

- 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**
- » **Inviolable Premise**
- » **Archives and document inviolable.**
- » **Free Communication**
- » **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:** professional activity outside diplomat's official functions. (Article 31.1c)
- » **Extension of (most) protection to family members:**

- **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.
 - 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.
 - Concerning compulsory settlement of dispute :** Dispute arising from the interpretation of this treaty may be bought before the ICIJ

A) 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 diplomats 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.

5) VIENNA CONVENTION ON CONSULAR RELATIONS (VCCR)

- **Consular Access** simply means that a consul (diplomat or other official) will have a meeting with the prisoner who is in the custody of another country. Though this meeting, the diplomat confirms the identity of the individual and ensures good treatment in the custody. Depending on the meeting, the official reports back to her/his country and the next step is initiated (providing legal support etc.)
- **Background to VCCR, 1963: What was the need?**
- **What is Vienna Convention on Consular Relations?**
 - VCCR of 1963 is an international treaty that defines the framework for consular relations between independent states. It was adopted in United Nation Conference on Consular Relations. It came into force in 1967.
 - A consul normally operates out of an embassy in another state, and performs two functions:
 - i. Protecting the interests of countrymen in the host country
 - ii. Furthering the commercial and economic relations between the two states.
 - A consul is not necessarily a diplomat, they work out of the same premise, and under this treaty they are afforded most of the same privileges, including a variation of diplomatic immunity called consular immunity.
 - The treaty has been ratified by 179 countries.
- **Key provisions of the treaty:**
 - **Key functions** of a consul are listed, protecting in the receiving state the interest of the sending states and its nationals, as well as developing commercial, economic, cultural, and scientific relations between the two states. (Article 5)
 - **Declaring persona non-grata**:
 - **Non-intrusion and protection**:
 - **Freedom of communication**
 - **Article 36**:

- It provides that when a national of foreign country is arrested or detained on criminal or immigration charges, the detainees must be advised of the right to have the detainees consulate to be notified and further detainee has the right to regular consultation with consular officials during detention and any trial.

Membership

There are 179 members to the convention including the most UN member states and UN observer states Holy See and State of Palestine.

Optional Protocol

The Conference (UNCCR) also adopted Optional Protocol Concerning Acquisition of Nationality, the Optional Conference concerning the compulsory settlement of disputes, the Final Act and the three-resolution annexed to the act.

6) TIR CONVENTION (THE CUSTOMS CONVENTION ON THE INTERNATIONAL TRANSPORT OF GOODS UNDER COVER OF TIR CARNETS)

- **Introduction**
 - » It is a **UN Convention** (adopted under the auspices of the United Nations Economic Commission of Europe - UNECE) that allows goods to be sealed in compartments and requires no need for physical checking of the contents, enabling shipments to pass through countries without being opened at the borders.
 - It came into effect in March 1978.
 - » **TIR** stands for "**Transports Internationaux Routiers**" or "International Road Transport".
 - » **Note:** Custom authorities remain entitled to perform inspections whenever they suspect irregularities or randomly.
 - » The convention applies to transport with road vehicles, a combination vehicles and containers provided that some part of the transport includes road transport.
 - This reduces cross border transport time by upto 80% and reduces costs by upto 38 percent.
- **India accessed to the convention in 2017**

4. NON-UN BODIES

1) WORLD TRADE ORGANIZATION (WTO)

- Introduction

- WTO was set up under Marrakesh Treaty (1994) as a result of GATT's Uruguay Round (1986-1994) of negotiation. It came into being in 1995 and is successor of GATT, which in turn was established in the wake of the second world war.
- It is the only international organization dealing with the global rules of trades between nations.
- **Headquarter:** Geneva, Switzerland.

- Objective

- The **main objective** of the WTO is to ensure that trade flows as smoothly, freely and predictably as possible. It does this by facilitating the administration, implementation and operation of multilateral trade agreements and negotiations.
- Further, WTO handles trade dispute through its Dispute Settlement Body (DSB).
- It also helps in reviewing national trade policies. It provides technical assistance to developing countries on trade policy issues and through training programs.

- Structure

- The WTO has 166 members (166 members (Comoros and Timor Leste joined in MC13 (Feb2024)), accounting for 96% of the world trade. Around 25 others are negotiating members.
- **Ministerial Conference**
 - Top decision-making body
 - Meet atleast once every two years
- **General Council**
 - Below ministerial council
 - Includes ambassadors and heads of delegation in Geneva, but sometimes officials sent from members' capitals) which meets several times a year in the Geneva headquarter.
 - The general council also meets as Trade Policy Review Body and Dispute Settlement Body.
- **Goods Council, Services Council, TRIPS council** are at the next level and report to General Council.

- Basic Principles used in WTO Trading System

1. Trade without Discrimination (1. Most Favored Nation 2. National Treatment)

a. **Most Favored Nation (MFN): treating other people equally.**

- Under this country cannot normally discriminate between their trading partners.
- Grant someone a special favor (such as lower customs duty rate for one of their products) and you have to do the same for all other WTO members.
- In general MFN means that every time a country lowers a trade barrier or opens up a market, it has to do so for the same goods or services from all its trading partners.
- It is the first article of GATT, which governs trade in goods.

- **Exceptions -**
 - FTAs, developing countries, unfairly traded products, national security (Article XXI(b)).

b. National Treatment: Treating foreigners and locals equally.

- Imported and locally produced goods should be treated equally - at least after the foreign goods have entered the market. The same should apply to foreign and domestic services.

2. Free Trade: gradually, through negotiation

- a. **Goal:** Eventually removing custom duties (or tariffs) and measures such as import bans or quotas that restrict quantities selectively. From time-to-time red tape and exchange rate policies have also been discussed.
- b. **Negotiations**
 - Under GATT from 1947-48 to 1994 (8 rounds of negotiation)
 - **Now, Doha Round of Negotiation, the 9th round** is underway.

3. Predictability: Through binding and transparent policies

- Binding and transparent policy provides predictability which gives businesses a clearer view of their future opportunities. With stability and predictability investment is increased.

4. Promoting Fair Competition

- Many of the WTO agreements aim to support fair competition: in agriculture, intellectual property, services, for example.

1. Encouraging Development and Economic Reform

- For developing countries' need of flexibility, WTO agreements allow for special assistance and trade concessions.

A) WTO AGREEMENTS:

Uruguay round resulted into 20 agreements on which WTO was founded.

- Some of the Important Agreements were WTO Agreement, Agreement on Agriculture, Trade Related Intellectual Property Rights (TRIPS), Trade Related Aspects of Investment Measures, General Agreement on Trade in Services

WTO AGREEMENT

- WTO was established through this agreement. It is an umbrella agreement and other agreements are annex to this agreement.

AGREEMENT ON AGRICULTURE (AOA)

- It is aimed at establishing a fair and market-oriented agriculture trading system.
- It is based on **Special and Differentiated Treatment**.
- The agreement also has a **Special Safeguard Mechanism**

- This provides options to countries to impose additional duties on imported products when there is surge in imports or products are imported at lower price.
- The **Main component of AOA** are:

A. Market Access

- It calls for provision of access to imported agriculture goods in the member countries.
- There are two provisions - one is tariffication and Tariff reduction and another one is Minimum market Access.

B. Domestic Support or Domestic Subsidies

▪ **Introduction**

- Under WTO, subsidies are identified as boxes which are given the colors of traffic lights: Green (permitted), Amber (slow down - i.e., be reduced), red (forbidden).
- In Agriculture, things are, as usual, more complicated.
- The Agriculture Agreement has no red box, although domestic support exceeding the reduction commitment levels in the amber box is prohibited; and there is a blue box for subsidies that are tied to programmes that limit production. There are also exemptions for developing countries (sometimes called an "S&D box", including provisions in Article 6.2 of the agreement).

▪ **Amber Box**

- All domestic support measures considered to distort the production and trade (with some exceptions) fall into the amber box.
 - These include measures to support prices, or subsidies directly related to production quantities.
- This support is subjected to limits:
 - 5% of agricultural production for developed countries
 - 10% of agricultural production for developing countries
- Countries that had larger subsidies than the limits at the beginning of post-Uruguay Round reform period are committed to reduce.

▪ **India's Current Situation and Stand:**

- Under WTO law, MSP based subsidy is counted as a trade-distorting subsidy, and if given beyond the permissible limit, breaches WTO law. Currently, India has a temporary relief due to a 'peace clause' which bars countries from bringing legal challenges against price support-based procurement for food security purposes.
- However, a permanent solution to this issue is still not in offing.

▪ **Current Negotiations:** Key points that are being discussed are:

- How much further these subsidies should be reduced, and whether limit should be set for specific products rather than continuing with a single overall "Aggregate" limits.

- **Blue Box**

- This is the '**amber box with conditions**' - conditions designed to reduce distortion.
 - Blue box supports are subsidies that are tied to programmes that limit production by imposing production quotas or requiring farmers to set aside part of their land.
- Any support that would normally be in the amber box, is placed in the blue box if the support also requires farmers to limit production.
- At present, there is **no limit on spending** on the blue box subsidies.

- **Green Box**

- Green box subsidies must not distort trade, or at most cause minimal distortion. They have to be government funded (not by charging consumers higher prices) and must not involve price support.
- These include programs that are not targeted at a particular product, and include direct income support for farmers that are not related to current production level or prices.
- They also include environmental protection and regional development program.
- They are **allowed without limits**, provided they comply with policy specific criteria.
- The green box is defined in Annex 2 of the Agriculture Agreement.
 - E.g. Agriculture research, Training, Pest Control etc.

- **Special and Differentiated Treatment Box (S&D Box) Subsidies**

- Not available to developed countries.
- These include assistance which are essential for rural development and upliftment of poor farmers. These are government assistance to encourage agriculture and rural development which is in nature of rural development program of developing countries, agriculture investment subsidies which are generally available to low-income or resource poor producers in developing countries.

- **Agriculture Subsidies and India:**

- India has continuously come under attack from the US and other western countries for its MSP regime. India along with China have also retaliated regularly by demanding US and EU to give up their farm subsidies first which they have strategically covered under Green Box subsidy.
- India claims that it is unnecessarily targeted to deflect attention from the enormous subsidy package that developed markets such as US and EU offer in form of Green box subsidies. India have complained that green box subsidies also distort global trade by making agricultural production cheaper in developed markets.
- Further, India is demanding exemption for its food security initiatives which is another bone of contention at WTO.

- The above difference has become a **major factor for lack of progress in the WTO negotiation process.**

C. Export Subsidies

- Subsidies that subsidize exports are called export subsidies. These are direct subsidies given by government to producers of agricultural products against exports.
- Targets were set for its reduction with time frame both for developed and developing countries

B) SOME RECENT UPDATES

WTO PANEL RULES AGAINST INDIA IN IT TARIFFS DISPUTE WITH EU, OTHERS (APRIL 2023)

- **Background of the case:** In 2019, the EU challenged India's introduction of import duties of between 7.5% and 20% for a wide range of IT products, such as mobile phones and its components, as well as integrated circuits, saying they exceeded the maximum rate. Japan and Taiwan filed similar complaints the same year.
- **WTO panel verdict:**
 - A world trade panel ruled that India has violated global trading rules in dispute with EU, Japan and Taiwan. It has recommended India to bring such measures into conformity with its obligations.
- **India's Response:**
 - If India decides to appeal, the case will sit in legal purgatory since the WTO's appeal bench is no longer functioning due to US opposition to judge appointments.

C) DISPUTE SETTLEMENT SYSTEM AT WTO

- **Introduction**
 - The eight yearlong Uruguay Round negotiations (1986-1994) also resulted in the creation of the Dispute Settlement System (DSS) and the adoption of the Dispute Settlement Understanding (DSU) to govern the trade disputes between member states.
- The DSS process **comprises three stages:**
 1. Consultations between parties
 2. Adjudication by panels, or the Appellate body (if appealed);
 3. Implementation of the ruling, including the possibility of countermeasures if the losing party doesn't implement the ruling.
- WTO's **General Council** (which have representatives (ambassadors or equivalent) from all member states) also convenes as the Dispute Settlement Body (DSB) to deal with disputes between member countries.

- It is a political body and has been established to administer rules and procedure of the DSU and has been tasked with fulfilling various functions.
- It has the authority to establish dispute settlement panels, refer matter for arbitration, adopt panel, appellate body, and arbitration reports, maintain surveillance over the implementation of recommendations and rulings contained in such reports, and authorize suspension of concession in the event of non-compliance with those recommendations and rulings.
- **Appellate Body:**
 - It is a standing body of seven persons that hear appeals from reports issued by panels in disputes brought by WTO members. It can uphold, modify or reverse the legal findings and conclusion of a panel. The AB has its seat in Geneva, Switzerland.
 - **DSS rulings and recommendations are nearly automatically adopted** as it follows a "negative consensus based procedure" for establishing panels, and adopting panel and AB reports.
 - **Note:** All other decisions such as appointment of panel or appellate body (AB) members, are taken through positive consensus mechanism.

US' WITHHOLDING OF APPELLATE BODY APPOINTMENT AND ITS IMPACT

- **Why new members are not being appointed?**
 - **What concerns have USA raised?**
 - The Appellate body has treated USA in an unfair manner and overstepped vis-a-vis its mandate.
 - USA also want an unconventional set of reforms that aim to increase the control of member states over DSS decisions, thereby allowing them to bilaterally modify, review and delete parts of the rulings.
- **Other concerns related to DSS.**
 - **Inability to effectively deal with complex cases** involving trade obligations and human health, environment, sustainable development and technology on trade and commerce.
 - Other criticisms include the process being costly, too "legalistic" in its interpretation of obligations (without accommodating the interests of developing countries) and it is lengthy.
- **Adverse Impact of dysfunctional Dispute Settlement mechanism of WTO** -> Increase in number of pending disputes; threatens entire rule-based trading regime -> difficult for smaller countries to hold larger countries accountable; Reduces relevance of WTO; Hamper trade including food trade -> exacerbate hunger and erodes food producer's income; Unresolved trade dispute -> political tensions.

D) REPORT: WORLD TRADE REPORT

- An annual publication that aims to deepen understanding about trends in trade, trade policy, and multilateral trading system.

- **Key Highlights of World Trade Report, 2023**
 - The report examines how re-globalization - or increased international cooperation - could address the three major challenges facing today's global economy: national and economic security, poverty alleviation, and environmental sustainability.

E) WORLD TRADE STATISTICAL REVIEW

The report provides a detailed analysis of the latest developments in world trade. It is produced annually and has replaced International Trade Statistics, the WTO's former annual statistical publication.

F) WORLD TRADE BAROMETER

- It is a set of indicators to provide "**real-time**" information on trends in world trade.
- The **Goods Trade Barometer**, formerly the **World Trade Outlook indicator**, is a leading indicator that signals changes in world trade growth two to three months ahead of merchandise trade volume statistics.
- The **Services Trade Barometer** is a coincident indicator that illustrates the current state of services trade slightly ahead of official statistics.

7) WTO: 13TH MINISTERIAL CONFERENCE (FEB MARCH 2024)

- WTO's 13th Ministerial Conference (MC13) took place in Abu Dhabi, UAE from 26th Feb 2024 to 2nd March 2024.
- **Key Decisions:**
 - MC endorsed the accession to the WTO of two LDCs - **Comoros and Timor-Leste** as members of WTO.
 - **Some important outcomes:**
 - **Domestic Regulation of Services:** An important outcome of MC13 was an agreement reached to implement new disciplines for domestic regulation of services, integrating into WTO framework. These disciplines are designed to facilitate trade in services by streamlining and simplifying regulatory procedures.
 - **Least developing countries** continuing to get the benefits of LDC even three years after graduation.
 - Geneva commitment to revive the dispute settlement system by 2024 was reiterated.
 - Decision to improve the use of **special and differential treatment (S&DT) provisions**.
- **No decision on several key issues such as:**
 - **Finding a permanent solution to public stockpile**
 - **Curbing fishing subsidies that leads to over-capacity and overfishing:** India has been asking developed countries engaged in distant water fishing to stop providing any kind of subsidies for 25 years.
- **A number of Developing country demands remained unresolved:**

- **Lifting of moratorium on levying customs duty on e-commerce:** India along with several developing nations has been consistently seeking an end to the moratorium in place since 1998 on their ability to levy custom duties on cross-border e-commerce. India has argued that this undermines its ability to generate revenue from a rapidly burgeoning area of global trade. However, the members agreed to further extend the moratorium on imposing import duties on e-commerce trade for 2 more years.
- **Reconstitution of the WTO's dispute settlement appellate body**

8) INTERNATIONAL CRIMINAL COURT

- **Introduction**
 - » **ICC** is an Intergovernmental Organization and International tribunal that is designed to investigate and prosecute genocide, crimes against humanity, war crimes and crimes of aggression when domestic courts fail to do so. It thus complements existing national judicial systems and therefore only exercises its jurisdiction when certain criteria are met, such as:
 - when national courts are unwilling or unable to prosecute the criminal or;
 - when the UNSC or individual states refer investigations to court.
 - » It sits in **the Hague, in the Netherlands**.
 - » It began functioning on **1st July 2002**, the date that the **Rome statute** entered into force. The Rome statute is a multilateral treaty which serves as the ICC's foundational and governing document.
 - » **Note:** Not to be confused with International Court Of Justice (ICJ).
 - » **Note:** Judgments are final without appeal and binding upon the parties concerned.
- **Membership:**
 - » As of **March 2024**, **124 states** are parties to the Statute of the Court, including all the countries of South America, nearly whole of Europe, most of Oceania and roughly half of Africa.
 - **Armenia joined** ICC in 2023.
 - **Burundi** and **Philippines** were member states but later withdrew (in 2017 and 2019) respectively.
 - » **Another 31 countries** have signed but not ratified the Statute.
 - The law of treaties obliges these states to refrain from "acts which would defeat the objects and purpose" of the treaty until they declare that they don't intend to become a party to the treaty.
 - » **Four Signatories, Israel, Sudan, USA and Russia**, have informed the UN Secretary General that they no longer intend to become state parties and, as such have **no legal obligations** arising from their signature of the statute.
 - » **41 members of UN** have neither signed nor acceded to the Rome statute; some of them including India and China are critical of court.
- **Why has India not joined ICC?**
 - » The issue of State Sovereignty and national interests.
 - The ICC Chief Prosecutor has been given the power to initiate cases on her/his volition.
 - » **Definition of crimes** that come under ICC's jurisdiction.
 - For e.g. India has objected to the definition of **Crime Against Humanity (CAH)** during negotiations of the Rome Statute. India was not in favor of using 'widespread or

- systematic' as one of the conditions, preferring 'widespread and systematic', which would require a higher threshold of proof.
- Further, India wanted a distinction to be made between international and internal armed conflict.
 - India also wanted that use of nuclear weapons and terrorism should be included among the crimes under the purview of ICC but it wasn't.
- **Composition and Voting Power:**
- » **Assembly of State Parties:** It is the court's legislative and oversight body. It consists of one representative from each member state having one vote each.
- **Judicial Division**
- » The judicial division of ICC consist of **18 judges of the court**, organized into three chambers - the Pre-Trial Chamber, Trial Chamber and Appeals Chamber.
 - » **Judges are elected** by the Assembly of States Parties. They serve **9 year term** and are generally not eligible for re-election.
- **Relation with the UN**
- » It is independent from the UN. However, the Rome Statute grants **certain powers to UNSC**, which limits its functional independence.
 - E.g. : Article 13, allows the UNSC to refer to the court situations that would not otherwise fall under the court's jurisdiction (e.g. UNSC referred situation in Darfur and Libya to ICC)
 - » The court **cooperates with UN** in other areas including exchange of information and logistic support.
 - » The court also reports to the UN each year on its activities and some meetings of the assembly of states of parties are held at UN facilities.
- **Limitations of ICC**
- » **Doesn't have capacity to arrest suspects** and thus have to depend on member states for their cooperation.
 - » **3 P-5 UNSC members** are not part of it. China never signed and US, and Russia didn't ratify the Rome Statute
- **Criticisms**
1. **A tool for Western Imperialism** -> Has convicted leaders from small, weak states (mostly African). Therefore, ICC has been accused of bias and is being a tool of western imperialism.
 2. **Insufficient Checks and Balances:** USA claims that there are insufficient checks and balances on the authority of the ICC Prosecutor and judges and insufficient protection against politicized prosecutions or other abuses.
 3. **Imposition of a particular kind of ideology** - ICC has tended to impose ideas of liberal democracy on all states. This 'one size fits all' is not an effective solution.
- **Recent Developments**

A) ARMENIA JOINING ICC (2023)

- Armenia's Parliament votes to join the ICC (60-22 votes). Later, the Armenian President approved the Parliament's decision.
- **Geopolitical Impact:**
 - **Straining of ties with Russia:** The ICC has issued an arrest warrant for President Vladimir Putin of Russia over events in Ukraine. Countries that have signed and ratified the Rome Statute that created the ICC are bound to arrest Mr. Putin, who was indicted for war crimes connected to the deportation of children from Ukraine, if he sets foot on their soil.
 - Though Armenia has assured Russia that Mr. Putin wouldn't be arrested if he entered the country.

