBs** in July 2014.
 - » SBI was included in the list in 2015, HDFC in 2016.
- The list of D-SIBs is as follows (as of Dec 2023)
 - » SBI, HDFC, and ICICI continue to be **identified as DSIBs**.
 - » While **ICICI** continues to be in **Bucket-1**; Both HDFC (from Bucket-1 to Bucket-2) and SBI (from Bucket-3 to Bucket-4) have been shifted to higher bucket.
 - » So, **starting 1st of April 2025**, both SBI and HDFC will have **to fulfill higher buffer requirements** of the higher bucket.
 - Till 31st March 2025, **surcharge applicable** will be **0.60%** for SBI and **0.20%** for HDFC Bank.

Bucket	Banks	Additional Common Equity Tier 1 requirement as a percentage of Risk Weighted Assets (RWAs)
5	-	1%
4	State Bank of India*	0.80%
3	-	0.60%
2	HDFC Bank*	0.40%
1	ICICI Bank	0.20%

* The higher D-SIB surcharge for SBI and HDFC Bank will be applicable from April 1, 2025. Hence, up to March 31, 2025, the D-SIB surcharge applicable to SBI and HDFC Bank will be 0.60% and 0.20% respectively.

5) S&T: HEALTH: MEASLES AND MEASLES VACCINE

- Measles is a highly contagious infectious disease caused by measles virus. It spreads through air when an infected person coughs or sneezes. It is an acute respiratory illness. Infection is characterized by a prodrome of fever (as high as 105-degree F) and malaise, cough, coryza, and conjunctivitis - the three "C"s, followed by maculopapular rash. The rash spreads from the head to the trunk to the lower extremities.
 - It can severely sicken young children, but is normally kept under check due to large-scale vaccination.
- About the Virus:
 - » It is a single stranded, enveloped RNA virus with 1 serotype. It is classified as a member of the genus Morbillivirus in the Paramyxoviridae family.
 - » Humans are the only natural host of the measles virus.
- Detection:
 - » RT-PCR
 - » Anti-body test
- Vaccinations:
 - » Measles can be prevented with Measles-containing vaccine, which is primarily administered as the combination of measles-mumps-rubella (MMR) vaccine.
 - » It can be used for children aged 12 months through 12 years. One dose of MMR vaccine is approximately 93% effective, and two doses are approximately 97% effective.
- Rise of Cases in 2022:
 - » This was primarily due to disruption of routine vaccination during 2020 and 2021 due to focus on COVID-19 and lockdown
- WHO Report and India's Response (Nov 2023)
 - » A new report from the WHO and US Centre for Disease Control and Prevention (CDC) said measles cases in 2022 have increased by 18%, and deaths by 43% globally, compared to 2021.
 - **Cases:** 9 million & **Deaths** - 1,36,000
 - » The report also said that globally 22 million children and in India 1.1 million infants didn't get the first dose of vaccine.
 - » **India has differed from this report:**
 - MoH&FW says that just over 21,000 Indian children didn't get the shot.

6) S&T: HEALTH: RUBELLA

- Rubella is a contagious viral disease caused by a virus. Most people who get Rubella usually have a mild illness, with symptoms that can include a low-grade fever, sore-throat, and a rash that starts on the face and spreads to the rest of the body. It can cause a miscarriage or serious birth defects in a developing baby if a woman is infected while she is pregnant.
- **The best protection** against rubella is **MMR** (Measles,Mumps,Rubella) vaccine

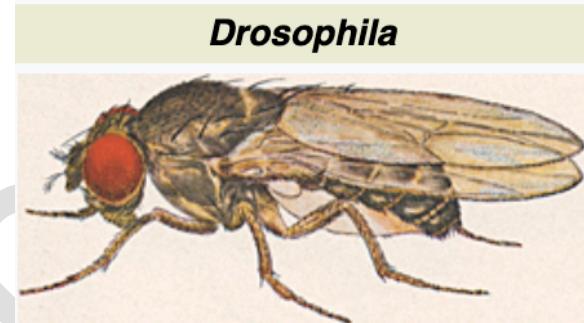
7) S&T: BIOTECHNOLOGY: HUNTINGTON'S DISEASE AND GM FRUITFLIES

- **What is Huntington's disease?**
 - » It is a rare, inherited disease that causes the progressive breakdown (degeneration) of nerve cells in the brain.
 - » **Symptoms:** It starts with mild symptoms like forgetfulness, loss of balance, and clumsiness in performing simple tasks. But the condition progressively worsens eventually leading to death.
 - » **Understanding the cause of Huntington's disease:**
 - The patients with Huntington's disease carry a mutated version of gene HTT. This gene codes for a protein called huntingtin, or Htt.
 - Each one of us have two copies of the HTT gene: one we inherit from father and one from mother. The disease is triggered even if only one copy of the gene is mutated while the other is normal.
 - **Use of huntingtin protein:** Nerve cells in our body needs Htt protein for their normal functioning and survival.
 - **Normal HTT gene** contains a stretch of DNA that specifies the number of times the amino acid glutamine is repeated in the Htt protein. This number varies from 11 to 31.
 - **Mutated HTT gene** however encodes abnormal Htt protein that instead destroys the neurons that regulate movement, thinking and memory. The mutated HTT the number of repetitions of glutamine amino acid is expanded to encode 35 or more repeats. **As the number of repetitions increase, the severity of Huntington's disease increases, and its debilitation begins at an earlier age**.
 - **How fruitflies (*Drosophila melanogaster*) are helping us understand Huntington's disease?**
 - » Researchers genetically modified fruitflies so that their neurons produce Htt proteins that had 120 repeating units of glutamine. These flies displayed neuronal degeneration, an impaired ability to climb surfaces, and lower viability as well as longevity.
 - » Researchers also had a 'control group', with fruit flies whose neurons made proteins with 25 repeating glutamine units. These flies were largely unaffected.
 - » **In other words**, expressing the longer tract produced symptoms in the fruit flies resembling those of Huntington's disease in humans - whereas expressing the shorter tract didn't.