B) IN MARCH 2023, THE ICC HAS ISSUED AN ARREST WARRANT AGAINST VLADIMIR PUTIN ACCUSING HIM OF THE WAR CRIME OF ILLEGALLY DEPORTING HUNDREDS OF CHILDREN FROM UKRAINE.

- Russia has repeatedly denied its forces have engaged in war crimes, or forcibly taken Ukrainian Children.

C) SOUTH AFRICA WAS LOOKING FOR LEGAL OPTIONS IF RUSSIAN PRESIDENT VLADIMIR PUTIN ATTENDED THE 15TH BRICS SUMMIT IN SA.

- It is because SA is a member of ICC and thus is obliged to arrest Vladimir Putin if he came to South Africa.
- Note: Putin attended the summit virtually.

9) PERMANENT COURT OF ARBITRATION (PCA)

- **Introduction**
 - » Established by the Convention for the Pacific Settlement of International Disputes, concluded in the Hague in 1899 during the first Hague Peace Conference, it is an intergovernmental organization of 122 contracting parties, providing a variety of dispute resolution services to the international community.
 - » It is based in The Hague in The Netherlands.
 - » It is not a court in conventional understanding of the term but facilitates international arbitration to resolve disputes that involve states, state entities, intergovernmental organizations, private parties etc. by assisting in the establishment of arbitration tribunals and facilitating their work.
 - » It is not a UN agency but is an official UN observer.
 - » PCA is different from International Court of Justice which is housed in the same building, the Peace Palace in Hague.
 - People at large are more familiar with the ICJ than with PCA, partly because of the closed nature of the cases handled by PCA and due to small number of cases dealt with between 1946 and 1990. THE PCA's CASELOAD however, has increased since then.
 - » The PCA has a three-part organizational structure consisting of an Administrative Council that oversees its policies and budgets, a panel of independent potential arbitrators known as the Members of the Court, and its Secretariat, known as the International Bureau, headed by Secretary General.
- **Other Key features**

- » **International Offices:** Beyond its headquarters in the Peace Palace in Hague, the PCA has opened offices in various cities in order to make its services more accessible in different regions of the world [Buenos Aires, Mauritius, Singapore]
- » **Financial Assistance Fund:** This fund aims to assist developing countries meet part of costs involved in international arbitration or other means of dispute settlement offered by the PCA.

A) INDIA REITERATES ITS "CONSISTENT AND PRINCIPLED POSITION" THAT THE CONSTITUTION OF THE "SO-CALLED COURT OF ARBITRATION" IS IN CONTRAVENTION OF THE PROVISIONS OF THE 1960 INDUS WATER TREATY (JULY 2023)

- Hours after a Court of Arbitration (CoA) ruled that it has "competence" to consider matter concerning the Kishenganga and Ratle hydroelectric projects in J&K, a construction that Pakistan has opposed, India reiterated its position.
 - » **Background:** The World Bank had appointed Murphy as chairman of the CoA on October 17, 2022, after Pakistan sought such a Court to consider its concerns about the designs of Kishenganga and Ratle hydroelectric power projects.
 - » India has opposed the constitution of the CoA and contends that it is in contravention of the provisions of the Indus Waters Treaty. Till date, India has not exercised its right under Treaty to appoint two arbitrators to the CoA. New Delhi has not attended the court's proceedings and has sent its correspondence to World Bank
 - » **In the Award,** the Court carefully considered objections to the competence of the Court raised by India (by way of correspondence to World Bank). In a unanimous decision, which is binding on the Parties and without appeal, the Court rejected each of the objections raised by India and determined that the Court is competent to consider and determine the disputes set forth in Pakistan's Request for Arbitration.
- Ministry of External Affairs said that a Neutral Expert is seized of differences pertaining the two projects. Neutral expert proceedings are the only Treaty Proceeding at his juncture. The treaty doesn't provide for parallel proceeding on the same set of issues.

B) OTHER IMPORTANT RECENT CASES

- Italian Marine Case (2020)
 - » The PCA ruled that both India and Italy had concurrent jurisdiction in the matter but concluded that the Marine's immunity precluded India's Jurisdiction.
 - In India's favor, the Court found that the Italian vessel had violated the right and freedom of navigation of the Indian fishing vessel under UNCLOS and this action merited compensation.
- Bay of Bengal Maritime Boundary (Bangladesh vs. India) (2014)
- Mauritius vs United Kingdom (18th March 2015, ruled that the Chagos Marine Protected Area was illegal)
- Philippines vs China (July 2016 - no evidence that China had historically exercised exclusive control over the waters or resources)

10) INTERNATIONAL CRIMINAL POLICE ORGANIZATION (INTERPOL)

- **Introduction**
 - INTERPOL is world's largest international police organization, with 196 member countries.
INTERPOL facilitates international police cooperation.
 - **Vision:** "Connecting Police for a safer world"
 - **Mission:** "Preventing and fighting crime through enhanced cooperation and innovation on police and security matters".
 - **Headquarter:** "Lyon, France"
 - Work focuses mainly on
 - Public safety and battling terrorism
 - Crime against humanity
 - Environmental crime
 - Genocide
 - War crimes
 - Organized crimes
 - Piracy, illicit traffic in work of art
 - Illicit drug production
 - Drug trafficking
 - Weapons smuggling
 - Human trafficking
 - **Money laundering**
 - Child Pornography
 - White-collar crime
 - Computer crime
 - Intellectual Property crime
 - Corruption
- **Interpol Notice**
 - An Interpol notice is international alert circulated by Interpol to communicate information about crimes, criminals, and threats from police in a member state (or an authorized international entity) to their counterparts around the world.
 - There are eight types, seven of which are known by their color codes: Red, Blue, Green, Yellow, Black, Orange and Purple.
 - **Red Notice**
 - The most well-known notice is the Red Notice which requests (provisional) arrest of wanted persons, with a view to extradition. An Interpol notice is "*the closest instrument to an international arrest warrant in use today*. (Interpol **does not have the authority to issue arrest warrants** in the formal sense of the word, as this is the domain of the sovereign member states.)
 - **A Blue Corner Notice** is issued by the international police cooperation body to collect additional information from its member countries about a person's identity, location, or activities in relation to a crime.

A) 91ST GENERAL ASSEMBLY OF INTERPOL

- About General Assembly: It is INTERPOL's supreme governing body and comprise of delegates appointed by the governments of our countries. It meets once a year and takes all the major decisions affecting general policy, the resources needed for international cooperation, working methods, finances and programmes of activities.
- **Key Highlights of 91st assembly in Vienna**
 - » Resolution was passed to strengthen the collaborative response to disrupt financial crime and corruption, combat online sexual exploitation, and promote diversity within interpol itself.
 - » The delegation supported the adoption of Interpol's Vision 2030 and the establishment of the Interpol Future Council.

Other Important initiatives by Interpol

1. Global Focal Point Initiative

- To trace, seize and return stolen public funds to the country of origin.

11) INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

- **Beginning:**
 - It is the world's **center of cooperation in nuclear field**. It was set up as world's "Atoms of Peace" organization in 1957 within the UN family. Though established independently of the United Nations through its international treaty, the IAEA statute, the IAEA reports to both UNGA and Security Council.
- **Objective / Purpose:**
 - It serves as an **intergovernmental forum for scientific and technical cooperation in the peaceful use of nuclear technology** and nuclear power worldwide.
 - It seeks to further inhibit the use of nuclear for military purpose, including nuclear weapons.
- **IAEA SAFEGUARDS**
 - It is a system of inspection and verification of the peaceful use of nuclear materials as part of Nuclear Non-Proliferation Treaty, supervised by IAEA.
- **Some Conventions**

A) CONVENTION ON SUPPLEMENTARY COMPENSATION FOR NUCLEAR DAMAGE

- Introduction

1. It recognizes the importance of the measures provided in the Vienna Convention on Civil Liability for Nuclear Damage and Paris Convention on Third Party Liability in the field of nuclear energy as well as in national legislation on compensation for nuclear damage consistent with the principle of these conventions.
2. It desires to establish a worldwide liability regime to supplement and enhance these measures with a view to increasing the amount of compensation for nuclear damage.

3. This worldwide liability regime would further encourage regional and global cooperation to promote a higher level of nuclear safety in accordance with the principles of international partnership and solidarity.

- Other details
 1. CSC allows for increasing the compensation amount in the event of a nuclear incident through public funds pooled in by contracting parties based on their own installed nuclear capacities.
 2. Entered into force on 15th April 2015.
- India ratified the convention in Feb 2016.

12) WORLD ECONOMIC FORUM (WEF)

- **Introduction**
 - WEF is a Swiss nonprofit foundation, based in Cologny, Geneva. Recognized by Swiss authorities as the international institute for public private cooperation, its mission is cited as "committed to **improving the state of the world** by engaging business, political, academic, and other leaders of society to shape global, regional, and industry agendas".
 - It is best known for its annual meeting at Davos (Switzerland).

B) 2024 ANNUAL MEET AT DAVOS (JAN 2024): KEY HIGHLIGHTS

- **Artificial Intelligence (AI)** took centre stage at this years WEF meet. Both its' positive and negative sides were discussed.
- **War and Uncertainty:** Fragile geopolitical situation in various parts of the world is threatening global supply chain and causing uncertainty around food security.
- **Need for businesses to adapt to climate and united action against climate** was another important area.
- **India's bright prospects** and **China's slowing economy** was another area of discussion
- **Investment in women's health** could boost global GDP by USD 1 trillion annually by 2040.
- **Announcement of the launch of 'Global Good Alliance for Gender Equity and Equality'**: It was launched with the support and endorsement of WEF and Government of India.
 - The objective of the alliance is to bring together global best practices, knowledge sharing and investment in the identified areas of women's health, education and enterprise.

C) KEY REPORTS BY WEF

Report	Period (last published)	India's ranking	Comments
Global Risks Report	Annual (Jan 2024)		See details below
Travel and Tourism Competitive Index	Biannual (2022)	54th/117 (eight lower than 2019)	Japan, the USA, Spain, France and Germany are at <u>top of the list</u> .

Global Competitiveness Index	Annual (2023)	40/134	The report ranks countries on <u>their ability to attract, develop and retain skilled people.</u> Switzerland, Singapore and the US are the top ranked countries
Global Gender Gap	Annual (June 2023)	127/146	Details below
Energy Transition Index	Annual (2023)	67th/140	The Energy Transition Index, <u>which benchmarks 120 countries on their current energy system performance and on the readiness of their enabling environment, finds that while there has been broad progress on clean, sustainable energy, there are emerging challenges to the equity of the transition – just, affordable access to energy and sustained economic development</u> – due to countries shifting their focus to energy security
Future of Growth Report, 2024		Global average score is <u>52.8</u> (100 is best score) India's score is <u>51.2</u> .	The report introduces a <u>multi-dimensional framework</u> to assess the quality of economic growth across <u>107 countries globally</u> . Nation's economic growth is measured across <u>four pillars</u> - Innovativeness; inclusiveness; Sustainability; and Resilience.
Future of Jobs Report, 2023	Annual (2023) 4th edition		The report explores <u>how jobs and skills will evolve over the next five years</u> . Economic, health and geopolitical trends have created divergent outcomes for labour markets globally in 2023 Technology adoption will remain a key driver of business

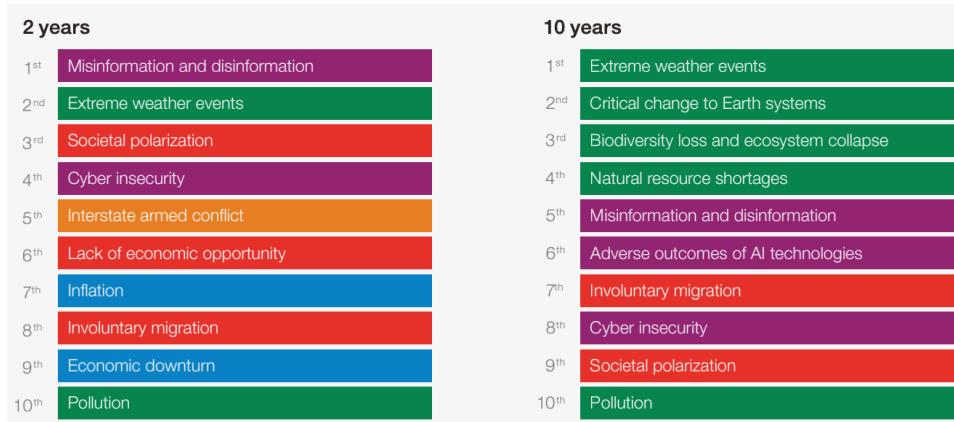
			transformation in the next five years Within technology adoption, big data, cloud computing and AI feature highly on likelihood of adoption
Global Cooperation Barometer 2024	Note: Released by <u>WEF</u> in collaboration with <u>McKinsey & Company</u> .		It is meant to serve as a tool for leaders to better understand the contours of cooperation broadly and along five pillars – trade and capital flows, innovation and technology, climate and natural capital, health and wellness, and peace and security

D) GLOBAL GENDER GAP REPORT, 2023

- GGG Report benchmarks 146 countries on their progress towards gender parity across four thematic dimensions:
 - i. Economic Opportunities
 - ii. Political Empowerment
 - iii. Educational Attainment
 - iv. Health and Survival
- **Key Highlights: 2023 Report**
 - Iceland (91.2%), Norway (87.9%) and Finland (86.3%) are the best performing countries
 - **India's rank is 127/146 countries (improvement from 135 last year)**
 - India performance badly in Economic Participation and Opportunities (36.7%) and Parity on Political Empowerment (25.3%).

E) GLOBAL RISK REPORT, 2024

- Global Risk Report is an annual study published by WEF ahead of its annual meet at Davos, Switzerland.
- The report describes changes occurring in the global risks landscape from year to year and identifies global catastrophic risks.
- **2024 Report: Key Highlights**
 - **Global Short-term and long term risks:**



- **Most Important Risk for India**

- **Misinformation and disinformation (MI); Infectious disease; Illicit Economic Activity; Inequality (Wealth and Income); and Labour shortage**

13) INTERNATIONAL WHALING COMMISSION

- International Whaling Commission is an inter-governmental organization whose purpose is the conservation of whale and the management of whaling to allow orderly development of whaling industry.
- The legal framework of the IWC is **the International Convention for the regulation of Whaling**.
 - The convention was established in 1946, making it one of the first pieces of international environmental legislation.
 - All member countries of IWC are signatories of this convention.
- Currently (Aug 2023) IWC has 88 members.
- The **legally binding schedule** of the convention sets out specific measures that the IWC has collectively decided to be necessary in order to regulate whaling and conserve whale livestock.
- These measures include
 1. **catch limits** (which may be **zero in the case of commercial whaling**) by species and area.
 2. **Designating specified areas as whale sanctuaries**,
 3. Protection of calves and females accompanies calves etc.
- The commission also **coordinates and funds conservation work** including research related to conservation.
 - **India joined the IWC in 1981**.
- **Important countries which are not members**
 - Canada (left in 1982), Venezuela (left in 1999), Egypt (left in 1989), **Japan (left in 2019)**.
- **Key Efforts**
 - In 1982, the IWC adopted moratorium on commercial whaling.
 - Countries like Russia and Japan had opposed it.
 - In 1994, the Southern Ocean Whale Sanctuary was created by the IWC.
- **Other facts**
 - The IWC allows whaling quotas for aboriginal subsistence and also member nations can issue 'Scientific permits' to citizens.

14) STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE (SIPRI)

- **About SIPRI**
 - » It is an international institute based in Stockholm, Sweden, dedicated to research into conflict, armaments, arms control, and disarmament.
 - » It was established in 1966. It provides data, analysis and recommendations to policy makers, researchers, media, and the interested public.
 - » Its **funds** are mostly drawn from governments and independent philanthropic organizations around the world. It also receives annual support from Swedish government.

A) SIPRI REPORT (MARCH 2024)

- India remained the world's largest arms importer and its imports increased by 4.7% (between 2014-18 to 2019-23)
 - **Russia (36%)** continues to be India's main arms supplier. But this was the first five year period since 1960-64 when deliveries from Russia (or USSR) made up less than half of India's arms import.
- **Saudi Arabia** is the world's 2nd largest arms importer.
- **Pakistan** has significantly increased its arms import (by around 45%).
- **China's arms import shrank by 44%**, mainly as a result of substituting imported arms, with locally produced systems.

B) SIPRI YEAR BOOK (JUNE 2023)

- **9 Nuclear armed states** are continuing to expand and modernize their nuclear arsenal.
- **Total nuclear warheads** in the world is estimated at 12,512 in Jan 2023.
- **Russia and USA** have 90% of all nuclear weapons.
- **Transparency and dialogue** regarding nuclear weapons and forces between Russia and USA have declined.
- **India:**
 - **Nuclear arsenal** has expanded from 164 in 2022 to 164 in 2023.
- **China** has 410 warheads in Jan 2023 (from 350 warheads in Jan 2022)

5. COMPREHENSIVE AND PROGRESSIVE AGREEMENT TRANS-PACIFIC PARTNERSHIP – CPTPP (EARLIER NAMED TPP)

- **Why in news recently?**
 - » The UK has reached an agreement in principle to join the CPTPP. (March 2023)
- **Introduction**

- » CPTPP is a free **trade agreement** between **11 Pacific Rim countries** (US is no longer part of TPP). It was signed in Santiago, Chile.
- » **Aims/Goals:**
 - Create a new single market (something like EU) -> Deepen economic ties, slash trade barriers, and thus increase trade and economic growth in the region.
 - Establish a common framework for **intellectual property**.
 - Enforce standards for labour law and environmental law.
 - Establish an **investor state dispute settlement**.

- **USA's withdrawal from TPP:**
 - » The earlier proposal of TPP which was signed on 4th Feb 2016 in Auckland, New Zealand, couldn't be ratified because of the withdrawal of USA on 23 January 2017.
- **Countries Participating:** Canada, **USA**, Mexico, Peru, Chile, Japan, Vietnam, Malaysia, Singapore, Brunei, Australia and New Zealand..



- **CPTPP Commission** was established when the CPTPP entered into force on 30th Dec 2018. It has representative from all 11 members and is the decision making body of the CPTPP.
 - The first meet of CPTPP took place Jan 2019, in **Tokyo, Japan**.
- **Significance**
 - Covers 15% of world's GDP (with UK)
 - In addition to tariff cuts, the CPTPP include **high standards on environment and labor laws, IPR regime, e-commerce** etc.
 -
- **Supporters' Argument**
 - The pact would boost growth in Asia Pacific Economies.
 - It would unlock opportunities and address vital 21st century issues within the global economy.