- **Yod1 Gene** and its impacts:
 - » Scientists studied several other genes and found that overexpression of one, called Yod1, removed all of the disease-like effects in flies caused by overexpression of Htt, including the neurodegeneration, impediments to motor activity, and lower viability and longevity.
- **Future:** Scientists now need to establish that fruit flies that overexpress the human version of the Yod1 gene will also suppress the Huntington's-like pathogenesis.

B) DROSOPHILIA

- Drosophila is a genus of flies, belong to the family Drosophilidae, whose members are often called "small fruit flies" or pomace flies.
- One species of the Drosophila in particular **D. melanogaster**, has been heavily used in research in genetics and is a common modern organism in developmental biology for last 100 years. Several discoveries in biology have been made using this. Its genome is entirely sequenced and there is enormous information available about its biochemistry, physiology, and behavior. The terms fruit fly and Drosophila are often used synonymously with D. melanogaster in modern biological literature.
- **Developmental biology** is the field of biology that studies the process by which multi-cellular organisms grow and develop, controlled by their genes.



8) EB&CC: BIODIVERSITY: LANTANA CAMARA

It is also known as big-sage, wild sage, red sage and tickberry. It is a species of flowering plant within the verbena family, Verbenaceae, that is native to American tropics.

How was it introduced in India?

Lantana arrived in India as a decorative shrub in the British colonial period but quickly took over several ecosystems as an invasive species.

Current Spread: The plant currently covers 40-50% of India's area and have also invaded national parks and pasture lands.

It has spread from its native Central and South America to 50 different countries, where it has become invasive species.

- **Reduces biodiversity:** It often outcompetes more desirable species, leading to reduction in biodiversity.
- **Impacts Agriculture:** It can also cause problems if it invades agricultural areas as a result of its toxicity to



Flowers and leaves of the Lantana camara. (Via Wikimedia Commons)

livestock as well as ability to form dense thickets which if left unchecked can greatly reduce the productivity of farm land.

Recent Updates: A decade long initiative in MP to reclaim land overrun by Lantana helps residents restart agriculture and restore natural biodiversity. (Dec 2023: Source: DTE)



9) EB&CC: BIODIVERSITY: THE NAMDAPHA FLYING SQUIRREL (*BISWAMOYOPTERUS BISWASI*)

The Namdapha flying squirrel is an arboreal, nocturnal flying squirrel endemic to India.

It was sole in the genus *Biswamoyopterus* until the description of the **Laotian giant flying squirrel (*Biswamoyopterus laoensis*)** in 2013.

It was first recorded in 1981 where a single individual was found in Namdapha Tiger Reserve. After that it wasn't seen till 2022.

Updates: Missing for 42 years, Namdapha flying squirrel resurfaces in Arunachal (Dec 2023)

IUCN: CR

WPA: Schedule-1 (after 2022 amendment)

Habitat: Tropical forests

Distribution : It is now restricted to as single valley in the Namdapha N.P. (or) W.L.S. in Arunachal Pradesh.

- Namdapha National park is the **largest protected area in the Eastern Himalayan Biodiversity hotspot** and is located in Arunachal Pradesh. It is also **one of the largest National Park in India in terms of area** (after hemis, desert, Simlipal and Gangotri)

Threats: Habitat loss is the primary threat. In the past it was also hunted for food, skins/fur.



Note: Namdapha is home to another flying squirrel (Red Giant Flying Squirrel) (*Petaurus petaurus*), whose IUCN status is LC. Like other flying squirrels, Red Giant Flying Squirrel is also mostly nocturnal and is able to glide long distance between trees.



CURRENT AFFAIRS PROGRAM

PRE CUM MAINS 2024

DEC 2023: BOOKLET-9

SPECIAL BOOKLET ON CLIMATE CHANGE

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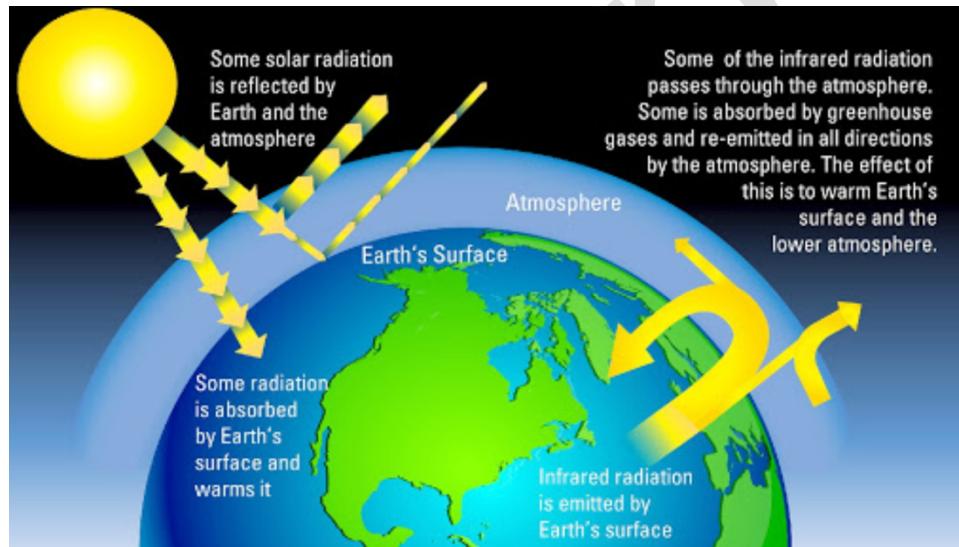
1. PYQ

- i. Discuss global warming and mention its effects on the global climate. Explain the control measures to bring the level of greenhouse gases which cause global warming, in the light of Kyoto Protocol, 1997 [Mains 2022, 15 marks, 250 words]
- ii. Do you think India will meet 50% of its energy needs from renewable energy by 2030? Justify your answer. How will the shift of subsidies from fossil fuels to renewables help achieve the above objectives? Explain [Mains 2022, 15 marks, 250 words]
- iii. Describe the major outcomes of the 26th session of the COP to the UNFCCC. What are the commitments made by India in this conference? [Mains 2021, 15 marks, 250 words]
- iv. Explain the purpose of Green Grid Initiative launched at World Leaders Summit of COP26 UNFCCC in Glasgow in Nov 2021. When was this idea first floated in the International Solar Alliance (ISA)? [Mains 2021, 10 marks, 150 words]
- v. Assess the impact of global warming on coral life system with examples (Answer in 150 words) (2019) [GS1]
- vi. 'Climate change' is a global problem. How India will be affected by climate change? How Himalayan and coastal states of India will be affected by climate change? (2017)
- vii. Should the pursuit of carbon credits and clean development mechanisms set up under UNFCCC be maintained even though there has been a massive slide in the value of a carbon credit? Discuss with respect to India's energy needs for economic growth. (200 words) (2014)

2. CLIMATE CHANGE

1) CLIMATE CHANGE, GLOBAL WARMING AND GREENHOUSE GASES

- **Climate:** Long term pattern of weather in a particular area.
- **Global warming** refers to the long-term increase in earth's average surface temperature due to the accumulation of greenhouse gases in the atmosphere.
- Gases in the earth's atmosphere that trap heat are known as **Greenhouse gases**. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. Greenhouse gases are crucial for survival of life on earth. In the absence of Greenhouse gases, the average temperature on earth would have been -18 degree Celsius instead of the present 15 degree Celsius.
- But the excess of greenhouse gases in the atmosphere is leading to extra warming of the earth's surface causing Global Warming and thus Climate Change.
- **Green House Effect:**



2) GREENHOUSE GASES – CO₂, METHANE, NITROUS OXIDE (N₂O), OZONE, FLUORINATED GASES, BLACK CARBON, BROWN CARBON ETC.

A) CO₂

- It is produced by **burning of carbon containing substances**, mostly fuels (Coal, natural gas, oil), Solid waste, trees, other biological materials etc.
- CO₂ is removed from atmosphere when it is absorbed (sequestered) by plants during photosynthesis.
- **Concentration of CO₂ in atmosphere:**
 - » For the first time in history, the atmospheric CO₂ level reached 419 parts per million (PPM), as measured by the United States' National Oceanic and Atmospheric Administration's Mauna Loa Atmospheric Baseline Observatory in Hawaii.

- This is nearly 45% above the pre-industrial baseline of 278 PPM in 1750 accepted by IPCC.
- » Our **annual CO₂ emission** have grown about 70 times since the pre-industrial era reaching nearly **36.4 Gt** in 2019.

B) METHANE

- **Practice Questions:**
 - Discuss the sources, implications, and potential mitigation strategies of methane emissions in the context of global warming and climate change. How can international cooperation play a significant role in addressing this significant environmental concern? [15 marks, 250 words]
- **Introduction:**
 - As per UNEP, Methane is a GHG which is responsible for 30% of the warming since pre-industrial times. Its contribution is 2nd only to carbondioxide.
- **Why special focus on methane is needed in our fight against climate change?**
 - Methane has much higher global warming potential than CO₂.
 - IPCC had said that the methane mitigation has the **greatest potential to slow warming** over the next 20 years.
 - A 0.3% reduction per year in methane is equivalent to net-zero for CO₂ - there would be no additional warming if this level of reduction is achieved.
- **Methane Emission: Sources:**
 - **Natural Sources:** Wetlands, termites etc.
 - **Wetlands** are the largest source of methane.
 - **Agriculture** - Rice cultivation, animal husbandry etc. generate substantial amount of methane.
 - **Energy Production** (fossil fuel) - Among anthropogenic factors, after Agriculture, it is this sector which contributes to the highest methane production. It is released during the extraction, processing, and transport of fossil fuels, including coal, oil, and natural gas.
 - **Leakage:** For e.g., the ruptures in the underwater Nord stream in Sep 2022 caused the single largest such release of the greenhouse gas.
 - **Landfills** in recent times are also becoming a big source of methane emissions.
 - **Thawing of permafrost** in polar region is also releasing methane. In future, it may become a big source of methane emissions.
- **Steps being taken:**
 - **International Steps:**
 - » **Improving Detection:**
 - UNEP has launched International Methane Emissions observatory - the Methane Alert and Response System (MARS) at COP27. It is focused on scaling up global efforts to detect and act on major emissions sources in a transparent manner and accelerate implementation of the global methane pledge.