15) BRITAIN HAS AGREED TO JOIN THE CPTPP, A TRADE PACT BASED AROUND THE PACIFIC RIM, AS IT SEEKS TO BUILD TIES AROUND THE WORLD AFTER LEAVING EUROPEAN UNION.

- The UK and the present members formally signed an accession protocol on 16th July 2023 and will join the agreement when it has been ratified by all parties, or after 15 months if the UK and the majority of CPTPP parties ratify.

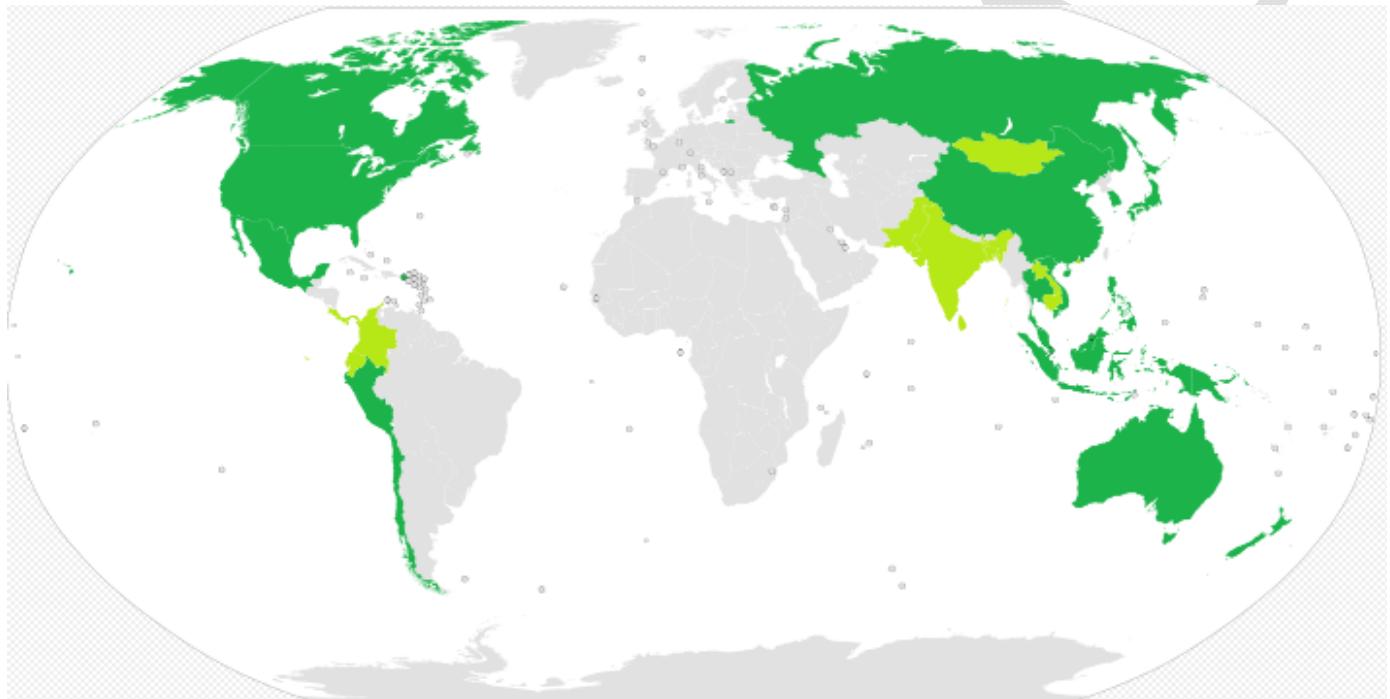
- Britain will become the 12th member and will be the first one to join the partnership since its inception.
- **Economic Benefits for UK**
 - Tariff free trade with a number of countries with which Britain doesn't have FTA.
 - CPTPP doesn't have single market for goods and services, and so regulatory harmonization is not required, unlike the EU, whose trading orbit Britain left at the end of 2020.
- **Other reasons for Britain to Join:**
 - While the economic benefit for Britain may be modest, Britain has geo-political reasons for joining the bloc. Joining CPTPP could enable the UK to enhance ties with like-minded countries to protect a free and open Indo-Pacific Region.
 - » In the context of growing tensions with China, defined as an 'epoch-defining challenge' in the recent refresh of the Integrated Review, strengthening relations with allies in the region has become increasingly important.
- **Note:** China has also applied to join CPTPP

6. APEC (ASIA PACIFIC ECONOMIC COOPERATION)

- **Introduction**
 - Asia Pacific Economic Cooperation (APEC) is a forum for 21 Pacific Rim member economies that promotes free trade throughout the Asia Pacific region.
 - **Establishment:** In 1989
 - in response to the growing interdependence of Asia-Pacific economies and the advent of regional trade blocs in other parts of the world (EU and North America FTA)
 - In response to fear that highly industrialized Japan (a member of G7) would come to dominate economic activities in the Asia Pacific region;
 - To establish new markets for agricultural products and raw materials beyond Europe.
- **Member Economies**
 1. Currently has 21 members, including most countries with coastline on the pacific ocean. However, the criterion for membership is that the member is a separate economy, rather than a state. As a result, APEC uses the term member economies rather than member countries to refer to its members.

Member Economies	Observers
1. Russia 2. People's Republic of China 3. Hongkong 4. Republic of China (Taiwan) 5. Japan 6. South Korea 7. Vietnam 8. Thailand 9. Malaysia 10. Singapore 11. Indonesia	22. ASEAN 23. The Pacific Island Forum 24. Pacific Economic Cooperation Council

- | | |
|---|--|
| <p>12. Phillipines
 13. Brunei Darussalam
 14. Papua New Guinea
 15. Australia
 16. New Zealand
 17. Canada
 18. USA
 19. Mexico
 20. Peru
 21. Chile</p> | |
|---|--|



2. Possible Enlargement

1. India has requested membership of APEC, and received initial support from USA, Japan and Australia.
 - But, China has remained opposed to India. And since, the APEC works on a consensus model, even one country opposing India's membership becomes an hindrance.
 - Following reasons are given for not admitting India:
 - **Extra-regional status:** India doesn't border pacific ocean, which all current member do
 - Opposition by some members due to India's record on economic reforms and WTO engagement.
 - India was invited to be an observer for the first time in November 2011.
2. Other countries seeking membership
 - Pakistan, Bangladesh, Sri Lanka, Macau, Mongolia, Laos, Cambodia, Costa Rica, Colombia, Panama, and Ecuador.

7. USMCA

- **Background: North America Free Trade Agreement (NAFTA)**
 - » NAFTA was a **trilateral agreement between Canada, USA, and Mexico** for creation of a **trade bloc in North America**. The agreement **came into force in 1994**. It was focused on eliminating barriers of trade and investment between US, Canada, and Mexico.
- » **Impact of NAFTA**
 - Most economic analyst believe that NAFTA has been very **beneficial for North American economies and the average citizen** but harmed a small minority of workers in industries exposed to trade competition.
- » **Contentious Issues - Maquiladoras**
- » Former President Trump in his election campaign in 2016 had criticized NAFTA and had called it "single worst trade deal ever approved in the US". Thus, soon after his election, a renegotiation of NAFTA started.
- » In Dec 2019, a trilateral United States Mexico Canada Agreement was finalized to replace the 25 year old NAFTA.
- **USMCA**
 - » It came into force in 2020.
 - » The new deal gives the **US greater access to the dairy markets of Canada and Mexico**, and allows extra imports of Canadian car.
 - » **Minimum wage provisions for auto workers**
 - 40% of the car parts of vehicles produced in the three countries must be made in North America, paying wages of \$16 an hour.
 - US expects that this will reduce the export of Jobs from US to Mexico where labor cost is less compared to US.
 - » **USMCA put the condition** that for a vehicle to qualify for zero tariff, 75% of its content must be from North America. (Under NAFTA this threshold was 60%)
 - » USMCA also contains **stronger protection for workers**, tough new **environmental rules**, and updates the trade relationship to **cover the digital economy and provides "ground breaking" intellectual property protections**.
 - » There are provisions to prevent manipulation of the trade rules, including covering currency values, and controls over outside countries trying to take advantage of the duty-free market.

8. EURASIAN ECONOMIC UNION

- **Introduction:**

- EEU is a **political, military and economic union** of states primarily located in northern Eurasia [Eastern Europe, Western Asia and Central Asia]. It consists of **five members**: Russia, Belarus, Armenia, Kazakhstan and Kyrgyzstan.
- In theory, the EEU is an **ambitious project for economic integration** in the former soviet region.
- It has its own institutions, mirroring that of the EU.
 - It includes **Eurasian Economic Commission** in Moscow as its regulatory body, and a **Court of the Eurasian Economic Union** based in Minsk.
- Came into existence on 1st Jan 2015.
- **Aim**
 - **Free movement** of goods, services, capital and people
 - **Common Policy**: Provide common transport and agriculture policy.
 - **Long term aims**: Common currency and common customs like EU.
- **Impact**:
 - Reality of integration between five member states is cumbersome and patchy.



- **India and EEU**

- In Dec 2016, negotiations started for an FTA between India and EEU. However, the talks haven't progressed much.

- **Russia continues to pressure Uzbekistan to Join EEU (2021)**

- In Dec 2020, Uzbekistan got the observer status.
- It plans to commit to half of the EAEU's requirements and technical standards for products exported to the Union market.
 - The government has also directed several agencies to draft national document to align with 26 EAEU technical regulations for common market products.



9. G20

- **Introduction**

- » The Group of Twenty (also known as G-20 or G20) is an international forum for the governments, finance ministers and the central bank governors from 20 major economies.
- » It was **founded in 1999** as an informal forum of Finance Ministers and Central Bank Governors of its members to meet annually, with the aim of studying, reviewing, and

promoting high level discussion of policy issue pertaining to the promotion of international financial stability.

- » It's agenda was **expanded in 2008** with the inclusion of the head of government in the meet. After this first summit it replaced the G8 as the main economic council of the wealthy nations.
- » G-20 in the current form is the child of 2008 global financial crisis.
- » Please note that G20 is an informal grouping and thus it doesn't have permanent secretariat/staff. **Rather, G20 presidency rotates annually** among members and is responsible for bringing together the G20 agenda, organizing its workings and hosting summits.

- **Members**

- » **19 countries, EU and African Union**
 - Canada, US, Mexico, Brazil, Argentina, UK, France, Germany, Italy, Turkey, South Africa, Saudi Arabia, Russia, China, India, Japan, South Korea, Indonesia and Australia.
 - EU is represented by European Commission and European Central Bank.
 - **Note:** In the 2023 summit in Delhi, inclusion of African Union has been agreed upon.
- » **The UN, IMF and WB** also attend G20 meet.
- » **Spain** is a permanent guest invitee at the summit.

- **Objectives:**

- » Policy Coordination between its member countries in order to achieve global economic stability, sustainable growth.
- » To Promote Financial Regulations that reduce risks and prevent future financial crisis.
- » To Create a new international financial architecture.

- **Significance of G20**

- » G20 has emerged as the premier forum of international economic cooperation, a sort of mini-UN, towards building an open world economy. G20 got its reputation because of its ability to restore stability in the global financial system after the 2008-09 crisis.
- » Discussions and agreements at G20 helps in reshaping the governance of global finance. It has enabled work towards reform of IMF, WB and United Nations as all the major world economies are represented here.
- » The member countries (before addition of AU) represent 90% of the Gross World Product, 80% of the trade, 2/3rd of the World Population and approximately half of the world land area.
- » When global governance in general are continuing to reflect the power equations at the end of World War - II, the G20 is a recognition of the changed realities and has given a place at the international high table to emerging powers.

16) 2023 G20 SUMMIT: INDIA

- **India's Presidency Theme** was "Vasudhaiva Kutumbakam" which means "the world is one family".
- **Key Outcomes:**

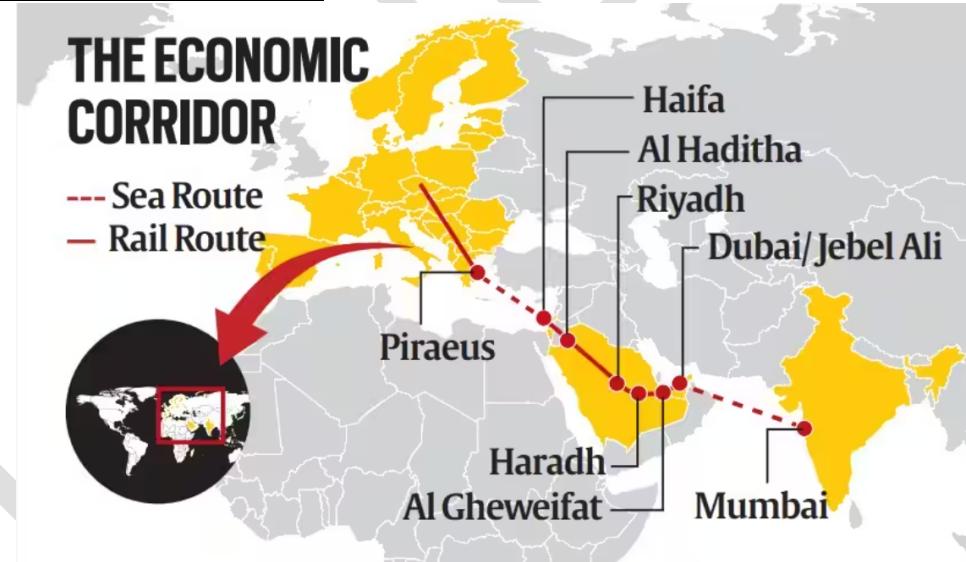
- **New Delhi Declaration:** The G20 has adopted a consensus declaration with following highlights:
 - **On Ukraine War:**
 - All states must act in a manner consistent with purposes and principles of UN charter in its entirety.
 - They must refrain from threat or use of force to seek territorial acquisition against territorial integrity and sovereignty or political independence of any state. States must also refrain from use of or threat of use of nuclear weapons.
 - Peaceful resolution of conflicts and efforts to address crisis as well as diplomacy and dialogue are critical.
 - "Today's ERA must not be of war."
 - **On Grain/Food/Energy Security:**
 - The declaration calls on Russia and Ukraine to ensure unimpeded delivery of food and fertilizer inputs from Russia and Ukraine.
 - **On Economies and Financial Market:**
 - It endorses financial board's high level recommendations for regulation, supervision and oversight of Crypto-assets, activities..
 - Renew our commitment to ensure a level-playing field and fair competition by discouraging protectionism, market distorting practices.
 - **On Climate Change:**
 - Notes that there is a need to accelerate efforts to phase down unabated coal power, in line with national circumstances.
 - The declaration noted that \$5.8-5.9 trillion in pre-2030 period is required by developing countries, in particular for their needs to implement their emission targets.
 - **On Global Debt Vulnerability:**
 - It committed to promoting resilient growth by urgently and effectively addressing debt vulnerabilities in developing countries.
 - **Health:** It remains committed to strengthening global health architecture.
 - **Terrorism:** It condemns terrorism in all its forms and manifestations, including those on the basis of xenophobia, racism, and other forms of intolerance, or in the name of religion or belief, recognizing the commitment of all religions to peace.
- **Announcement of G-20 decision to include the 55-nation African Union**, the second regional bloc to join the G-20 after the EU.
 - With this, the future summits in Brazil and South Africa is expected to take India's Global South Initiative forward.
 - The move help tilt the balance within G-20 away from Power-11 of the geopolitical powers, the G7, Australia, the EU and the Russia and China combined to the Developing 10 (Argentina, Brazil, Mexico, African Union, South Africa, Turkey, Saudi Arabia, India, South Korea and Indonesia) who make up rest of the member.
- **Finance Track of India's G20 Presidency** also paved the way for coordinated global approach to regulating cryptocurrencies, strengthening multilateral development banks' lending capacity and

replicating the use of digital public infrastructure like the India Stack to expand financial inclusion around the world.

- Announcement of India-Middle East - Europe Economic Corridor (IMEE EC) to strengthen economic connectivity between India-West Asia and Europe.
- Launch of Global Biofuel Alliance on the sidelines of G20 summit.

17) INDIA MIDDLE EAST EUROPE ECONOMIC CORRIDOR (IMEE EC)

- It was announced by PM Modi during the G20 Summit in India in 2023
 - India, USA, UAE, Saudi Arabia, France, Germany, Italy and the European Union Commission have signed MoU to establish IMEE EC.
- It entails an ambitious project that could leverage railway tracks and shipping corridors to help physically link up a vast stretch of the Eurasian subcontinent and in the process improve digital connectivity and catalyze trade among countries including energy products including Green Hydrogen.
- It will consist of **two separate corridors:**
 - **East Corridor** connecting India to West Asia/ Middle East
 - **Northern Corridor** connecting West Asia/Middle East to Europe
 - i. It involves laying of a railway link through the Arabian Peninsula that could then link up with shipping passages to India and Europe on both ends.
- The initiative is jointly spearheaded by the US and India, and spans India, UAE, Saudi Arabia, Jordan, Israel, and the European Union.



- **Significance:**
 - **Impetus to Economic Development**
 - **Strategic Significance:** ideological alternative to China's BRI.
 - Reduce dependency on Suez Canal
- **Official Timeline and Funds** have not been detailed about.

18) GLOBAL BIOFUEL ALLIANCE

- Launched during the sidelines of G-20 Summit in Delhi in 2023 by PM Modi and a host of global leaders including US President Joe Biden, Brazilian President Lula da Silva, Bangladesh PM Sheikh Hasina and Italian Prime Minister Giorgia Melon.
- **Initiating members** include USA, Brazil, Argentina, Italy, South Africa, Mauritius, UAE, India and Bangladesh.
 - **Observer Countries:** Singapore and Canada.
- Other G-20 countries have been urged to join the initiative.
- **The alliance is aimed at facilitating global cooperation in increasing the sustainable production and use of biofuels across the sector.**
 - Its focus is on strengthening market, facilitating global biofuel trade, developing concrete policy lesson-sharing and providing technical support for national biofuel program worldwide.
 - **Target:** Take ethanol blending with petrol globally to 20%.
- The Alliance mirrors International Solar Alliance (ISA) which aims to bring clean and affordable solar energy within the reach of all.

10.G7

- **Introduction**
 - » The Group of Seven is a group consisting of Canada, USA, UK, France, Germany, Italy and Japan. It is an informal forum of leading industrialized nation/ seven major advanced economies as reported by IMF.
 - » The European Union is also represented within the G-7.
- **Beginning**
 - » **World Economic** Summit, which later became the G7, was launched in 1975 by former French President Valery Giscard. Initially there were **6 members (G6)** and heads of government/state of USA, UK, Germany, France, Italy and Japan met for a fireside chat at Rambouillet Castle in France. The participants exchanged ideas on the economic problems of the 1970s.
 - » **In 1976**, Canada joined as the 7th member.
 - » In the 1980s, the interest of G7 expanded to include foreign and security policy issues. The Soviet General Secretary Mikhail Gorbachev was invited to talks on the sidelines of the London Summit in 1991.
 - » **In 1998**, Russia became a member and the **G8** was constituted.
 - » **Russia was thrown out of the group** after its violation of Ukraine's Sovereignty and territorial integrity in 2014.
- Canada became the 7th member in 1976.
- **Purpose**
 - » Discuss the **current world issues** (dominated in 1975 by the oil crisis) in a frank and informal manner -> Economic, foreign and security issues.
- **Criteria**
 - » A very high net national wealth.