- **Global Methane Pledge** announced at COP26
 - » By COP27, 150 countries have joined the initiative lead by USA and EU. They have promised to cut their methane emission by at least 30% from 2020 levels by 2030.
 - » **Significance:**
 - Global warming would be reduced by at least 0.2 degree Celsius by 2050, if countries deliver according to the pledge.
 - **Health benefits:** Oxidation of methane is responsible for formation of ground-level ozone (smog), which is a harmful air pollutant.
 - » **Why has India not joined the pledge?**
 - India's methane emissions are 'survival emissions' and not 'luxury' emissions.
 - The two prominent source of methane in India are enteric fermentation and 'paddy cultivation' and any restriction on them would harm small and marginal farmers.
 - Other than harming farmers, it may also reduce agri production. Currently, India is one of the largest producers and exporters of rice.
 - India also argues that 6th IPCC report has highlighted that CO2 is the major global warming gas and this pledge is shifting focus to methane which has a lifetime of only 12 years, whereas CO2 can survive for more than 100 years.
- **India has not joined the global methane pledge**, but it doesn't mean the India is not worried about methane emissions. There are several fronts on which India is working.
 - » National Innovation in Climate Resilient Agriculture (NICRA) project of ICAR has developed several technologies with the potential to mitigate methane emissions.
 - For instance, the 'System of Rice Intensification' has the potential to enhance rice yield from 36-49% with 22-35% less water than conventional transplanted rice. It also uses less seed, fertilizers, and pesticides.
 - Key steps involve:
 1. Planting young seedlings (less than 15 days old) with only one or two leaves
 2. Planting them singly, spaced widely apart
 3. Maintaining soil moisture at a level that promotes aerobic soil conditions.
 4. Controlling weeds by mechanical means, such as hand weeding or using a rotary hoe
 5. Using organic matter to improve soil fertility.
 6. Applying small amounts of fertilizer at specific stages of plant growth
 - Another technology, 'Direct Seeded Rice' reduces methane emissions as it does not involve raising nurseries, puddling, and transplanting. Unlike transplanted paddy cultivation, standing water is not maintained in this system.
 - **Harit Dhara:** It is an anti-methanogenic feed supplement developed by ICAR. It can cut down cattle methane emissions by 17-20% and can also result in higher milk production.
 - Under Crop Diversification Program, methane emission is being avoided due to diversion of paddy to alternate crops like pulses, oilseeds, maize, cotton, and agro-forestry.

- **Way Forward:**
 - » **Renewable Energy Transition:** In long run it will reduce dependency on fossil fuels which will reduce emissions of both CO₂ and methane.
 - » **Alternate Agricultural practices:**
 - Improving the effectiveness and yield of rice cultivation methods like System of Rice Intensification and Direct Seeded Rice and encouraging more farmers to adopt these practices.
 - Crop diversification to reduce dependency on rice.
 - » **Focus on Burp Control:**
 - Promote anti-methanogenic feed supplement like **Harit Dhara**.
 - More R&D on alternatives. For e.g. in 2021 EU approved a food supplement, Bovaer, saying that it can consistently reduce methane emissions from dairy cows by 30-80%.
 - » **Scientific Waste Management:** Reduce the waste disposal on landfills; ensure installation of landfill gas capture systems etc.; converting organic waste into biogas which can be used for energy etc.
 - » **Leak Detection and Repair:** Regular monitoring and maintenance of oil and gas infrastructure can minimize methane leaks.
 - » **Improved International Cooperation:** Global targets; data sharing, finance mobilization; technology transfers; Improved R&D are some of the methods by which international cooperation can contribute in fighting the challenge of methane.
- **Conclusion:** Addressing methane emissions is critical for mitigating global warming and its associated impacts. A comprehensive approach dealing with fossil fuel sector, agriculture sector and international cooperation will be needed for a more resilient and climate-resilient future.

3) IMPACT OF GLOBAL WARMING/CLIMATE CHANGE

GWG emissions is breaching all the records: As per the AR6, **Emissions of Carbon dioxide, methane and nitrous oxide breached records in 2020.** CO₂ Concentration in the atmosphere - at around 419 parts per million - are the highest they have been in 2 million years.

Three factors make carbon budgeting complex:

1. **The pollutants** - primarily GHGs like CO₂ and methane - have an extraordinary long life. Thus, historic emissions continue to warm up the planet just like current emissions.
2. GHG emissions are linked to economic growth.
3. **Sharing of burden** becomes difficult as the emissions are associated with economic growth.

1. Rising Temperatures

- » As per the AR6 of IPCC, the global temperature has already risen by 1.1 degree C since preindustrial 19th century. This could increase upto 1.5 degree Celsius in less than 20 years (before 2040).
 - **Further, the 2 degree C warming** is likely to get exceeded by the end of this century unless immediate and deep reductions in greenhouse gas emissions are initiated immediately.
 - **In business-as-usual approach**, or in **worst case scenario**, the temperature rise by the end of this century would exceed even 4 degree Celsius'
 - The report is also '**unequivocal**' (i.e., there is almost no doubt) that most of the observed warming of the planet since the late 1800s is caused by human activities.
- » As per the WMO, the **decade 2010-20 and the five years (2015-20)** were the hottest in the earth's history

2. Melting of Glaciers and Sea Level Rise -> Submergence of coastal region

- » AR6: Sea level rise has tripled compared with 1901-1971. The Antarctic sea ice is the lowest in last 1,00 years.
- » The temperature of Antarctica rose above 20 degree Celsius for the first time on record.

3. Heating up of Oceans -> marine heat waves, intense cyclones etc.

- » Ocean temperatures are better indicators of global warming as 93% of the excess solar energy trapped by GHG accumulate in the world's oceans

4. Increasing variability in weather patterns

- » **Heat waves and floods** which used to be once-in-a century event are becoming more regular occurrence.
- » **Weather Disasters** have displaced millions of people this year and affected rainfall patterns from India to northern Russia and the Central United states.
- » **For instance: India saw 13 Deficit Monsoons in 18 years between 2001-18.**

5. Compounding extremes (several climate change drivers operating together) are maximizing disaster in India and elsewhere.

- » E.g., heavy rainfall, landslides, snow avalanches, and flooding occurring together is an example of compounding event.

6. Thawing of Permafrost and Arctic Lakes Bubbling Methane

» Introduction

- Recent months have seen **thousands of lakes in Arctic Tundra, Alaska and Siberia bubbling** with gases and producing a hiss sound along with bubbles.

» Permafrost Thawing producing methane gas

» Warmer temperature increases the thawing of permafrost and release methane to the atmosphere.

- But this also means that growing season increases, more plant growth takes place and thus more CO₂ getting absorbed. But overall, the increase in release of GHGs would be much higher.

» Presently Arctic is a net carbon sink

- But soon arctic could become a carbon source, if the earth continues to warm, and a lot of permafrost thaws out. This would start a cycle of releasing more carbon from permafrost thawing and less absorption where the extra carbon in the atmosphere results in increasing warming.

7. Sea Water is 26% more acidic than at the start of the industrial era. This is leading to degradation of marine ecosystem.

8. Biodiversity Loss

- » At least **1 million species were at risk** because of the rising CO₂ concentration in the atmosphere and global warming.

- For instance, a recent study shows that seal pups (IUCN: LC) are finding it tough to survive in the Baltics in the absence of ice. 100s of grey seal pups are dying on the shores of the Baltic Sea in Estonia and Latvia as the Nordic coastline faced winter without ice in decades.

9. Negative Impact on Food Security, Agriculture and Economy

- » Variability in rainfall
- » Increased temperature and evaporation of water sources
- » Increased chances of Locust attacks
- » Extreme weather events triggered by climate change costs India \$87 billion annually: State of Climate in Asia, 2020 (report by WMO)

10. Climate change has adversely affected both physical and mental health of people.

- » Impacts on health is mediated by both through natural and human systems, including economic and social conditions and disruptions.
- » Extreme heat events -> Mortality and morbidity
- » Climate related food borne, and water borne diseases has increased. The incidence of vector borne diseases have also increased due to range expansion and/or increased reproduction of disease vectors.
- » Some mental health challenges are associated with increasing temperatures, trauma from weather and climate extreme events, and loss of livelihood and culture. Exposure to wildfire

smoke, atmospheric dust, and aeroallergens have been associated with climate sensitive cardiovascular and respiratory distress.

11. Achievements of SDG targets are negatively hindered.

12. Impact on Cities, Settlements and Infrastructure

- » Hot extremes including heatwaves have intensified in cities. This has also aggravated air pollution events and limited functioning of key infrastructure. Infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow onset of events.

13. Economic Impact:

- » Damages due to variability in weather pattern (e.g. slow onset of Monsoons) and extreme weather events.
- » Climate exposed sectors like agriculture, forestry, fishery, energy and tourism have been adversely affected. Outdoor labour productivity have gone down
- » Extreme events like cyclones hinder economic growth in short run too.

14. Climate Migration:

- IPCC's 6th AR says that through displacement and involuntary migration from extreme weather and climate events, climate change has generated and perpetuated vulnerability.
- Since 2008, an average of more than 20 million people per year have been displaced by extreme weather events, many of which were exacerbated by climate change.

15. Shrinking of Stratosphere:

- » According to a study published by NASA on June 15, the earth's energy imbalance doubled over the 14-year period between 2005 - 2019, doubling the pace at which the Earth retains heat from 2005. As a result of this we are already on the brink of losing stratosphere.

4) IPCC AND ITS REPORTS

A) ABOUT IPCC

- The Intergovernmental Panel on Climate Change (IPCC) is the UN body for assessing the science related to climate change. Its job is **to assess already published scientific literature** to update our knowledge of climate change science.
 - IPCC's Assessment Reports (ARs), which are produced every few years, are the most **comprehensive and widely accepted** scientific evaluations of the state of Earth's climate.
 - They form the basis for government policies against climate change and provide scientific foundation for the global Climate Change negotiations.
 - So far, **Six Assessment Reports** have been produced.
- **IPCC was set up in 1988** by World Meteorological organization (WMO) and United Nations Environment Program (UNEP) to provide policy makers with regular assessment of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigations.

B) WHAT HAVE PREVIOUS REPORTS AR1-AR5 SAID?

- The **first Assessment Report** (1990) noted that anthropogenic emissions are increasing atmospheric GHGs. In the business-as-usual scenario, temperature was likely to increase by 2 degree C compared to pre-industrial levels by 2025, and 4 degree C by 2100.
 - The report formed the basis for the negotiation of the UNFCCC in 1992, known as the Rio Earth Summit.
- The **Second Assessment Report** (1995) revised the projected rise in global temperature to 3 degree C above pre-industrial level by 2100. It was the scientific underpinning for the Kyoto Protocol of 1997.
- The **third Assessment Report** (2001) projected the rise in global temperature to 1.4 to 5.8 degree C by 2100 compared to 1990.
- The **fourth Assessment Report** (2007) said that the GHG emissions increased by 40% between 1970 and 2004 and the atmospheric CO2 was the most in 650,000 years. In the worst case scenario, the global temperature could rise by 4.5 degrees.
 - The report won the 2007 Nobel Peace Prize for IPCC. It was also the scientific input for the 2009 Copenhagen Climate meeting.
- The **fifth Assessment Report** (2014) said that more than 50% of the temperature rise since 1950 is due to human activities. The rise in global temperature by 2100 could be as high as 4.8 degree C from pre-industrial times, and more frequent longer heatwaves were "virtually certain". It formed the scientific basis of the Paris Agreement in 2015.