- » A very high HDI.
- **Economic Strength**
 - The G7 countries represent more than 64% of the net global wealth; 10% of the world's population; 31T of the global GDP and 21% of the CO2 emissions.

19) 49TH SUMMIT: MAY 2023: HIROSHIMA, JAPAN

- **India, Australia, Brazil** etc. were also invited to the summit.
 - » India gave 10-point action plan to combat challenges associated with food, health, and other development related problems.
- **Major outcomes of the summit:**
 - » **Decision to set up "Coordination Platform on Economic Coercion"** to counter the attempt to "weaponize" trading and economic dependencies in the "critical emerging technologies such as micro-electronics".
 - » **Decision for Development and Adoption of International Technical Standards** for "trustworthy" AI.
 - » **Net Zero by 2050:** Members pledged to achieve net zero by 2050 to fight climate change.
 - » The summit produced Hiroshima Action Statement on Food Security.

20) G7'S COMMITMENT TOWARDS CARBON-FREE ELECTRICITY PRODUCTION (APRIL 2023)

- » **G7 Climate and Energy Ministers and envoys** have committed to ensuring carbon-free electricity production by 2035 and accelerating phase out of coal. The agreement was made at Sapporo, Japan, ahead of the G7 summit in Hiroshima in May 2023.

11.G77

- Group of 77 at the United Nations is a loose coalition of developing countries, designed to promote its members' collective economic interests and create an enhanced joint negotiation capacity in the UN.
- **Membership**
 - There were 77 founding members of the organization, but the membership since expanded to more than 130 member countries.
- **China has never officially joined** but provides consistent political support and financial donation to the G77.

12.SCO

- **Introduction: 9 Members**
 - » The SCO is a Eurasian political, economic and security organization which emerged from Sanghai Five (China, Russia, Kazakhstan, Kyrgyzstan, and Tajikistan) that was founded in 1996 after demarcation of China's border with four newly independent states that appeared after collapse of the Soviet Union in 1991. Shanghai five was supposed to serve as a platform for political, economic, cultural and security cooperation.

- » This was transformed into today's SCO with the induction of **Uzbekistan** as a new member at the Shanghai summit in 2001; **India & Pakistan** in Astana summit in 2017; and **Iran** in 2023 summit.
- **Members**
 - » **Member States (Important for pre):**
 - China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, India, Pakistan and Islamic Republic of Iran.
 - Belarus has also started the process of joining SCO.
 - » **Observers:**
 - Afghanistan, Belarus and Mongolia
 - » **Headquarter**
 - Beijing, China
 - » **Official Language:** Russian and Chinese
 - » **Objectives**
 - SCO's objectives are centered around **security related concerns**, military cooperation, intelligence sharing, and counterterrorism.
- **Activities**
 - Cooperation on Security
 - Military Activities:
 - Economic Cooperation
 - Connectivity
 - Cultural Cooperation

21) SCO SUMMIT, 2023

- It was hosted by India and was a virtual summit.
- During this summit, Iran officially joined as the 9th member.
- The **theme** of India's chairmanship of SCO is '**Towards a SECURE SCO**', which was an acronym given by PM Modi in 2018 summit in Qingadao.
 - » S: Security, E: Economic development, C: Connectivity, U: Unity, R: Respect for sovereignty and territorial integrity, E: Environmental protection
- **Key Highlights:**
 - » **New Delhi Declaration** - It calls for international communities to come together to counter the activities of terrorist, separatist, and extremist group.
 - » **Five new pillars of cooperation** has been identified: Startups and Innovation; Traditional Medicine; Youth Empowerment; Digital Inclusion; Shared Buddhist Heritage.

13. QUAD

- QUAD, also known as the Quadrilateral Security Dialogue, is a strategic forum comprising of four nations: United States, Japan, India, and Australia.
 - » The idea of the Quad was first proposed by the Japanese Prime Minister Shinzo Abe in 2007 as a response to China's growing assertiveness in the Indo-Pacific region. However, the initiative did not gain much momentum at that time.

- **The Quad was revived in 2017** and has since gained momentum, with the four countries holding regular meetings at various levels, including at the leaders' level. The Quad is primarily focused on security issues in the Indo-Pacific region, such as **maritime security, counterterrorism, and cybersecurity**, as well as economic and humanitarian issues.

22) QUAD SUMMIT, 2023 (FIFTH SUMMIT, HIROSHIMA)

- **Infrastructure:**
 - » **Quad Infrastructure Fellowship:** The program will provide at least 1,800 scholarships, work exchanges, and other executive programs to government officials on best practices surrounding the design, delivery, and management of high-standard infrastructure projects.
 - » **Quad Partnership for Cable Connectivity and Resilience:** It will bring together public and private sector to address gaps in infrastructure and coordinate on future builds.
- **Investment:**
 - » **Quad Investment Network (QUIN):** a network of investors and executives across Quad countries that seeks to foster co-investment in critical technologies. The QUIN will facilitate access to capital and facilitate technology partnerships through the establishment of an Advisory Board of business leaders and expert working groups to advance the prosperity and security of the Indo-Pacific Region.

14. PARIS CLUB

- **Why in news?**
 - » Sri Lanka reaches agreement with India, Paris Club on debt treatment (Nov 2023)
- **Details**

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.

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.

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

» **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.

15. SAARC

- **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.
- 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.

- **Summits**

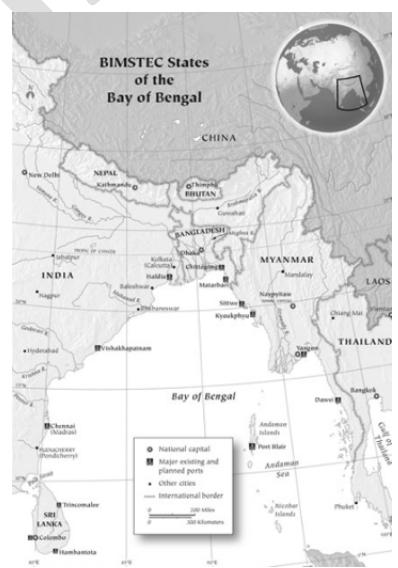
- The first SAARC Summit took place in Dhaka in 1985, and there have been 18 summits since then.
- However, the organization hasn't had a smooth sail, with many summits getting postponed for political reasons, either bilateral or internal.
 - **18th SAARC summit** was held in Kathmandu in November 2014
 - **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.

16. BAY OF BENGAL INITIATIVE FOR MULTI-SECTORAL TECHNICAL AND ECONOMIC COOPERATION (BIMSTEC)

- **Introduction:**

- 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 BIST-EC - Bangladesh-India-Sri Lanka - Thailand Economic Cooperation) through the **Bangkok declaration**. It was later rechristened as BIMSTEC.
 - It is headquartered in Dhaka.

- **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 has based on two basic principles.

- To respect the principle of sovereign equality, territorial integrity, political independence, non-interference in internal affairs, peaceful-coexistence, and mutual benefits.
- **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 **15 priority sectors** such as Transport and Communication, Tourism, Trade, Environment & Disaster Management, Public Health Agriculture etc. and focus on cooperating here.
 - Each sector is led by a member country. (For e.g., India leads transport and communication, tourism, counterterrorism, and trans-national crimes, environment and disaster management.)

- **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

1) 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.
 - » It was preceded by 18th BIMSTEC Ministerial meeting and the 22nd BIMSTEC Senior Officials' meetings.
 - » It was held under the **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.**

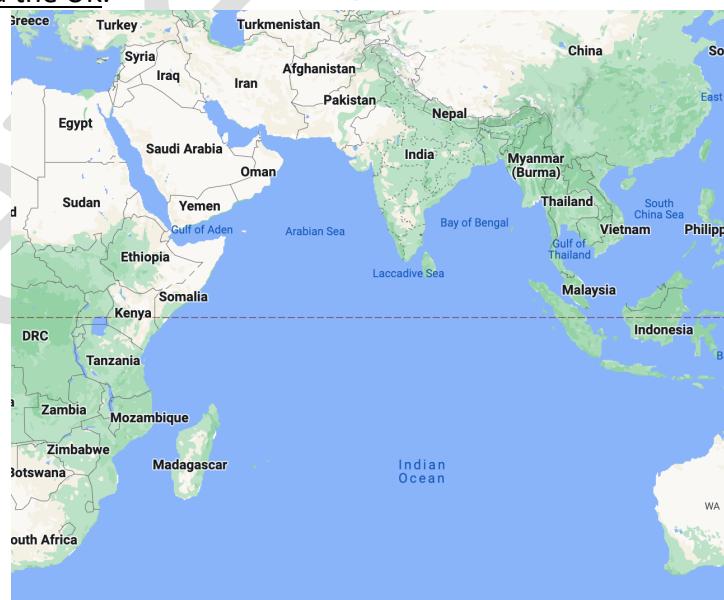
17. INDIAN OCEAN RIM ASSOCIATION (IORA)

- Introduction

- The IORA, formerly known as Indian Ocean Rim Initiative and Indian Ocean Rim Association for Regional Cooperation (IOR-ARC), is an international organization consisting of coastal states bordering Indian Ocean.
- Formally launched in 1997.
- The coordinating Secretariat of IORA is located at **Ebene, Mauritius**.
- The IORA is a regional forum, tripartite in nature, bringing together representatives of Government, Business and Academia for promoting cooperation and closer interaction among them.
- It is based on the principles of Regionalism for strengthening Economic Cooperation particularly on Trade Facilitation and Investment, Promotion as well as social development of the region.
- IORA became an observer to the UN General Assembly and the African Union in 2015.
- Decisions of IORA are reached by consensus and the commitments are undertaken on voluntary basis.

- Members

- **Member nations (23)**: South Africa, Mozambique, Tanzania, Kenya, Somalia, Madagascar, Mauritius (became member in 2014), Seychelles, Comoros, Yemen, Oman, UAE, Iran, India, Maldives (became member in 2018), Bangladesh, Sri Lanka, Thailand, Indonesia, Malaysia, Singapore, Australia, and France (became member in 2021).
- **Dialogue Partners (10)**: The USA, China, Egypt, Germany, Italy, Japan, Turkey, Russia, South Korea, and the UK.



- Significance of IORA

- **Economic Growth:**
- **Maritime Security**

18. ASEAN (ASSOCIATION OF SOUTHEAST ASIAN NATIONS)

- **Introduction**
 - ASEAN is a political and economic organization of 10 South East Asian countries which promotes Pan-Asianism.
 - Formed in 1967 by - Indonesia, Malaysia, Phillipines, Singapore and Thailand. Since then Brunei, Cambodia, Laos, Myanmar, and Vietnam have joined.
- Headquarter: **Jakarta, Indonesia**
- **Vision:** "One Vision, One Identity, One Community"
- **Various Institutional Mechanisms**
 - **ASEAN Summit:** This is the highest decision and policy making body of ASEAN.
- **Various ASEAN led forums.**
 - **ASEAN plus 3**
 - This was created to improve ties with China, Japan and South Korea.
 - **EAST ASIA Summit**
 - It promotes the security and prosperity in the region. Other than ASEAN leaders it is attended by heads of the states of the important players in the region.
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 - It started with 16 countries in the East Asian, Southeast Asian, South Asian, and Oceanian regions, based on **ASEAN Plus Six mechanism**. Six countries were China, Japan, South Korea, India, Australia and NewZealand
 - **Membership expanded to 18 countries** when USA and Russia joined at sixth EAS in 2011.
- **FREE TRADE Agreements**
 - » ASEAN has concluded free trade agreements with China, South Korea, Japan, Australia, New Zealand, and India

19. REGIONAL COMPREHENSIVE ECONOMIC PARTNERSHIP (RCEP)

- Introduction

- RCEP is an FTA between 10 member states of ASEAN and the six five states with which ASEAN has existing FTAs (Australia, New Zealand, China, Japan and South Korea). **India has decided to stay out of the agreement.**
- RCEP negotiations were formally launched in Nov 2012 at the ASEAN summit in Cambodia and **concluded in Nov 2020**.
- Its **areas of negotiation** included trade in goods, services, and investment; intellectual property rights; and special and differential treatment to less developed ASEAN members.
- **Key Provisions of the Agreement**
 - It simplifies the custom provisions and rules of origin laws between countries - implying reduced potential regulatory frictions



- India's decision to stay out of RCEP:

Threat of increasing Trade Deficit: India's trade deficit with RCEP members is still the highest (\$108 billion in 2018-19).

India's Key Concerns were not being taken care of

- Protection against sudden surge in imports was not looked into by member countries.
- India's request of exemption from the Ratchet Obligations was ignored.
- Addressing non-tariff barriers which have hindered India's exports. Issues such as environmental and labor laws were used to prevent India's export.
- India's request for country-specific tariff schedule was also rejected at the beginning of the negotiations.
- Dealing with possible circumvention of the rules of origin required stronger provisions, but it couldn't pass the muster.
- Securing better access in service sector couldn't be fructified
- Movement of professionals was also not being liberalized.

Even after hard negotiation by India the other member countries were not ready to budge. **Domestic Slowdown** has also played a role in forcing the government to withdraw from the negotiation.

- **Domestic slowdown intensified the political opposition of India's participation in RCEP.**

Ongoing tensions with China also became an important factor in India staying away from RCEP.

20. MEKONG GANGA COOPERATION (MGC)

- Introduction

- The Mekong-Ganga cooperation (MGC), established in the year **2000**, is a sub-regional initiative, focusing on expanding project-based cooperation between India and Mekong countries (Myanmar, Thailand, Laos, Cambodia, and Vietnam).

- Key areas of cooperation under MGC are tourism, culture, education, public health and traditional medicines, agriculture and allied sectors, transport, and communication, and MSMEs. During the Aug 2019 MM, three new areas of cooperation i.e., Water Resource Management, Science and Technology, and Skill Development & Capacity Building were added. These are aimed at strengthening people to people contact in the region.

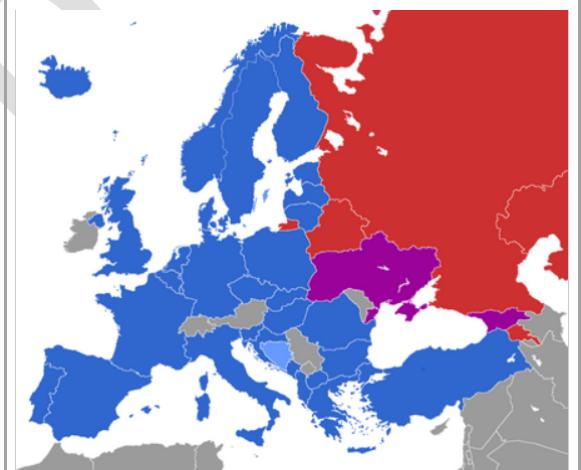


21. NATO

- NATO is a political and Military alliance established in 1949. Its primary purpose is to provide collective defense against potential military aggression from outside alliance. Since the end of cold war, NATO has expanded its membership and taken on new roles, including peacekeeping and counter terrorism operations.
- Headquarter: Brussels

Members: Currently (March 2024) there are 32 members

USA, Canada, UK, Portugal, Spain, France, Luxemburg, Netherlands, Belgium, Germany, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Italy, Romania, Bulgaria, Greece, Turkey, Estonia, Latvia, Lithuania, Denmark, Norway, Sweden (joined in March 2024), Finland (joined in 2023), Iceland, Albania, Montenegro, North Macedonia



Map of NATO in Europe:

- Current members
- Membership Action Plan
- Countries seeking membership
- Countries where membership is not a goal
- Collective Security Treaty Organization (CSTO)

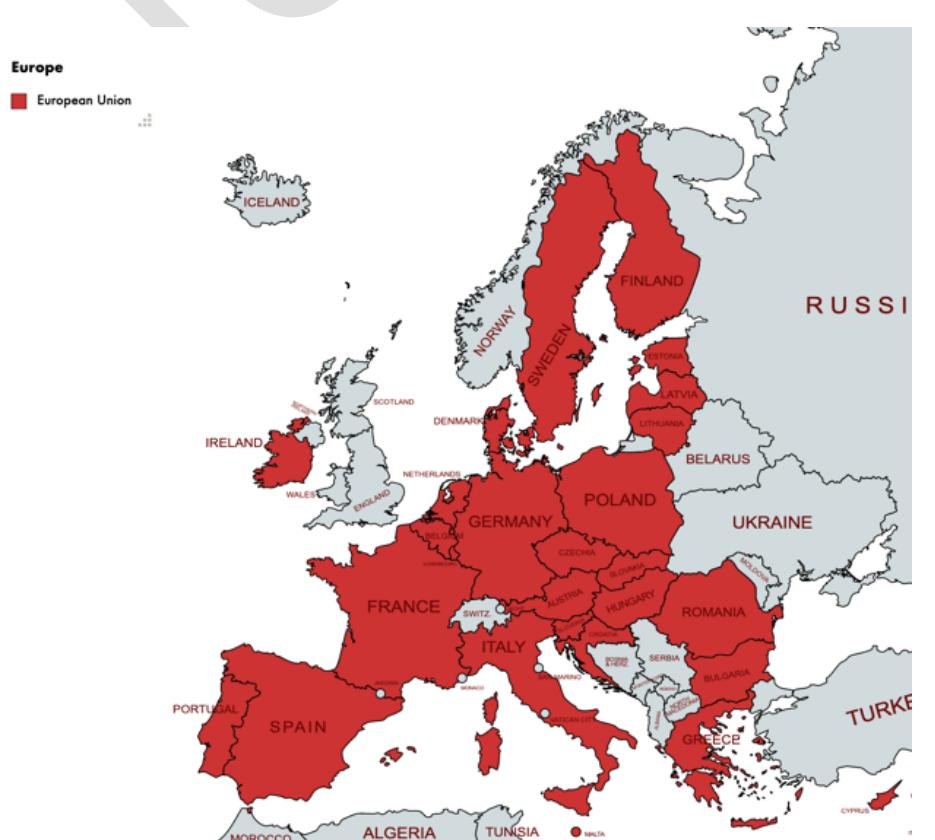
- Note: EU countries not part of NATO: Ireland, Austria, Malta, Cyprus
- Note: Non EU countries part of NATO: USA, Canada, UK, Iceland, Albania, Montenegro, North Macedonia, Turkey and Norway

22. EUROPEAN UNION (EU)

- European Union (EU) is a **politico - economic union** of 27 member states (UK withdrew from the group in 31st Jan 2020) that are located primarily in Europe.
 - EU has **developed an internal single market** through a standardized system of law that apply to all member states in those matters, and only those matters, where members have agreed to act as one.
 - The Policies of EU aim to achieve:
 - **free movement of goods, services, people and capital** across the EU market.
 - Enact common legislations in justice and home affairs.
 - Maintain common policies on trade, agriculture, fisheries and regional development.
 - The **Maastricht** Treaty (Maastricht is a place in south-east Netherlands) established the **European Union** under its current name in **1993** and introduced the **European citizenship**.
 - The latest major amendment to the constitutional basis of the EU, the **treaty of Lisbon**, came into force in 2009. It amended Maastricht treaty and Treaty of Rome to form European Union on Constitutional Basis.
 - In 2012, the EU was awarded the **Nobel Prize** for having "contributed to the advancement of peace and reconciliation, democracy, and human rights in Europe."

27 MEMBER COUNTRIES:

Ireland,
Portugal,
Spain,
France,
Luxemburg,
Belgium,
Netherlands,
Germany,
Poland,
Czechia,
Slovakia,
Austria,
Hungary,
Slovenia,
Croatia,
Italy,
Malta,
Romania,
Bulgaria,
Greece,
Cyprus,
Denmark,



Sweden, Finland, Estonia, Latvia, Lithuania	
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- Its members have a **combined area** of 4.2 million sq km and an **estimated total population** of about 447 million.
- The EU operates through a system of **supernational institutions** and intergovernmental negotiated decisions by the member states.
 - The Institutions of European Union are the **seven-principal decision-making bodies** of the European Union. Their function include:
 - Competencies in **scrutinizing and amending legislation** are divided between **European Parliament** and the **Council of European Union** while **executive tasks** are carried out by the **European commissions** and in a limited capacity by **European Council**. The **Monetary Policy** of the Euro zone is governed by **European Central Bank**. The **interpretation and application of EU law and the treaties** are ensured by the **Court of Justice of European Union**. The **EU budget is scrutinized** by the **European Court of Auditors**. There are also a number of ancillary bodies which advise the EU or operate in a specific area.