5) 6TH ASSESSMENT REPORT OF IPCC

- The sixth report was published in three parts: - the first in Aug 2021, the second in Feb 2022, and the third in April 2022. These three parts were by three working groups of scientists:
 - » **Working Group-1:** Deals with **scientific basis of climate change**
 - » **Working Group-2:** Looks at **likely impacts, vulnerabilities, and adaptation issues**.
 - » **Working Group-3:** Deals with **action that can be taken to combat climate change**

A) THE FIRST REPORT “CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS” HIGHLIGHTED THE FOLLOWING:

- Climate was changing more rapidly than originally anticipated by climate scientists.
- Rise in global temperature was direct result of human activities and there are 'unequivocal evidence' about it.
- Temperature has already rise by 1.1 degrees from the pre-industrial 19th century.
- **Greenhouse gas Emissions:**
 - Emissions of Carbon dioxide, methane and nitrous oxide breached records in 2020.

- CO₂ Concentration in the atmosphere - at around 416 parts per million - are the highest they have been in 2 million years.
- **Impact:**
 - A more intense and frequent heatwaves; increased incident of extreme rainfall; a dangerous rise in sea-levels; prolonged droughts; Melting of glaciers.

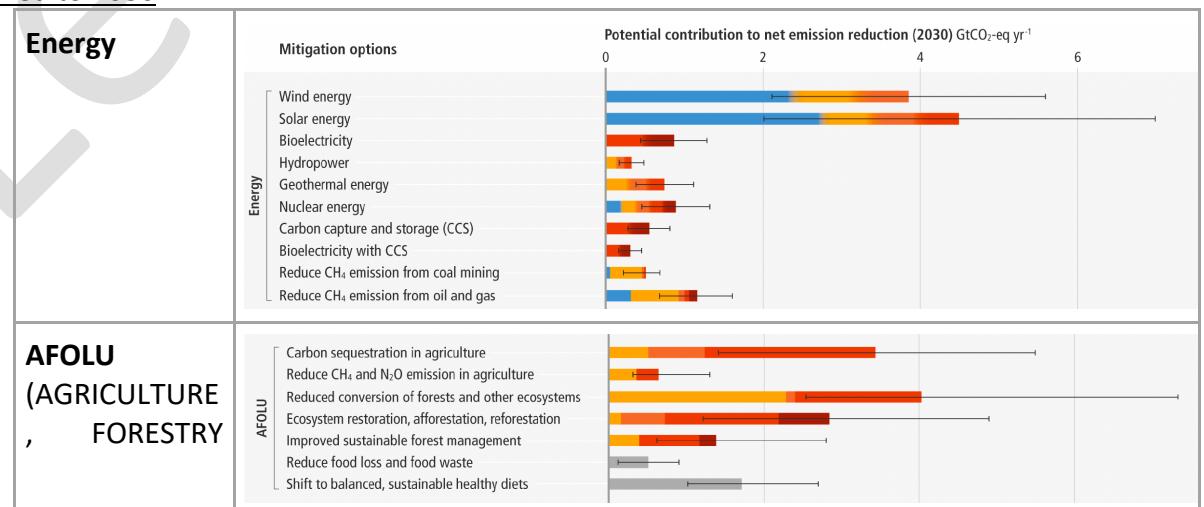
B) THE SECOND REPORT: CLIMATE CHANGE 2022: IMPACTS, ADAPTATION, AND VULNERABILITY

- The report recognizes the interdependence of climate, ecosystem, and biodiversity, and human societies and integrates knowledge more strongly across the natural, ecological, social and economic sciences than earlier IPCC reports.
- **Impact of Climate Change** (already discussed)
- **Risk in Near Term (2020-2040)**
 - Global warming, reaching 1.5 degree C in near term, would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans.
 - All the current problems would be intensified, and some irreversible damages would occur.
 - Near term actions that limit global warming to close to 1.5 degree C would substantially reduce projected losses and damages related to climate change in human systems and ecosystems, compared to higher warming levels, but cannot eliminate them all.
- **Mid to Long-Term Risks (2041-2100)**
 - Beyond 2040 and depending on the level of global warming, climate change will lead to numerous risks to natural and human systems. For 127 identified key risks, assessed and mid- and long-term impacts are upto multiple times higher than currently observed.
- **Complex Compound and Cascading Risks**
 - Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions.
- Multiple climate change-induced disasters were likely in the next two decades even if strong action was taken to reduce the emissions of greenhouse gases.

C) THE THIRD REPORT: CLIMATE CHANGE 2022: MITIGATION OF CLIMATE CHANGE

- The report lays out actions that the world can take to stop global temperatures rising beyond certain levels by the end of the century.
- If countries stick to current NDC commitments, it would lead to breach of 1.5 degree C temperature rise.
 - » Even the 2-degree Celsius target, in that case, would rely on "rapid acceleration" of climate actions after 2030.
- **Global warming would stabilize if emissions reach net zero.**
 - For 1.5 degree C target, this meant achieving net zero emissions globally in the early 2050s; for 2 degree C, it is in early 2070s.

- Even limiting warming to 2 degree C would require greenhouse gas emissions to peak before 2025 at the latest and be reduced by a quarter by 2030.
- **Carbon Inequality remains pervasive** as ever with LDCs emitting only 3.3% of global emissions in 2019.
 - Their average per capita emissions in the period 1990-2019 were only 1.7 tonnes CO₂e, compared to global average of 6.9 tCO₂e.
- **Abundant and Affordable Solutions exist across sectors including energy, buildings, and transport, as well as individual Behavioural changes.**
 - The report has detailed 60 different options and pathways that can lead to 40-70% reduction in global emissions.
 - It states with high confidence that "**several mitigation options**, notably solar energy, wind energy, electrification of urban systems, urban green infrastructure, energy efficiency, **demand side management**, improved forests - and crop/grassland management and reduced food wastage and loss, are technically viable, are becoming increasingly cost effective and are generally supported by the public".
 - The per-unit costs of several low emissions technologies have fallen continuously since 2010, however innovation has lagged in developing countries due to weak enabling conditions.
 - On a unit costs basis, solar energy has dropped 85%, wind by 55%, and lithium-ion by 85%.
 - Their deployment and usage has increased multifold since 2010 - 10 times for solar and 100 times for electric vehicles.
 - **Factors:** Higher public spending in R&D; Funding for demonstration and pilot projects; and demand pull instruments such as deployment subsidies to attain scale.
- The report covers **demand side mitigation** and states that it can help reduce emissions by 40-70% by 2050.
- **Individuals can also contribute in other ways:**
 - Putting political pressure on leaders.
- **Many options available now in all sectors are estimated to offer substantial potential to reduce net emissions by 2030.** Relative potential and cost will vary across countries in the longer term compared to 2030.





- **Implementing these mitigation strategies** would come at a substantial cost. The report estimates that taking the actions to keep temperature below 2 degree C could reduce global GDP by 1.3% to 2.7% by 2050, but not doing so has its own costs
- **Climate Finance:**
 - Tracked financial flows were still falling short of the levels needed to achieve mitigation goals across all sectors and regions.
 - The gaps are the widest for the agriculture, forestry, and other land use (**AFOLU**) sector and for developing countries.
 - But, the **global financial system is large enough** and "sufficient global capital and liquidity" exist to close these gaps.

3. UNFCCC – FROM PARIS AGREEMENT (COP21) – COP28

1) UNFCCC (UNITED NATION FRAMEWORK CONVENTION ON CLIMATE CHANGE)

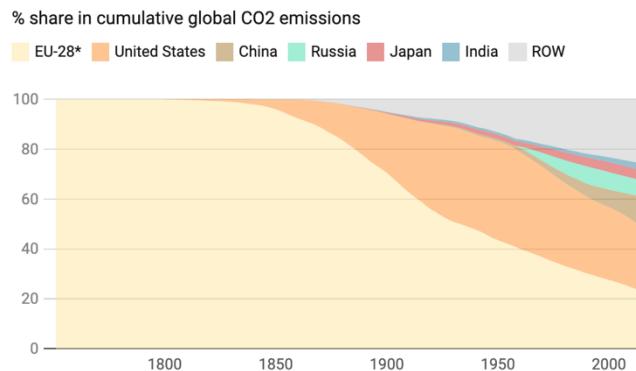
- It is one of the three conventions adopted at the Rio Earth Summit (UN summit Conference on Environment and Development (UNCED)) in 1992. Its sister Rio Conventions are the UN Convention on Biological Diversity and the Convention to Combat Desertification.
- This was the first multilateral legal instrument on climate change and came into force in 1994 after a sufficient number of countries had ratified it.
- **Ultimate Aim** of UNFCCC: Prevent dangerous human interference with the climate system by stabilizing greenhouse gas concentration in atmosphere.
- It sets on non-binding limits on greenhouse gas emission for individual countries and contain no enforcement mechanism.
- **Parties to Convention**
 - **197 parties**
 - All UN member states, Palestine (observer state), Niue and Cook Island (non-member states) and the European Union.
 - **Annex 1 Parties** -> Industrialized OECD countries, Economies in Transition (EIT), EU
 - **Annex 2 Parties** -> OECD members of Annex-1, NO EIT.
 - Provide financial and technical support to EITs and developing countries for mitigating Climate change.
 - **Non-Annex 1 Parties** -> Mostly developing.
 - **Least Developed Countries (LDCs)**
- **Key Significance of UNFCCC** - 1) Recognition of the problem 2) Setting target of stabilizing GHGs 3) Onus on Developed countries 4) Funds and technology transfer to developing countries 5) Regular Reporting -> Keep a tap on the problem.

2) KYOTO PROTOCOL (COP-3)

- It was an international agreement to reduce greenhouse gas emissions. It was negotiated under the UNFCCC during a meeting held in Kyoto, Japan, in 1997 and came into force in 2005 (due to complex ratification process)
 - **The first commitment period** was 2008-2012
 - **The second commitment period** beginning 1 Jan 2013 to 2020.
 - » Launched by Doha Amendment (2012)
- The **objectives of KP** included reducing greenhouse gas emissions through enforcement of compliance; promote sustainable development through tech-transfer and investment; and encourage developing countries and private sector to contribute to emission reduction.
- **Parties to Kyoto Protocol**
 - **Annex B:** Nearly identical to Annex - I of the UNFCCC; Agreed for emission reduction.
 - **Non-Annex B Parties:** Countries which are not listed in Annex B of KP.
- **Key Features**
 - The protocol 'operationalized' the UNFCCC. It commits industrialized countries to stabilize greenhouse gas emissions based on the principles of the Convention.