1) SCHENGEN AREA

- The Schengen area is the area comprising **27 European countries** that have **abolished passport** and any other type of border control at their common borders, also referred to as internal borders. It mostly functions as single country for international travel purposes, with a common visa policy. Countries in Schengen Area have eliminated border controls with the other Schengen members and strengthened border controls with non-Schengen states.
- **Schengen Agreement (1985)** is the treaty which led to creation of Europe's borderless Schengen Area. It proposed the gradual abolition of border checks at the signatory's common borders.
- Relation with EU
 - Originally, the Schengen treaties and the rules adopted under them operated independently from the EU.
 - However, in 1999 they were incorporated into European Union law by **Amsterdam treaty**, while providing opt-outs for the only two EU member states which had remained outside the area: **United Kingdom and Ireland**. (Note: UK has left EU in Jan 2020)



Map of the Schengen area

- Schengen is now a core part of EU law, and all EU member states without an opt-out which have not already joined the Schengen area are legally obliged to do so when technical requirements have been met.
 - Several non-EU countries are included in the area.
- Within the **Schengen Area** (27 countries), passport controls have been abolished.
 - Out of 27 EU members - 23 participate in the Schengen Area.
 - EU member - Bulgaria, Romania, and Cyprus - are legally obliged to join in future.
 - EU Member - Ireland maintains an opt-out, and instead operates its own visa policy.
 - Non-EU members who are part of Schengen Area include Iceland, Norway, Switzerland and Liechtenstein.
 - Some countries like Monaco, San Marino and the Vatican City also maintain an open border for passenger traffic with other Schengen member countries and thus are de-facto part of Schengen area.
- Note:
 - Croatia joined the Schengen Zone in 1st Jan 2023.
 - » It also switched to the shared European Currency - the EURO and removed dozens of border check post to join the world's largest passport-free travel area, completing a dream conceived 30 years ago when it fought a war for independence from Yugoslavia.
 - Croatia joined the Schengen Zone on 1st Jan 2023, but didn't lift its air borders to Schengen countries until 26th March 2023

2) EUROZONE

- The Monetary Union (Euro zone) was established in 1999 and came into full force in 2002. It is currently composed of 20 member (Croatia joined in 2023) states that use the Euro as their legal tender.

3) OTHER FACTS ABOUT EU

- Through, the Common Foreign and Security Policy, the EU has developed a role in external relations and defence.
- The Union maintains permanent diplomatic missions throughout the world and represents itself at the United Nations, the WTO, the G8, and the G-20.

23.BREXIT

- Brexit Withdrawal Agreement (officially titled "Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Island from the European Union and the European Atomic Energy Community")

- It is a treaty between EU, Euratom and United Kingdom signed on Jan 24, 2020 which set up **terms of withdrawal of the UK from the EU and Euratom**. The text of the treaty was first published in Oct 2019.
- This agreement was approved by the British parliament by enactment of **European Union (Withdrawal Agreement) Act 2020**.
- The **Council of European Union** ratified the agreement on 30 Jan 2020 following the consent of European Parliament on 29th Jan 2020.

- Key Features of the BREXIT Withdrawal Agreement

- The whole of UK will leave EU, but Northern Ireland will stay in the EU's single market for goods.
- The U.K. can impose tariff on goods entering Northern Ireland from third countries as long as they are not at risk of entering EU single market
- For the goods that are at risk of entering the single market from third countries via Northern Island, EU tariffs will apply.
- Practically, there would be custom border between Great Britain and the island of Ireland, with goods being checked at Northern Irish Ports.
- The agreement replaced the contentious "Irish Backstop" plan in Theresa May's deal with new arrangement which would prevent the return of the 'hard' border between Northern Ireland and the Republic of Ireland.



ON JAN 31, 2020, THE UNITED KINGDOM LEFT THE EUROPEAN UNION

- UK has become the first country to leave the EU which was set up to forge unity among nations after the horrors of World War - II.
 - Had any nation state ever left the EU before UK?**
 - No, but Greenland one of the Denmark's overseas territories, held a referendum in 1982, after gaining a greater degree of self-government and duly left after a period of negotiation.
- UK had a **11-month transition period** till 31st Dec 2020. During this Britons were able to work in the EU and trade freely - and vice versa, though Britain would not be represented in Bloc's institutions i.e. legally, Britain was out.
- From **1st Jan 2021**, **EU nationals will no longer be able to live and work in Britain without visas** - though it doesn't apply to more than 3 million already doing so - and **Britons can no longer automatically work or retire in EU nations**.

24. ECOWAS (ECONOMIC COMMUNITY OF WESTERN AFRICAN STATES)

- Why in news?
 - » ECOWAS orders to standby force to deploy in Niger (Aug 2023)
 - This is an attempt to restore democratic forces in ECOWAS.
- About ECOWAS:
 - » It is a regional political and economic union of 15 countries located in Western Africa. It was established in 1975 through the Lagos Treaty.
 - » Its mandate is to promote economic integration among its members. Its **larger aim** is to have a single common currency and create a single trading bloc in areas of industry, transport, telecommunication, energy, financial issues, and social and cultural matters.
 - » According to the website, the Vision of ECOWAS is the creation of a "borderless region" that is well-integrated.
 - » It is meant to be a region governed by principles of democracy, the rule of law and good governance.

- Membership:

As of Aug 2023, there are 15 members to this grouping:

Cabo Verde, Senegal, Gambia, Guinea-Bissau, Guinea, Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo, Benin, Nigeria, Mali, Burkina Faso, and Niger.



Following coups in some of the biggest countries in the bloc - namely **Mali, Guinea, and Burkina Faso** - it suspended the three members and refused to recognize their new governments.

- Organizational Structure:

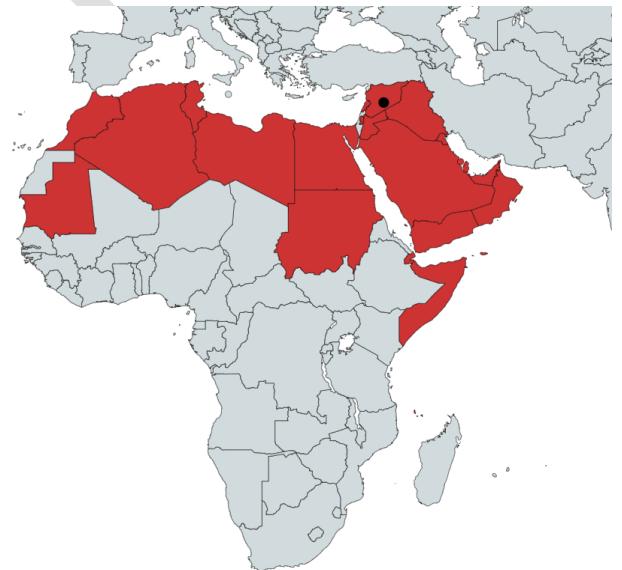
- At the helm of the organizational structure is the Chairman of the Authority of Heads of State and Government.
 - The Chairman is the current head of state and government and is appointed by other Heads of State and Government to oversee its affairs for one year.

- What kind of role has ECOWAS played in the region so far?

- Economic Cooperation
- Promoting peace by quelling military conflict.
 - ECOWAS has operated a regional peacekeeping operation known as ECOMOG, led by Nigeria in 1990s and early 200s.
 - For e.g. in Liberia when forces were deployed in 1990 during the deadly civil war and in Sierra Leone in 1997 when a democratically elected government was overthrown.
- **What might ECOWAS do in Niger?**
 - Its response so far has indicated military intervention.
 - But this would face many challenges. For e.g. both Mali and Burkina Faso, both neighbours of Nigeria, run by Military juntas, were sending a delegation of officials to Niger to show support and would consider an attack as an attack on them as well.
 - **Economic Sanctions:**
 - But, there is a question of whether the longstanding measures of economic sanctions - such as those imposed by ECOWAS - can work, as these countries are also leading with low economic growth prospects at the moment.

25. ARAB LEAGUE

- **Basics:**
 - The Arab League, the League of Arab States, is a voluntary regional organization of Arabic speaking countries in and around North Africa, the Horn of Africa, and Arabia. It was formed in Cairo on 22nd March 1945 with six members: Egypt, Iraq, Transjordan (Jordan), Lebanon, Saudi Arabia, and Syria.
 - **Membership: 22 countries**, although Syria's participation has been suspended since 2011, as a result of government's repression during the ongoing uprising and the civil war. (Mauritania, Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, Somalia, Djibouti, Comoros, Palestine, Jordan, Saudi Arabia, Yemen, Oman, UAE, Qatar, Bahrain, Kuwait, Iraq, Syria, and Lebanon)
- **Main Goal** is to "draw closer relation between member states and co-ordinate collaboration between them, to safeguard their independence and sovereignty, and to consider in a general way the affairs and interests of the Arab countries".
- **How are decisions made?**
 - Decisions are made on the basis of majority, but there is no mechanism to compel members to comply with resolutions.



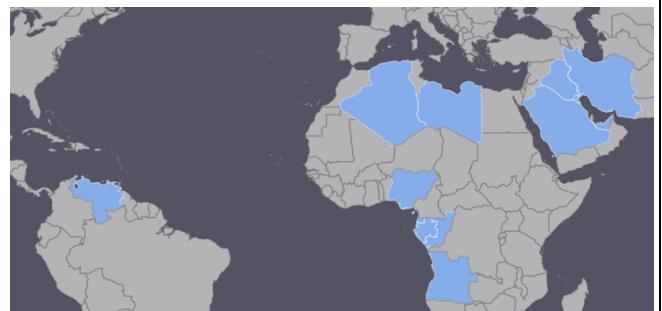
26. GULF COOPERATION COUNCIL (GCC)

- Member states are Saudi Arabia, Kuwait, Bahrain, Qatar, UAE, Oman.
 - » **Note:** Iraq is the only Arab country bordering Persian gulf that is not a member of the GCC.
- Gulf Cooperation Council is a regional intergovernmental political and economic union consisting of all Arab states of the Persian Gulf, except for Iraq.
 - » **Note:** All current members are **Monarchies**, including three constitutional monarchies (Qatar, Kuwait, and Bahrain).
- **Formed in 1981**, after signing of Charter of Gulf Cooperation Council (GCC).
- **Objectives**
 - » Formulating similar regulations in various fields such as religion, finance, trade, customs, tourism, legislation, and administration
 - » Fostering scientific and technical progress in industry, mining, agriculture, water and animal resources
 - » Establishing scientific research centers
 - » Setting up joint ventures
 - » Unified military (Peninsula Shield Force)
 - » Encouraging cooperation of the private sector
 - » Strengthening ties between their people
 - » Establishing a common currency



27. OPEC (ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES) AND OPEC+

- **Introduction**
 - » It is an intergovernmental organization founded in Baghdad, in **1960** by five countries - **Iran, Iraq, Kuwait, Saudi Arabia and Venezuela**. Since 1965, it is headquartered in Vienna.
- **Membership:**
 - » Currently, the group consists of **13 oil exporting countries** (March 2021).
 - **Five Founding Members:** Iran, Iraq, Kuwait, Saudi Arabia and Venezuela
 - **Other 8 members:** Algeria, Libya, Nigeria, Eq Guinea, Gabon, REPUBLIC OF Congo, Angola and UAE.
- **OPEC differentiates between founding members, full members and Associate Members**
 - **How can someone become full member of OPEC:** The statute stipulates that "any country with a substantial net export of crude petroleum, which has fundamentally similar interests to those



- of Member countries, may become a Full Member of the Organization, if accepted by a majority of three-fourth of Full Members, including the concurring votes of all Founder Members.
- **Associate Members:** The statute further provides for Associate members which are those countries that don't qualify for full membership, but are nevertheless admitted under such special conditions as may be prescribed by the Conference.
- **Members who have left recently:**
 - Qatar (1st Jan 2019)
 - Ecuador (1st Jan 2020)
- **OPEC aims to regulate** the supply of oil in order to set the prices on the world market.
- **Influence on world economy**
 - OPEC decisions have come to play a **prominent role in the global oil market and international relations**.
 - The 13 OPEC countries account for an estimated 44 percent of global oil production and 81.5% of the world's "proven" oil reserves, giving OPEC a major influence on global oil prices.
 - They have started to come to play an important role in global oil market and international relations.
 - The effect can be really strong when wars or civil disorders lead to extended interruptions in supply.
 - E.g.
 - 1970s restriction in oil production led to a dramatic rise in oil prices and OPEC revenue and wealth.
 - Although their influence on international trade is periodically challenged by the expansion of non-OPEC energy sources, and by the recurring temptation for individual OPEC members to exceed production ceiling. Further, **new technologies** like **fracking** in the USA, has had a major effect on worldwide oil prices and has lessened OPEC's influence on the markets.

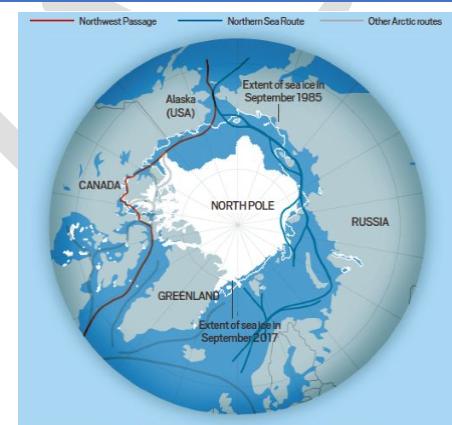
4) OPEC+ (I.E. OPEC AND ITS ALLIES)

- **Background:**
 - After 2014 "glut" diplomacy which brought down prices below \$30-barrel, Saudi Arabia and Russia came together to cut output and steady prices. This is known as **OPEC+** arrangement (Note: Russia is not a member of OPEC) and include Russia, Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, South Sudan etc.
 - This alliance kept production lower and pumped up the prices.
- **OPEC+ collapsed in March 2020**, after Russia rejected a Saudi request to affect more cuts in output given the fall in demand due to COVID-19 outbreak.
 - But later, in **April 2020**, OPEC and its allies agreed to historic 10 million barrel per day production cut.
 - **OPEC+ has decided not to increase supply in April** as they await a more substantial recovery in demand amid COVID-19 pandemic. (March 2021)
 - Crude Prices rose after the announcement and are up 33% this year.
 - **India** have said that the OPEC+ decision to extend the output cuts may hurt some economies.

- In April 2023, OPEC+ announced a surprise cut in oil production.
 - The Group of Oil producing nations say cut of 1.5 million barrels a day is aimed at supporting market stability.
- ~~OPEC+ has decided to increase overall production by 4,00,000 barrels per day every month till the remaining portion of the group's 10 million barrel per day every month production cut announced in April 2020 is completely phased out. (July 2021)~~
 - ~~The decision also ends a standoff between UAE and other OPEC+ countries~~ on trying an extension of the supply agreement to increase production.

28. ARCTIC REGION

- **Introduction**
 - The region around the north pole is known as arctic region. It is usually understood as the area within the arctic circle (parallel of latitude - 66 degree 33 minutes 39 seconds).
 - Climate change and melting of ice in the arctic region has led to opening up of two main sailing routes through Arctic:
 - **The Northwestern Trail** runs along the Canadian coast
 - **The Northeast Passage** through Siberia, which is also the shortest route connecting the far east to the western Europe.
 - It stretches from Murmansk in the west (north west part of Russia) to the Bering Strait in the east and has become the focal point of both Russia and China's Arctic Strategy.
 - This route will be 1/3rd quicker from Asia to Europe than going the long way via Suez Canal and offers a way to rejuvenate the depressed part of Russia.
 - **Some experts believe that Shipping through the Arctic don't make much sense today and likely won't for decades to come:**
 - 1) Even though the routes are shorter, ships have to go slow through the still icy waters.
 - Transit times are still very unpredictable.
 - 2) Most vessels needs to be ice-classed to operate in the route which will lead to extra cost.
 - 3) Shallow waters along Russia rule out the big container ships that dominate cross-ocean traffic.
 - 4) Further, the route bypasses the markets like the Mediterranean sea and Southeast Asia, key hubs in big shipper's global network.
 - 5) This with increased cost due to insurance, and safety consideration are other deterrents.
 - These limitations explain why, despite all the hype, shipping companies are hesitant to dip a toe in the chilly waters.



1) CHINA AND ARCTIC REGION

- China is increasingly active in the polar region despite being a non-Arctic country. It became an observer member of the Arctic Council in 2013.

- Among its increasing interests in the region is its **major stake in Russia's Yamal liquified natural gas project** which is expected to supply China with 4 million tonnes of LNG a year. It has invested **in mining in Greenland** and also seeks to negotiate an FTA with Iceland.
- In fact, the **North Sea route** has become the focal point of both **Russia and China's Arctic Strategy**.

A) CHINA'S OFFICIAL ARCTIC POLICY (ANNOUNCED IN JAN 2018)

- It highlights Beijing's **linking the "Polar Silk Road"** to **Beijing's Belt and Road Initiative**.
- China has **self-identified itself as a "Near Arctic Country"** while keeping its economic and strategic interest in mind.
- China has narrowed down its **interest in two categories**:
 - i. Firstly, Beijing is closely involved in **activities in the areas like scientific research, resource exploration and exploitation, shipping and security**.
 - ii. Secondly, **Climate change** and its potential consequences on the region are expected to affect much of the world, so China is naturally concerned.
- China has outlined its ambitions **to extend President Xi Jingping's BRI to the Arctic** by developing shipping lanes opened up by global warming. China has said that it would **encourage enterprises to build infrastructure and conduct commercial trial voyages**, paving the way **for Arctic Shipping routes that would form a "Polar Silk Road"**.

A) INDIA'S PRESENCE IN ARCTIC

Currently, India has a **single station, Himadri**, in **Ny-Alesund**, Svalbard, a Norwegian archipelago, where research personnel are **usually present for 180 days**. India is in the process of procuring ice-breaker research vessel that can navigate the region

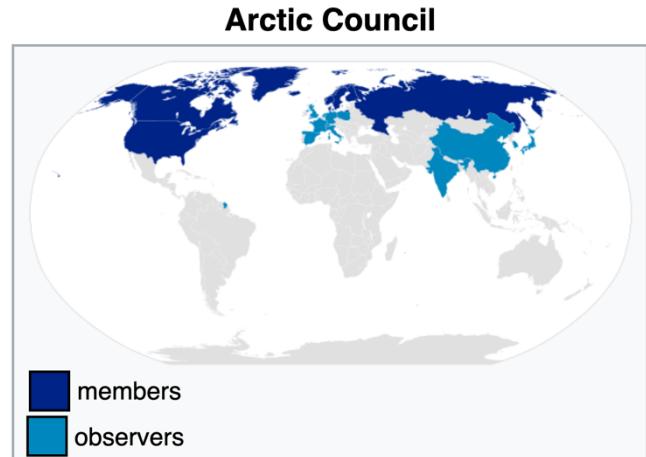
29. ARCTIC COUNCIL

- **Introduction**
 - Arctic Council is a **high-level intergovernmental forum** that addresses **issues faced by Arctic governments and the indigenous people of Arctic**.
 - It acts as **forum for promoting cooperation, coordination, and interaction among the arctic states**, with the involvement of the arctic indigenous communities and other arctic inhabitants on issues such as **sustainable development** and **environment protection**.
 - It was **established in 1996 through the 1996 Ottawa declaration**.
- **Membership**
 - **Members:**
 - Only states with territory in the Arctic can be members of the Council. It has **eight member countries** : Canada, USA, Iceland, Denmark, Norway, Sweden, Finland and Russia.
 - **Observer states**

- United Kingdom, France, Spain, Germany, Italy, Netherlands, Poland, **India**, China, Japan, South Korea, Singapore.