- Binding Emission targets for 38 industrialized countries and the European Community (Annex 1 Parties) in its first commitment period.
- Only bound developed countries - Common But Differentiated Responsibility (CBDR)

Over the last 250 years, Europe and the US have contributed to most of the world's CO2 emissions



*28 nations in the European Union

Source: Global Carbon Project; Our World in Data • [Get the data](#) • Created with Datawrapper

- Flexible Architecture of KP Regime to meet target.
 - » National Measures and Market Based Mechanisms
 - This market-based mechanism allows GHG abatement to start where it is most cost-effective - for e.g. in the developing world.
 - » 3 Components - Carbon Trading, Clean Development Mechanisms and Joint Implementation
- Penalties for not meeting the targets.

- What happened to Kyoto Protocol?

- Were targets met?
 - » Most countries didn't meet the targets for emission reduction assigned for the first period of commitment (2008-2012).
 - » So, protocols impact was very small.

- Kyoto Beyond 2012

- At Doha in 2012, the amendments to Kyoto Protocol for the 2nd commitment period (the Doha Amendment) were successfully adopted for the period 2012-2020.
 - » **It never entered into force** as the required number of countries didn't deposit their instrument of accession.
 - » But some developed countries started implementing their commitments under the '**opt-in**' provisions of the Doha Round.
 - » Note: India ratified the second commitment period of Kyoto Protocol in Jan 2017.

3) PARIS AGREEMENT (COP21)

- The Paris Agreement and the accompanying COP decisions are focused on enhancing **efforts to mitigate and adapt to climate change beyond 2020**.
 - a. Long Term Goal:

- » Limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees.
 - » Two long term emission goals
 - Peaking of emissions as soon as possible (with a recognition that it will take longer for developing countries)
 - A goal of Net Green House Gas Neutrality (expressed as "a balance between anthropogenic emissions by sources and removals by sinks") in the second half of this century.
- b. Ends the Strict Differentiation between developed and developing countries:** Provides for a framework that commits all countries to put forward their best efforts against climate change and keep strengthening these efforts.
- c. Mitigation - Binding Procedural Commitments** -> Preparing, communicating and maintaining NDC; Communicate new progressive NDC every five years.
- » The agreement commits parties to "pursue domestic measures with the aim of achieving the objectives" of its NDC.
 - » Doesn't make implementation or achievement of NDCs a binding obligation.
- d. Carbon Markets**
- Though the agreement avoided any direct reference to the use of market-based approaches, it recognized that the parties may use 'internationally transferred mitigation outcomes' to implement its NDCs.
- e. STOCKTAKE/SUCCESSIVE NDCs**
- To ensure successive improvement in efforts, the agreement provides for two linked processes, each on a five-year cycle.
 - Global Stocktake to assess collective progress towards the agreement's goals. The first global stocktake took place in 2023.
 - New NDCs every five years informed by the outcomes of the global stocktake. Signatories should ensure that the new NDCs are more ambitious than the previous ones.
- f. Finance**
- Provisions for Support to poor developing countries by Developed countries.
 - Finance Mobilization goal
 - The COP decided to extend the \$100 billion-a-year goal through 2025, and beyond that, by 2025 COP will set a "new collective quantified goal from a floor of "\$100 billion a year".
- g. Adaptation:**
- A major priority for many developing countries was strengthening adaptation efforts under the UNFCCC. The agreement does that by :
 - Establishing a global goal of "enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change"
 - Committing enhanced adaptation support for developing countries

- Including a review of adaptation progress, and of the adequacy and effectiveness of adaptation support, in the global stocktake to be undertaken every five years.

h. Loss and Damage:

- In a victory to small island countries and other countries highly vulnerable to climate impacts, the agreement includes a free standing provisions extending the Warsaw International Mechanism for Loss and Damage
 - The mechanism, established at COP-19 is charged with developing approaches to help vulnerable countries cope with unavoidable impacts, including extreme weather events such as sea-level rise.
 - Potential approaches include early warning systems and Risk insurance.
- Loss and Damage provision "did not involve or provide a basis for any liability or compensation.

- When Paris Agreement of COP 21 entered into force

- » It required approval of atleast **55 countries accounting for atleast 55 percent of greenhouse gas emission.**
- » It came into force on **Nov 4, 2016** (a month after required number of ratification).

- Analysis: Positives

- » **PARIS Agreement** was a major breakthrough whose significance could be understood from the fact that with **150 Presidents and Prime Ministers**, it was the largest ever single day gathering of heads of state surpassing even the UN summits.
- » **It turned the corner after the failure of Kyoto Protocol** and inability to reach an agreement in previous COPs. It represented a change in global attitude and recognized that climate change is a global problem which should be dealt immediately.
- » The agreement is more Comprehensive than Kyoto protocol which was limited to assigning greenhouse gas emission targets for a group of developed countries.
- » **Regular stock take** would increase the chances of world community rectifying its targets to prevent climate crisis.
- » **Best Compromise possible:** Developed countries ensured climate action would be joint responsibility of every nation unlike Kyoto Protocol; Developing countries were able to take heart by the fact that all important principle of differentiation - has been retained, even though in diluted form; Island nations and least developed countries were happy to force the rest of the world to acknowledge the need to take a 1.5 degree path instead of the 2 degree it is more comfortable with.

- Analysis: Negatives/Limitations

- » **NDCs** are not ambitious enough and the world is moving towards missing the goal of limiting the temperature rise to 1.5 degree celsius.
- » **Non-Binding nature** raises a question on effectiveness of the implementation.
- » **Frequent reviews by stocktaking** may be challenging to achieve as it is difficult to generate a Paris like consensus regularly.
- » **Exit Clause is also problematic:** A country can exit from the agreement with one year's notice after three years have passed from the time a country ratifies the Agreement.