- Importance of the Region

- Vast natural resources
 - Oil, Gas and Minerals
 - Commercial fishing opportunities
- Shortened shipping routes that are now accessible because of global warming.
- Scientific research opportunities
- Climate Change studies
- Strategic significance



- India and Arctic Council

- India was first given observer status in 2013 for five years. This was then renewed in 2018 for another five-year term.
- According to MEA India's interests in the Arctic region are scientific, environmental, commercial as well as strategic.
 - This is also visible from the Draft Arctic Policy released by India recently.

- India Scientific work in Arctic Region

- India now maintains a permanent presence in the region through a **research base Himadri** and **two observatories**, in Kongsfjorden and Ny Alesund.
- **Note:**
 - Himadri is India's first permanent Arctic Research base located at Spitsbergenu, Svalbard, Norway. It is located at the International Arctic Research Base, **Ny-Alesund**. It was set up during India's second Arctic Expedition in June 2008.

30. BRICS

- BASICS

- BRICS is a grouping of five major emerging economies (BRAZIL, RUSSIA, INDIA, CHINA, and SOUTH AFRICA) that are becoming the key driver of globalization. Their cooperation has been driven by not only economic and political factors, but also because of failure of existing global governance framework to satisfy the real needs of these countries.
- Originally the first four were called BRIC before induction of South Africa in 2010.
 - **Note:** Term **BRIC** was coined in 2001 by the then chairman of Goldman Sachs Asset Management **Jim O'Neil**, in his publication "*Building Better Global Economic BRICs*". On the basis of economic analysis, he claimed that the four economies would individually and collectively occupy far greater economic space and become **among the world's largest economies in the next 50 years**.



- BRICS members are all developing and newly industrialized countries, but they are distinguished by their large and fast-growing economies and significant influence on regional and global affairs.
- All five are G20 members.
- The first summit was held in Yekaterinburg, Russia in 2009 and since then the BRICS nations have met annually at formal summits.

- **AIMS and Objective**

- Promoting a more legitimate international system including UNSC and IMF/WB reforms
 - Promote South-South Cooperation and regional cooperation.
 - Act as a bridge between developed and developing countries
 - Present a united front of developing countries in climate change negotiations
 - Embrace cultural diversity and promote people to people contact among BRICS countries
- In Recent years BRICS has diversified its objectives and is also working towards fighting protectionism and promoting & protecting multilateralism. Focus on counterterrorism has also increased.

31. NEW DEVELOPMENT BANK

- US\$100 billion New Development Bank (formerly known as the "BRICS Development Bank") is a multilateral development bank operated by BRICS states (Brazil, Russia, India, China and South Africa).
- **History**
 - New Development Bank was agreed to by BRICS leaders at the 5th BRICS summit held in Durban, South Africa in 2013.
 - In 2014, at the 6th Summit held at Fortaleza, Brazil, the group of emerging economies signed the long-anticipated document to create the \$100 billion BRICS development bank and a reserve currency pool worth over another \$100 billion.
 - **Headquarter:** The bank is headquartered in Shanghai, China. A regional headquarter will be set up in Johannesburg.
 - The first President will be from India, the inaugural Chairman of the Board of Directors will come from Brazil and the inaugural chairman of the board of Governors will be Russia.
 - On May 11, 2015: K.V. Kamath was appointed as president of the bank. (He completed his five year term in 2020).
 - On March 24, 2023 , the NDB announced Dilma Rousseff as its new President.
- **Voting Powers:** Unlike the World Bank, which assigns votes based on capital share, in the New Development Bank each participant country will be assigned one vote, and none of the countries will have veto power.
- **Why BRICS bank was born -> Lack of Reforms in Bretton Woods Institutions**
- **Objectives and Total Capital**
 - Development Capital

- The bank's primary focus of lending will be infrastructure projects with authorized lending of upto \$34 billion annually. The bank will have starting capital of \$50 billion, with capital increase to \$100 billion overtime.
- **Contribution and voting rights**
 - Each member's contribution will be equal with equal voting rights.
- Each member cannot increase its capital share without all other 4 members agreeing. This was primary requirement of India.
- The bank will allow new members to join but the BRICS capital share cannot fall below 55%.

- **Contingency Reserve Arrangement (CRA)**

- The CRA is a framework for the provision of support through liquidity and precautionary instruments in response to actual potential short term balance of payment pressure.
- **Objective** of this capital is to provide protection against the global liquidity pressure. This include currency issues where member's national currencies are being adversely affected by global financial pressures. The bank would also provide assistance to other countries suffering from the economic volatility in the wake of US exit from its expansionary monitoring policy.
- **Contribution By Each Country**
 - Out of the total initial capital of \$100 billion, China will contribute \$41 billion, Brazil, Russia and India would give \$18 billion each, and South Africa would contribute \$5 billion.

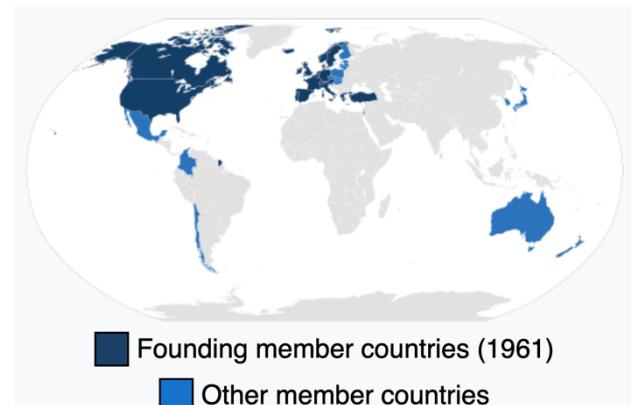
Initial Subscribed Capital	\$50 billion (each member gave 10 billion)
Initial Authorized Capital	\$100 billion
Contingency Reserve Arrangement (CRA)	\$100 billion

- **Update:** New Development Bank has announced the launch of its Indian Regional Office in GIFT City.

32. OECD (ORGANIZATION OF ECONOMIC COOPERATION AND DEVELOPMENT)

- **About OECD**

- OECD is an international economic organization for 37 countries, founded in 1961 to stimulate economic progress and world trade.
- It is a forum of countries describing themselves as committed to democracy and the market economy, providing a platform to compare policy experiences, seeking answers to common problems, identify good practices and coordinate domestic and international policies of its members.
- **Origin in 1948** OEC which was formed to help administer Marshall plan.
- **Headquarter:** Chateau de la Muette in Paris, France
- **Members:** The OECD's 37 members are: Austria, Australia, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland,



■ Founding member countries (1961)

■ Other member countries

Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

33. FINANCIAL ACTION TASK FORCE (FATF)

- **Intro**
 - Financial Action Task Force (on Money Laundering) is an intergovernmental organization **founded in 1989** on the initiative of the G7 to develop policies to combat money laundering. In 2001, the purpose expanded to act on **terrorism financing**.
 - It **monitors countries' progress** in implementing the FATF Recommendations by the '**peer review**' ('**mutual evaluations**') of member countries.
 - FATF **secretariat** is housed at the headquarters of the OECD in Paris.
- **Members and Observers**
 - **For being a member**, a country must be considered **strategically important** (large population, large GDP, developed banking and insurance sector, etc.), must adhere to **globally accepted financial standards**, and be a **participant in other important organizations**.
 - **Responsibilities of a member:**
 - » The country or organization must endorse and support the most recent FATF recommendations, commit to being evaluated by (and evaluating) other members, and work with the FATF in the development of future recommendations.
- **Every year there are three plenary meeting** of the inter-governmental body.
- What are **Blacklist** and **Grey List**?
 - These two terms **don't exist in FATF's official terminology**. The group identifies "**jurisdictions with weak measures**" through two documents issued at the end of the plenary held thrice a year.
 - The first document (Colloquially known as the **blacklist**) has the **two set of countries ("Call for action")**
 - A. Countries or jurisdictions with such **serious strategic deficiencies** that the FATF calls its members and nonmembers to apply counter measures.
 - **North Korea** falls in this category.
 - B. Countries for which FATF calls on its members to apply enhanced due diligence measures proportionate to the risks arising from the deficiencies associated with the country.
 - **Iran** falls in this category.
 - C. Blacklist is also known as **non-cooperative countries / Territories [NCCTs]**
 - The **second document** is called "**Improving Global AML/CFT Compliance: On Going Process**". It consists of "**Other Monitored Jurisdiction**". This is colloquially known as the **grey list**.

- A. These countries have shown strategic weakness in preventing money laundering and terror financing, but they **will get a second chance** as they "provided a high-level commitment to an action plan developed with the FATF".
- B. **Pakistan** is listed in this list. It has been on the Grey List from **2008-2015**, after which it was taken off the watch list until 2018. In 2018 it was again added on the list and given a 27 point action plan. It was removed from the list in Oct 2022.
- C. A **country in grey list** may face following limitations:
 - Economic Sanctions from IMF, World Bank, ADB
 - Problem in getting loans from IMF, World Bank, ADB and other countries
 - Reduction in international trade
 - International boycott.

FATF SUSPENDED THE MEMBERSHIP OF RUSSIA FEDERATION (FEB 2023)

Reason: Ukraine War: The Russian Federation's actions unacceptably run counter to the FATF core principles aiming to promote security, safety, and the integrity of the global financial system. They also represent a gross violation of the commitment to international cooperation and mutual respect upon which FATF Members have agreed to implement and support the FATF Standards

34. REGIONAL DEVELOPMENT BANKS: ASIAN DEVELOPMENT BANK

- **Asian Development Bank (ADB)** is a regional development bank established 1966. It was conceived as a financial institution that will be Asian in character and foster economic growth and cooperation in one of the poorest regions of the world.
 - **Mission:** Achieve a prosperous, inclusive, resilient, and sustainable **Asia and the Pacific**, while sustaining our efforts to eradicate extreme poverty.
- **Headquarter:** Metro Manila, Philippines
- **Objective:** To facilitate social and economic development in Asia.
 - **80% of ADB's lending** have been concentrated in Public sector with focus on **five operational areas**:
 - i. **Education**
 - ii. **Environment, Climate Change, and Disaster Risk Reduction**
 - iii. **Financial Sector development**
 - iv. **Infrastructure** including transport, communication, energy, water supply and sanitation, and Urban development.
 - v. **Regional cooperation and integration**
- **Voting** =: Modelled closely on the World Bank, and has a similar weighted voting system where votes are distributed in proportion with member's capital subscription.
- **Observer at UN:** ADB is an official UN observer.
- **Members:**
 - The bank admits the members of the United Nations Economic and Social Commission for Asia Pacific Region (UNESCAP) and non-regional developed countries.
 - ADB presently (Feb 2020) has **68 members** of which **49** are from within Asia Pacific and 19 outside.

Country	Shares	Voting Power
---------	--------	--------------

Japan	15.571%	12.756%
US	15.571%	12.756%
China	6.429%	5.442%
India	6.317%	5.352
Australia	5.773%	4.917

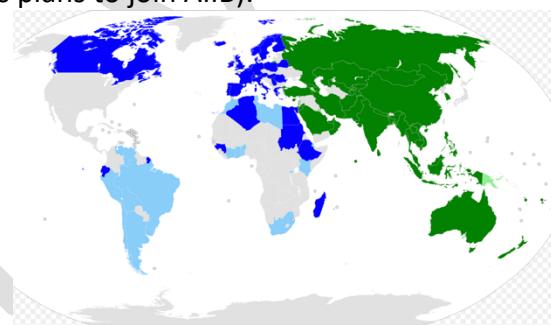
35. REGIONAL DEVELOPMENT BANKS: ASIAN INFRASTRUCTURE INVESTMENT BANK (AIIB)

- Introduction

- » The Asian Infrastructure Investment Bank (AIIB) is a multilateral development bank with a mission to **improve social and economic outcomes in Asia**. It aims to support the building of infrastructure in the Asia Pacific Region.
- » On **29th June 2015** countries from five continents formally signed in Beijing the **Articles of Association** (also called **60 article agreement**), the legal framework that begun the existence of the Bank.
 - The agreement entered into force on 25th Dec 2015 when ratification was received from 10 member states holding a total of 50% of initial subscription of the authorized capital stock.
- » It is regarded by some as rival to IMF, World Bank and the Asian Development Bank, which are dominated by developed countries like the USA, EU and Japan.

- Members and Founding Members

- » The institution currently has **103 members** (Regional members: 46, Non-regional members: 39, Prospective Members: 18).
 - All of Europe, Canada, Australia, NewZealand are also members.
- » **Major economies that are not members** of AIIB are **USA, Japan, Mexico and Nigeria** (Nigeria has plans to join AIIB).



- Objectives

- To provide finance to infrastructure projects in Asia region.
- Fostering Long Term Economic Development
- Infrastructure as regional integration and foreign policy tool.

- Reasons for Formation - Slow pace of reforms and governance in **global financial institutions** such as IMF, World Bank, and Asian Development Banks

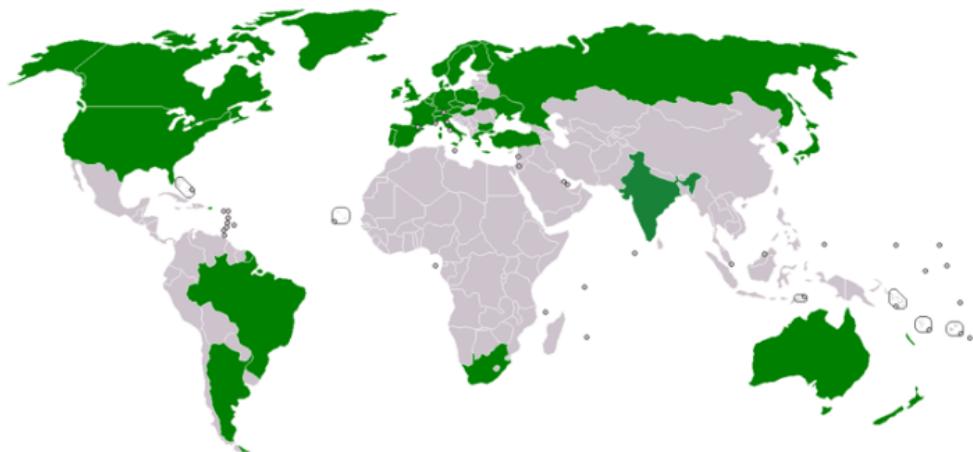
- **Capital**
 - The bank has an authorized capital of \$100 billion (around 2/3rd the capital of ADB, and half that of World Bank)
- **Regional Character of the Bank:** The bank's regional members will be holding around 75% shares i.e.; they will be majority shareholders.
- **Shareholding structure and Voting Right**
 - Voting share: It is based on the size of the economy and not on authorized capital share of the Bank.

Country	Share	Voting Rights
China	30.79%	26.52
India	8.65%	7.604
Russia	6.75%	5.98
Germany	4.63%	4.17

- **India and China** are the only countries to have a permanent seat on AIIB's Board of Directors.
- **China also holds veto power** for certain key decisions.
- **India and AIIB**
 - **Biggest Beneficiary:** India has been the biggest beneficiary of the bank. Out of \$20 billion in loans issued by the Beijing-based Asian Infrastructure Investment Bank (AIIB), about \$6 billion has gone to India.
 - **Overlooking China's de-facto veto:**
 - **Projects funded in partnership:**
 - **Easy terms of loans:**

36. WEAPON CONTROL REGIMES: MISSILE TECHNOLOGY CONTROL REGIME

- MTCR is an informal and voluntary partnership between 35 countries (India became a member in June 2016) to prevent the proliferation of missile, complex rocket systems, unmanned aerial vehicles and related technology capable of carrying a 500 Kg payload for atleast 300 kms, as well as systems intended for delivery of weapons of mass destruction (WMD).
- **Established**
 - In 1987 by Canada, USA, United Kingdom, France Germany, Italy, and Japan.
 - It was created to curb the spread of unmanned delivery systems for nuclear weapons, specially delivery systems that could carry a minimum payload of 500 Kg a minimum of 300 km.
- **Membership**
 - **Participating states: 35**
 - **Note:** China, Israel and Pakistan are not members of MTCR



- In 2002, the MTCR was supplemented by the International Code of Conduct Against Ballistic Missile Proliferation (ICOC), also known as Hague Code of conduct, which calls for restraint and care in the proliferation of ballistic missile systems capable of delivering weapons of mass destruction, and has 119 members, thus working parallel to MTCR will less specific restrictions but with greater memberships.

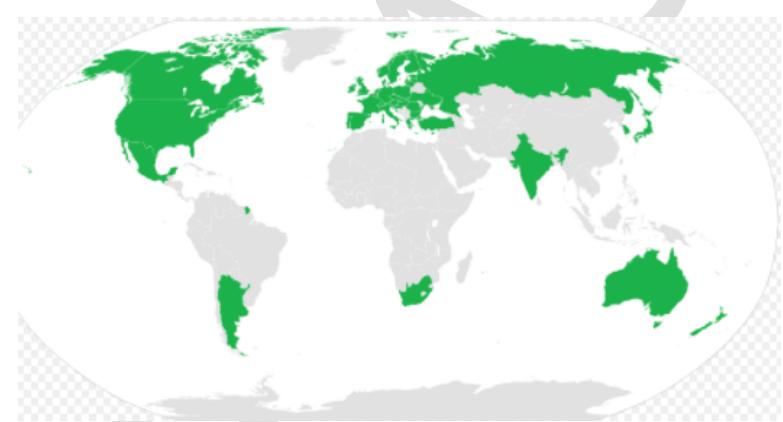
37. WEAPON CONTROL REGIMES: NUCLEAR SUPPLIER GROUP (NSG)

- **Introduction**
 - NSG is a multinational body concerned with reducing nuclear proliferation by controlling the export and re-transfer of material that may be applicable to nuclear weapon development and by improving safeguards and protection on existing materials. In short NSG was established **to prevent the civilian nuclear trade from being used for military purpose**.
- **Background**
 - India's Nuclear Test, May 1974.
 - The test demonstrated that certain non-weapons specific nuclear technology could be readily turned to weapons development. Nations already signatories of Nuclear Non-Proliferation treaty saw the need to further limit the export of nuclear equipment, materials, or technology.
 - Another advantage of forming NSG was that the Non-NPT nations, then specifically France (France and China acceded to NPT in 1992), could be brought in.
- **First met in 1975**
- **Membership**
 - As of March 2023: NSG has 48 members (**India isn't a member**).
- **Future Indian Participation in NSG**
 - NSG has been opened to admitting new members, but it has been stringent in opening its doors only to those countries that are part of the NPT or CTBP. India is neither signed the NPT nor the CTBT.
 - In 2008, NSG issued an India-specific waiver allowing it to engage in Nuclear trade. India got its exemption on the basis of certain non-proliferation commitments to which it agreed under the India-US Nuclear Agreement.
 - The commitments included

- Separating its civilian and military nuclear facilities in phased manner
- Placing civil nuclear facilities under IAEA safeguards
- Signing and adhering to IAEA's additional protocol
- Continuing unilateral moratorium on nuclear testing
- Working with the US for the conclusion of Fissile Material Cut-Off Treaty (FMCT)
- Refraining from transfer of enrichment and reprocessing technology to states that do not have them and supporting international efforts to limit their spread.
- US has shown its support in 2010 and 2015, president visit to India. UK, France and Russia are also in favour, only China opposes.

38. WEAPON CONTROL REGIMES: WASSENAAR ARRANGEMENT

- **Introduction:** The Wassenaar arrangement on Export Controls for Conventional Arms and Dual Use Good and Technologies is a multilateral export control regime with 42 participating states including many former COMECON(Warsaw) countries.
- **Establishment**
 - July 1996
 - Wassenaar, Netherlands
 - **Secretariat: Vienna**
- **Aim:** The Wassenaar Arrangement was established to contribute to regional and international security and stability by promoting transparency and greater responsibility in transfers of conventional arms and dual use goods and technologies, thus preventing established accumulation.
 - Member countries are required to ensure that transfers of these items don't contribute to the development or enhancement of military capabilities which undermine the goals of security and stability.
- **Membership**
 - **42 Participating Members**
 - In Dec 2017, India became the 42 members
 - China is not a member of this grouping.
 - Admission requires states to
 - Be a producer or exporter of arms or sensitive industrial equipment
 - Maintain non-proliferation policies and appropriate national policies, including adherence to
 - NSG, MTCR, Australian Group
 - NPT, Biological Weapon Convention, Chemical Weapon Convention



39. WEAPON CONTROL REGIME: AUSTRALIA GROUP

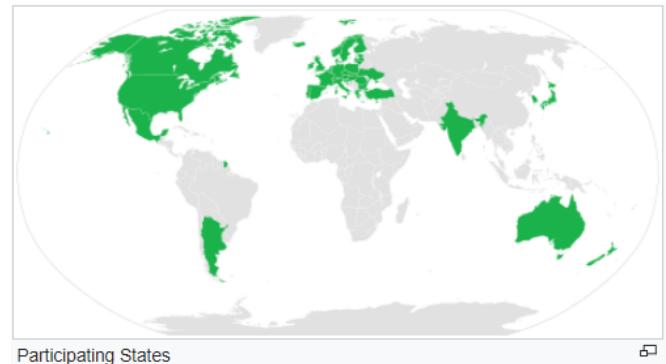
- **Introduction:** It is an informal group of countries (now joined by the European Commission) established in 1985 (after the use of chemical weapons by Iraq in 1984) to help member countries to identify those exports which need to be controlled so as not to contribute to the spread of chemical and biological weapons. So, it is one of the multilateral export control regimes (MECR).

- **Naming:** The group has been so named because of Australia's initiative to create the group. Australia also manages the secretariat.

- **Membership**

- **Member countries:**

- The group consists of 43 countries including all 28 members of EU, Ukraine and Argentina.



- **India became the 43rd Member** in January 2018.
- **Note: China, Russia and Pakistan** are not members of the group.
- **Meeting:** Delegations representing the members meet every year in Paris, France.

- **Control**

- Members of the group maintain **export controls on a uniform list of 54 compounds**, including several that are not prohibited for export under the Chemical Weapons Convention, but can be used in the manufacture of chemical weapons.

- **Significance of India's membership**

- India's membership shows that our export controls and safeguards for biological and chemical agents, equipment, technologies meet the benchmark established by the international community.
 - It is understood that India's membership of AG will also boost India's membership bid for the NSG, which is being opposed by China.

40. NON PROLIFERATION TREATY (NPT) – INDIA NOT A SIGNATORY

- **Introduction:** The Treaty on Non-proliferation of Nuclear Weapons, commonly known as NPT, is an international treaty whose **objective** is to
 - Prevent the spread of nuclear weapons and weapons technology (non-proliferation)
 - Promote cooperation in the peaceful uses of nuclear energy (peaceful uses)
 - Further the goal of achieving nuclear disarmament and general and complete disarmament (disarmament)
- **Dates**
 - Open for signature in 1968, the treaty entered into force in 1970.
 - On 11 May 1995, the treaty was extended indefinitely.
- **Membership**
 - A total of 191 states have joined NPT
 - North Korea, acceded in 1985 but never came into compliance, announced its withdrawal in 2003.
 - **Four UN member states who have never joined.**
 - India
 - Pakistan

- Israel
- South Sudan
- **Nuclear Weapon States**
 - The treaty recognizes five states as nuclear weapon states
 - The USA
 - Russia
 - United Kingdom
 - France
 - China
 - Four other states known or believed to possess nuclear weapons
 - India
 - Pakistan
 - North Korea
 - Israel
- **Central Bargain of the treaty**
 - The NPT is often seen to be based on the central bargain: "The NPT non-nuclear weapon states agree never to acquire nuclear weapons and the NPT nuclear weapon states in exchange agree to share the benefits of peaceful nuclear technology and to pursue nuclear disarmament aimed at ultimate elimination of their nuclear arsenals".
- **Achievements**
 - At the time NPT was proposed, there were predictions of 25-30 nuclear weapon states in next 20 years.
 - Today only 5 states are not party and 4 of them are nuclear weapon states.
 - Several additional measures
 - NSG
 - IAEA Additional Protocol
- **Limitations**
 - Failed in disarmament
 - 5 recognized nuclear weapon states have a stockpile of 22,000 warheads. Article VI of the treaty "obligates the nuclear weapon states to liquidate their nuclear stockpiles and pursue complete disarmament". There is no sign of this happening.
- **Why India has not joined**
 - **Haves and Have nots**
 - **NPT Is flawed:** it did not recognize the need for universal, non-discriminatory verification and treatment.
 - **India's own security concerns**
 - **Nuclear weapons as active tools of international diplomacy**
 - **India also remains a strong proponent of universal disarmament.**

41. COMPREHENSIVE NUCLEAR TEST BAN TREATY (CTBT)

- **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 test 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 March 2020, 8 annex-2 states have not ratified**
 - USA, China, Egypt, Iran and Israel have signed but not ratified
 - India, North Korea and Pakistan have not signed the treaty.
 - Total 184 countries have signed the treaty (16 without ratification) - As of March 2020.

- **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.
- **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 longer 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.

42. OPEN SKIES TREATY

- **Why in news?**
 - IN NOV 2020, **USA formally withdrew from OPEN Skies Treaty**.
 - In Jan 2021, Russia also withdrew from OST.
- **What is Open Skies Treaty?**
 - It is an **accord** that allows participants to fly unarmed reconnaissance flights over any part of their fellow member states.

- The treaty was proposed for the first time in 1955 by the former US President Dwight Eisenhower as a means to deescalate tensions during the Cold War. But it could eventually be signed only in 1992 between the NATO members and the former WARSAW Pact countries following the disintegration of USSR. It came into force in 2002.
 - A country can undertake aerial imaging over the host state after giving notice 72 hours before, and sharing its exact flight path 24 hours before.
 - The **information gathered** such as on troop movement, military exercises, and missile deployment has to be shared with all the member states.
 - **Only approved imaging equipment** is allowed on the surveillance flights, and officials from the host state can also be on board throughout the planned journey.
- **Significance of OST**
 - **Openness and transparency** building confidence among the member countries. It thus reduces the chances of accidental war.
 - It gives **key information** which advanced satellite imagery can't provide till now.
 - **Why has US withdrawn?**
 - Many experts in USA have, for over a decade, accused Russia of non-compliance with the OST protocols and have blamed them for obstructing surveillance flights on its territory, while misusing its own missions for gathering key tactical data.
 - USA has **advanced its satellite imagery capabilities** like no other country. At the same time, it has **not advanced its surveillance aircrafts** while **Russia has gained an unfair technical advantage under the OST** by introduction of a new digital electro-optical sensor to its Tupolev Tu-154 aircraft used for Open Skies Flight. So, remaining in this treaty may not be useful for USA.

43. IMPORTANT REPORTS

A) DEMOCRACY INDEX, 2021

- Released by **the Economist Intelligence Unit (EIU)** which is a UK-based private company which publishes the weekly newspaper ***The Economist***.
- It ranks 167 countries based on 60 indicators divided into **5 parameters**
 1. Electoral Process and Pluralism
 2. Functioning of Government
 3. Political Participation
 4. Political Culture
 5. Civil Liberties.

B) VARIETIES OF DEMOCRACY REPORT

- **About V-Dem**
 - » Varieties of Democracy (V-Dem) is a **new approach to conceptualizing and measuring democracy**.

- It provides a multidimensional and disaggregated dataset that reflects the complexity of the **concept of democracy as a system of rule that goes beyond the simple presence of elections**.
 - It not only takes into account the electoral dimension (free and fair elections), but also the liberal principle that a democracy must protect "individual minority rights against both the tyranny of the state and the tyranny of the majority".
 - The report **classifies countries into four regime types** based on their score in the **Liberal Democracy Index (LDI)**:
 - **Liberal Democracy**
 - **Electoral Democracy**
 - **Electoral Autocracy**
 - **Closed Autocracy**
 - The **Liberal Democracy Index (LDI)** captures both liberal and electoral aspects of a democracy based on 71 indicators that make up the **Liberal Component Index (LCI)** and **Electoral Democracy Index (EDI)**.
 - The **LCI measures** aspects such as protection of individual liberties and legislative constraints on the executive;
 - The **EDI considers** indicators that guarantee free and fair elections such as freedom of expression and freedom of association.
 - In addition, **LDI also uses Egalitarian Component Index** (to what extent different social groups are equal), **Participatory Component Index** (health of citizen groups, civil society organizations), and **Deliberative Component Index** (whether political decisions are taken through public reasoning focused on common good or through emotional appeals, solidarity attachments, co-ercion).
- » It is a monumental study from the **University of Gothenburg, Sweden**. The report is backed by EU, and funded by a multitude of different institutions and think tanks, ensuring a robust access to data.

C) FREEDOM HOUSE'S REPORT: FREEDOM IN THE WORLD

- **Details**
 - **Freedom House** is a US based human rights watchdog.
 - It publishes an annual report - Freedom in the World - which **assesses the political and civil liberties** around the world.

2) TRANSPARENCY INTERNATIONAL

- **About Transparency International**
 - It is an international not for profit NGO which works towards combating global corruption and preventing criminal activities arising from corruption.
 - It was founded in 1993 and is based in Berlin, Germany.

A) CORRUPTION PERCEPTION INDEX

- It ranks **180** countries and territories based on how corruption in their public sector is perceived to be.
- It is a composite index i.e., it draws upon corruption related data by a variety of reputable institutions.
- It uses a scale of 0 to 100 (0 is highly corrupt and 100 is very clean)
- **Some limitations of the CPI**
 1. Experts argue that CPI is not a reflection of the corruption environment of a country and it fails to highlight the pressure points.
 2. It is **not truly representative** - It only uses expert assessments and surveys of business people, excluding surveys of public. This generates **sample bias** as business elites are generally less negative about forms of corruption that favor their own group.

B) GLOBAL CORRUPTION BAROMETER

- It is the largest survey in the world tracking public opinion on corruption

3) GLOBAL PRESS FREEDOM INDEX (PFI)

- Published by **Reporters without Borders** (RSF): It is an international NGO whose self-proclaimed aim is to defend and promote media freedom. It is headquartered in Paris and has consultative status with the UN.
- The **objective of the World Press Freedom Index**, which it releases every year, “is to compare the level of press freedom enjoyed by journalists and media in 180 countries and territories” in the previous calendar year
- **RSF defines Press Freedom** as “the ability of journalists as individuals and collectives to select, produce, and disseminate news in the public interest independent of political, economic, legal, and social interference and in the absence of threats to their physical and mental safety”
- **Method Used:**
 - Countries are ranked after being assigned a score from 0 to 100, with 100 representing the highest possible level of freedom and 0 the worst.
 - The scoring has **two components**:
 - **A quantitative one**: It tallies abuses against journalists and media outlets
 - **A qualitative analysis** based on the responses of press freedom specialists (journalists, researchers, human right defenders) to an RSF questionnaires.
- **2022 World Press Freedom Index:**
 - India's ranking has fallen to 150/180 countries (from 142 last year)
 - The **top three positions** have been given to **Nordic trio** – Norway (92.65 score), Denmark (90.27) and Sweden (88.84).
 - **Norway** has topped for the fifth year in running.

4) WORLD JUSTICE PROJECT – OPEN GOVERNMENT INDEX AND RULE OF LAW INDEX

- WJP is an international civil society organization with the stated mission of "working to advance the rule of law around the world".
 - It works through **three programs:**
 - Research and Scholarship
 - The WJP Rule of Law Index
 - Engagement
 - It seeks to increase public awareness about the foundational importance of rule of Law, stimulate government reforms and develop practical programs at community level.
 - It was released first in 2015

A) ABOUT THE OPEN GOVERNMENT INDEX

- WJP's **Open Government Index** is the first effort to measure government openness based on general public experience and perception worldwide.
- Open government index is based on the following dimensions:
 - Publicized Laws and government data
 - Right to Information
 - Civil Participation
 - Complaint Mechanism
- The index was first released in 2015.

B) ABOUT THE RULE OF LAW INDEX

- It is the world's leading source for original, dependent data on the rule of law.
- It measures rule of Law based on the experiences and perceptions of the general public and in-country legal practitioners and experts worldwide.

44. NOT VERY IMPORTANT INDICES AND REPORTS

1) ACADEMIC FREEDOM INDEX – GLOBAL PUBLIC POLICY INSTITUTE

2) OXFAM

- It is an international confederation of 20 NGOs focusing on alleviating global poverty. It was formed in 1995 by a few NGOs to share knowledge and resources and combine their efforts in fighting against poverty and injustice.
 - » The name "Oxfam" comes from the oxford committee of famine relief, founded in Britain in 1942. The group campaigned for food supplies to be sent through an allied naval blockade to starve women and children in enemy occupied Greece during the WW-II.

3) FOOD WASTE INDEX REPORT – BY UNEP AND PARTNER ORGANIZATIONS

4) HENLEY PASSPORT INDEX

5) GLOBAL CHILDHOOD REPORT AND END OF CHILDHOOD RANKING 2021 – BY SAVE THE CHILDREN (A NOT FOR PROFIT ORGANIZATION)

- 6) WORLD COMPETITIVENESS INDEX BY INTERNATIONAL INSTITUTE FOR MANAGEMENT AND DEVELOPMENT (IMD)
- 7) IMD WORLD TALENT RANKING
- 8) GLOBAL TALENT COMPETITIVENESS INDEX (GTCI) BY INSEAD BUSINESS SCHOOL
- 9) GLOBAL LIVEABILITY INDEX – ECONOMIC INTELLIGENCE UNIT (EIU)
- 10) WORLDWIDE COST OF LIVING SURVEY, 2020 – BY ECONOMIC INTELLIGENCE UNIT (EIU)
- 11) GLOBAL PEACE INDEX (GPI) BY THE INSTITUTE OF ECONOMICS AND PEACE
- 12) GLOBAL TERRORISM INDEX BY THE INSTITUTE OF ECONOMIC AND PEACE
- 13) GLOBAL ECONOMIC FREEDOM INDEX – BY FRASER INSTITUTE CANADA
- 14) GLOBAL SMART CITY INDEX BY (THE INSTITUTE OF MANAGEMENT AND DEVELOPMENT IN COLLABORATION WITH SINGAPORE UNIVERSITY)




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BOOKLET-35

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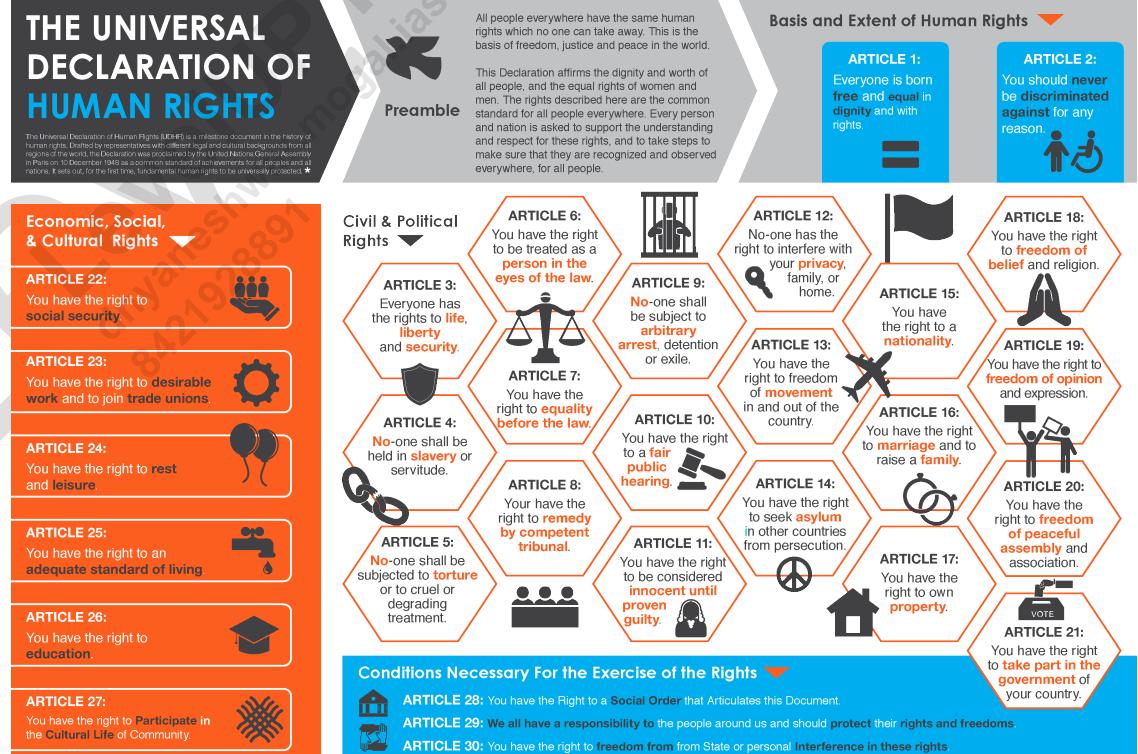
1. UN BODIES, CONVENTION, SUMMITS ETC.

1) ARTICLE 99 OF UN CHARTER

- **Why in news?**
 - » Article 99 of the UN Charter invoked for the first time in decades as Israel invokes Gaza (Dec 2023)
- **Article 99:** "The Secretary-General may bring to the attention of the Security Council any matter which in his opinion may threaten maintenance of international peace and security".
 - » **More details:** It is seen as a discretionary power. According to the UN, the **President of the Security Council is under the obligation to call a meeting of the Council** if the Secretary-General brings to the attention of the Council any matter under Article 99
- **UN Secretary General Antonio Guterres** as invoked Article 99 of the UN Charter in a bid to establish ceasefire amid the Israel's military action on the Gaza Strip.

2) UNIVERSAL DECLARATION OF HUMAN RIGHTS (UDHR)

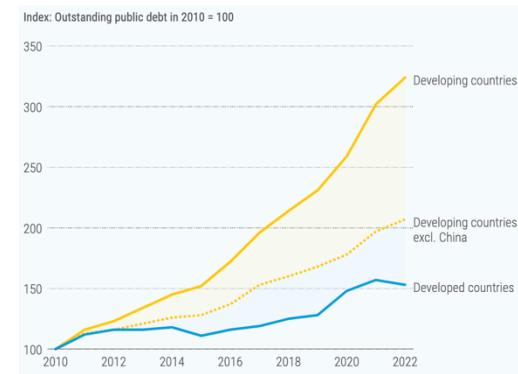
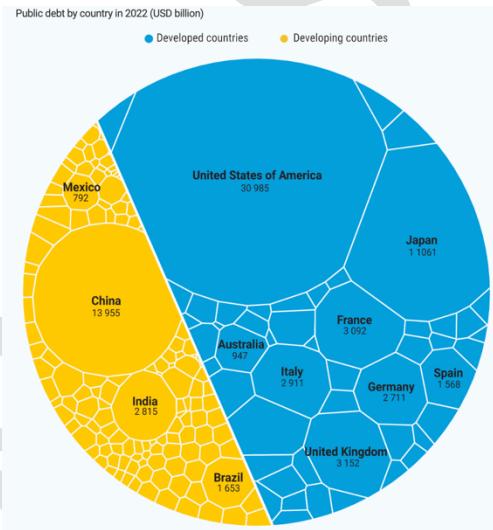
- **75 years ago**, on 10th Dec, 1948, the UNGA approved UDHR at a meeting in Paris - laying one of the foundation stones of the international order that emerged following the horrors of WW-II.
- **Some details about the UDHR:**
 - The document consist of a preamble and 30 articles setting out fundamental rights and freedoms.
 - **Article-1:** "All humans being are born free and equal in dignity and rights".
 - **Article 2:** says that everyone is entitled to all the rights and freedoms the declaration sets out, "without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status."



- **Background: Need of Universal Declaration of Human Rights (UDHR)**
 - » The declaration was born of the "never again" sentiment among political leaders after the two world wars and the holocaust.
- **Is it legally binding?**
 - » The declaration isn't a treaty and isn't legally binding in itself, but the principles it sets out have been incorporated into many countries' laws and it is viewed as the basis for international human rights law.

3) GLOBAL CRISIS RESPONSE GROUP

- **About GCRG:**
 - » The GCRG was set up by the United Nation Secretary General (UNSG) in March 2022 to address the urgent and critical global issues pertaining to interlinked **crisis in food, security, energy, and finance** and to coordinate a global response.
 - » The GCRG is overseen by the Champions Group comprising of HOS/HOGs of Bangladesh, Barbados, Denmark, Germany, Indonesia, and Senegal.
 - » The UN Deputy Security General leads the steering committee of the GCRG.
- **Update: July 2023: India has joined GCRG, accepting an invitation from UNSG Antonio Guterres to PM Modi.**
 - » The decision to join reflects India's increasing global leadership and commitment addressing contemporary global challenges.
 - » India's participation will boost efforts of UN in finding result-oriented solutions on developmental issues that impact the world, particularly developing countries.
- **Update: July 2023: Report 'A World of Debt: A growing burden to global prosperity'**
 - » **Global Public Debt at Record Highs:** Public debt has increased more than fourfold since 2000 (USD 22 trillion in 2002 to USD 92 trillion in 2022)
 - » **Around 30% of Global public debt is owned by developing countries.**
 - » **Public debt is growing faster in the developing world:**
 - » **A growing number of countries** are facing high levels of debt.
 - » **Public debt can be vital for development.** But at the same time, it can also be a heavy burden. It will be the case when public debt grows too much too fast.



4) 2023 IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

- In support of the UN SDG Goal 13, to take urgent action to combat climate change and its impact.
- **Background:**
 - » In 2018, IMO adopted an initial strategy, on the reduction of GHG missions from ships.
 - » In Oct 2018, IMO approved a follow-up program, intended to be used as a planning tool in meeting timelines identified in the initial IMO Strategy upto 2023. Further, the initial strategy had envisaged that a revised strategy would be adopted by 2023.
- **In July 2023**, IMO adopted the new strategy: **Key Highlights**
 - » The 2023 IMO GHG Strategy represents a framework for Member States, setting out the future vision for international shipping, the levels of ambition to reduce GHG emissions and guiding principles.
 - » **Levels of Ambition** directing the 2023 IMO GHG Strategy are as follows:
 1. Carbon Intensity of Ships to decline through further improvement of energy efficiency for new ships.
 2. Carbon intensity for international shipping to decline to reduce CO2 emissions per transport work, as an average across international shipping, by at least 40% by 2030, compared to 2018.
 3. Uptake of zero or near zero GHG emission technologies, fuels and/or energy sources to represent at least 5% striving or 10% of the energy used by international shipping by 2030
 4. Peak GHG emissions from international shipping ASAP and to reach net-zero GHG emissions by or around, close to, 2050.
 - » The 2023 IMO GHG strategy also introduces indicative checkpoints to reach net zero GHG emissions from international shipping:
 1. Reducing annual GHG emissions from international shipping by at least 20%, striving for 30%, by 2030 from 2008 levels and by 70% (striving for 80%), by 2040 from 2008 levels.

5) UNITED NATION CONVENTION AGAINST TRANSNATIONAL ORGANIZED CRIME (UNCTOC) AND THE PROTOCOLS THERETO

- **Why in news?**
 - » Minister of State for Home Affairs Shri Nithyanand Rai attends two-day conference to mark the 20th anniversary of UNCTOC at Palermo, Italy (Sep 2023)
- The UNCTOC was adopted by UNGA in 2000. It is the main international instrument against transnational organized crime. It is also known as Palermo Convention.
- It entered into force in 2003.
- The convention is supplemented by three protocols:
 - » The Protocol to Prevent Suppress and Punish Trafficking in Persons, especially Women and Children
 - » The Protocol against Smuggling of Migrants by Land, Sea and Air.

- » The Protocol against Illicit Manufacturing or and Trafficking in Firearms, their parts and components and Ammunition.
- Countries must first become party to the convention before becoming parties to any of the protocol.
- India signed the convention and the three protocols in Dec 2002.
 - » CBI is the nodal agency to deal with UNTOC.

6) UNITED NATIONS FORUM ON FOREST (UNFF)

- Why in news?
 - » The MoEF&CC organized a Country Led Initiative (CLI) event as part of the UN Forum on Forests from 26-28th Oct 2023 at the Forest Research Institute (FRI), Dehradun, Uttarakhand (Oct 2023: Source-PIB)
- About UN Forum on Forests (UNFF)
 - » It promotes, management, conservation, and sustainable development of all types of forests.
 - » It was established in 2000 by the UN Economic and Social Council (ECOSOC) of the UN.
 - » The forum meets annually at the UN HQ in New York and brings representation from all member states and forest related agencies for high-level dialogue on technical matters in odd years and policy matters on even years.
 - Note: The eighteenth session of UNFF (UNFF18) was held in New York in May 2023 and the UNFF19 will be held in May 2024.
 - » Note: The forum has universal membership and is composed of all member states of UN and Specialized agencies.
 - » India is a founding member of the forum.
- About Country Led Initiative:
 - » The CLI's primary goal is to contribute to the discussions of UNFF regarding the implementation of Sustainable Forest Management (SFM) and the UN Strategic Plan for Forests (UN SPF).
 - » It also aims to facilitate the sharing of best practices among UNFF member states for the implementation of SFM and UN SPF
 - » Note: The UN General Assembly adopted the first-ever UN Strategic Plan for Forests for the period of 2017-2030. This Strategic Plan serves as a global framework for actions at all levels to achieve the sustainable management of all types of forests, including trees outside forests, and to combat deforestation and forest degradation.

7) UN STATISTICAL COMMISSION (UNSC)

- Why in news?
 - » India starts four-year term as UN Statistical Commission member (Jan 2024)
- About UN Statistical Commission:
 - » It was established in 1946 by UN Economic and Social Council.
 - » It is the highest body of the global statistical system. It oversees the work of the UN Statistics Division (UNSD) and is a Functional Commission of the UN Economic and Social Council.
 - » It brings together Chief Statisticians from member states from around the world.

- » It is the highest decision making body for international statistical development activities, responsible for setting of statistical standards and the development of concepts and methods, including their implementation at the national and international level.

A) IN APRIL 2023, INDIA WAS ELECTED TO THE UN STATISTICAL COMMISSION FOR A FOUR-YEAR TERM WITH 46/53 VOTES IN UN ECONOMIC AND SOCIAL COUNCIL.

- » **India and South Korea** have been elected from Asia Pacific region.

B) IN JAN 2024, INDIA BEGAN ITS FOUR-YEAR TERM AS UN STATISTICAL COMMISSION MEMBER.

- The Commission consist of 24 member countries of the UN elected by UN Economic and Social Council on the basis of equitable geographic distribution.
 - » **Five Members** are from African States; Four from Asia Pacific States; Four from East European States; Four from Latin American and Caribbean States; Seven from Western Europe and other States.
- India has been able to become a member after 2 decades.
- **Significance of the tenure:**
 - » The most crucial business India will participate in is the finalization and implementation of the 2025 System of National Accounts (SNA). The current estimates of national income are based on the 2008 SNA, with 2011-12 as the base year.

C) 55TH SESSION OF THE UN STATISTICAL COMMISSION (FEB - MARCH 2024)

- At the UN headquarters -> New York.

8) UN COMMISSION FOR SOCIAL DEVELOPMENT (UN CSOCD)

- It is one of the eight commissions established by the UN ECOSOC since 1946 to assist it in carrying its work.
- Since the World Summit for Social Development in Copenhagen in 1995, the CSocD has been the key UN body in charge of the follow up and implementation of the Copenhagen Declaration and Program of Action.
- **CSocD** consist of 46 members elected by ECOSOC based on equitable geographical distribution.
- **India chairs 62nd session of CSocD** (Feb 2024)
 - » It's a historic moment for India as it was the first time since 1975 that the country had held this esteemed position within the CSocD.
 - » India's Permanent Representative to the UN Ruchira Raj was elected as the chair of the CSocD.

9) UN RELIEF AND WORK AGENCY (UNRWA) FOR PALESTINIAN REFUGEES IN THE NEAR EAST

- **About UNRWA**
 - » Following the 1948 Arab-Israel Conflict, UNRWA was established by **UNGA Resolution 302 (IV) of Dec 1949** to carry out direct relief and works programmes for Palestinian Refugees.

- The UNRWA definition of refugee covers Palestinians who fled or were expelled from their homes during the 1948 war.
- It started functioning on 1st May 1950 and is funded almost entirely by voluntary contributions from UN member states. It receives some funding from UN Budget which is mostly used for International Staffing Cost.
- In the absence of solution to the Palestinian Refugee Problem, the UNGA has repeatedly renewed UNRWA's mandate.
- The agency's human development and humanitarian services encompass primary and vocational education, primary health, relief and social services, infrastructure and camp improvement, microfinance and emergency response, including in situations of armed conflict.
- It is unique in terms of its long-standing commitment to one group of refugees.

- » UNRWA operates in five areas:
 - Jordan, Lebanon, Syria, the Gaza strip, and the West Bank, including East Jerusalem.
- » Outside these areas the aid for Palestinian refugees is provided by United Nations High Commissioner for Refugees (UNHCR).

A) PAUSING OF THE FUNDING FOR THE AGENCY (JAN 2024)

- USA and 8 other western countries, which together provide more than half of the UNRWA's 2022 budget, have decided to pause funding for the agency. The development could have had severe implications for Palestinians in Gaza.
- UN asked the countries to reconsider their decision to suspend the funding as 2 million Palestinian in Gaza are dependent on UNRWA services that could be scaled back if the funding is not restored.
- What has Israel accused UNRWA of?
 - » It has alleged that 12 staff of UNRWA were involved in the 7th Oct 2023 attack. It has also claimed that Hamas siphons off funds given to UNRWA and fights from in and around the agency's facilities.
 - » Israel has also alleged that "Hamas tunnels (are) running next to or under UNRWA facilities and accuses the agency of teaching hatred of Israel in its schools,"
- Updates: Canada lifting ban on UNRWA funding after facing severe criticism for cutting assistance during Israel's war on Hamas (March 2024)
 - » Finland will also resume funding to the UN agency (March 2024)

2. INTERNATIONAL GROUPINGS

1) SASEC

- **Why in news?**

» Prime Minister Modi laid the foundation stone for multiple road upgradation projects worth Rs 34,00 crore, under which 43 roads including 38 bridges will be upgraded as part of SASEC Corridor Connectivity (Feb 2024)

- **Introduction**

» SASEC Program was formed in 2001 in response to the request of the four countries in South Asia - BD, Bhutan, India and Nepal - from ADB to assist in **facilitating economic cooperation among them**. The four countries comprised the **South Asia Growth Quadrangle (SAGQ)**, formed in 1996, as a vehicle of accelerating sustainable

» Now, it brings together Maldives, Sri Lanka, India, Nepal, Bhutan, Bangladesh and Myanmar in a **project-based partnership to promote regional prosperity by improving cross-border connectivity, boosting trade among member countries, and strengthening regional economic cooperation.**

▪ **Membership**

- Founding members were BD, India, Nepal and Bhutan.
- Maldives and Sri Lanka joined in May 2014.
- Myanmar became a part of this in Feb 2017.

» **Secretariat**

- Manila, Phillipines-based Asian Development Bank serves as the secretariat of the SASEC countries.

- **Need of such a program**

1. **Poor Economic integration of South Asia**
2. **Poor Cross Border Energy Networks**
3. **Poor Cross border telecommunication connections**
 - Better telecommunications connections would also expand personal and business links, increasing trade at all levels.

- **Key Priority Areas Cooperation for SASEC**

- » In 2005, SASEC countries agreed on priority sectors for investment and coordinated action:
1. **Transport**
 2. **Trade Facilitation**
 3. **Energy**
- » In 2016, SASEC countries approved the SASEC Operational Plan 2016-2025, a 10-year strategic roadmap, which introduced **4. Economic Corridor Development (ECD) as a fourth sectoral area of focus**. SASEC also supports regional initiatives in ICT.

- **Significance**

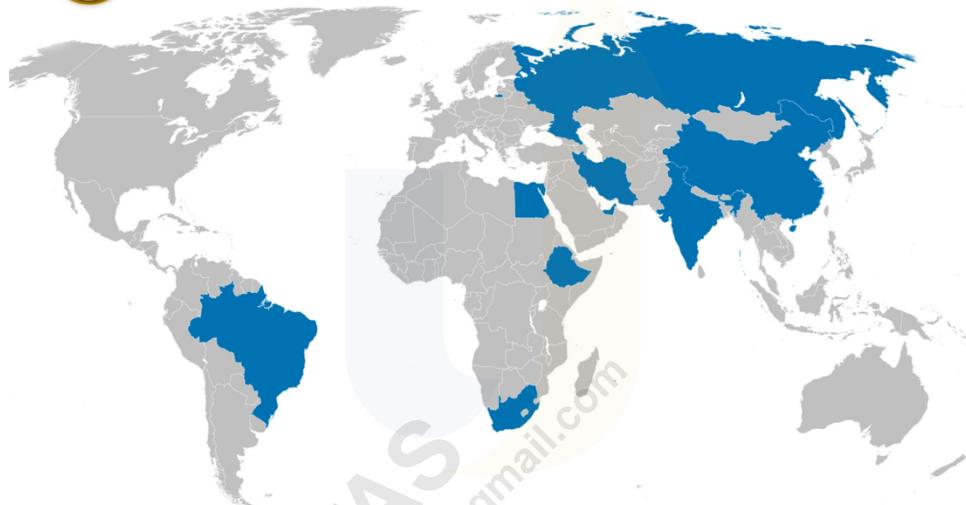
- » Promoting trade, cooperation and economic growth in the region
- » Compensate for the failure of SAARC.

2) BRICS

- **BASICS**

- » BRICS is an intergovernmental organization which comprise of Brazil, Russia, India, China, South Africa, Egypt, Ethiopia, Iran, and UAE.

- » Originally, the grouping was **BRIC** (and only consisted of Brazil, Russia, India and China). It became **BRICS** with the induction of South Africa in 2010.
- » **Note:** The term "BRIC" was coined in 2001 by the then chairman of Goldman Sachs Asset Management Jim O'Neil, in his publication "Building Better Global Economic BRICS". On the basis of economic analysis he claimed that the four economies would individually and collectively occupy far greater economic space and become among the world's largest economies in the next 50 years.
- » **9 Members:** The founding countries - Brazil, Russia, India and China held the first summit in Yekaterinburg in 2009, with south Africa joining in 2010. Iran, UAE, Ethiopia and Egypt joined the organization on 1st Jan 2024.
- » **Note:** All five initial countries are member of G20.



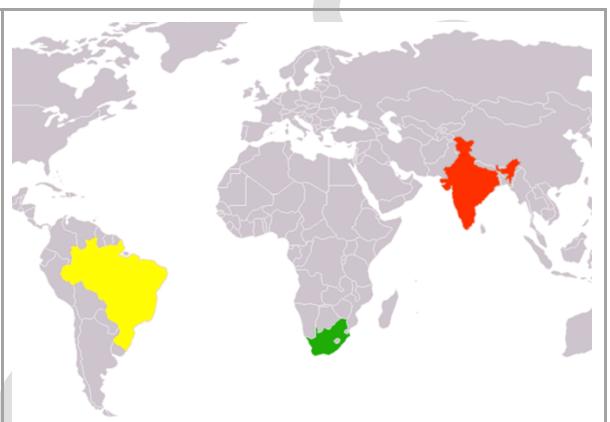
- **AIMS and Objective**
 - » Promoting a **more legitimate international system** including UNSC and IMF/WB reforms
 - » Promote **South-South Cooperation** and regional cooperation.
 - » Act as a bridge between developed and developing countries.
 - » Present a **united front of developing countries** in climate change negotiations.
 - » Embrace cultural diversity and promote people to people contact among BRICS countries
- In Recent years BRICS has **diversified** its objectives and is also working towards **fighting protectionism** and promoting & protecting multilateralism. Focus on counterterrorism has also increased.
- **Significance of BRICS**
 - » BRICS countries are emerging as new centre of gravity in the international economic system.
 - BRICS countries now comprise of more than 40% of the world's population and have surpassed G7 countries in terms of purchasing power parity.
 - » **Shaping of global economic and political architecture:**
 - BRICS have managed to **increase the representation and say of developing countries and global south** in major international organizations such as IMF, WB and WTO in recent years.

- BRICs is also championing an open and multilateral world order against a growing tide of protectionism.
 - Push towards de-dollarization.
- » New Development Bank has made BRICS a serious international actor in financial arena.
- » Expanding the group's footprint in key regions like middle east, Africa etc

3) IBSA FORUM

It's a unique forum that brings together India, Brazil, and South Africa (three large democracies and major economies from three different continents). All three countries are developing, pluralistic, multi-cultural, multi-ethnic, multilingual and multi-religious nations.

The group was formalized and named the IBSA Dialogue Forum when the foreign ministers of the three countries met in Brasilia on 6th June 2003 and issued the Brasilia Declaration.



Cooperation in IBSA is on three fronts:

- first, as a forum for consultation and coordination on global and regional political issues, such as, the reform of the global institutions of political and economic governance, WTO/Doha Development Agenda, climate change, terrorism etc.;
- second, trilateral collaboration on concrete areas/projects, through fourteen working groups and six People-to-People Forums, for the common benefit of three countries; and
- third, assisting other developing countries by taking up projects in the latter through IBSA Fund

A) IBSA FUND

- The IBSA facility for poverty and hunger alleviation (IBSA Fund) was established jointly by India, Brazil, and South Africa in May 2004. It became operational in 2006 to identify replicable and scalable projects that can be disseminated to developing countries on a demand driven basis as examples of best practices in combating poverty and hunger.
- Since its inception, 42 project in 35 countries have been supported by the fund with disbursement of US\$46.78 million.
- India has been a regular contributor to the IBSA fund since its inception and has contributed more than \$18 million till date.
 - In Feb 2024, India contributed \$US 1 million to IBSA fund.
- The informal understanding so far has been that the partners countries sponsor projects corresponding to the proportion of their contribution to the fund.

- The fund has an appeal for small states who seek funding for small and medium sized project and it has proved to be a useful outreach tool with states which we are not able to assist through bilateral development projects.

4) WEIMAR TRIANGLE

- It is a regional alliance of France, Germany and Poland, created in 1991 in the Germany city of Weimar. The group is intended to promote cooperation between the three countries in cross-border and European Issues.
- It provides the three countries with a unique forum to coordinate approaches to cross-border and European issues. Along with the governments themselves, the parliaments and civil societies of the three countries are also working closely together.
- **Update:**
 - » **In Feb 2024**, the foreign ministers of the three countries met in the Paris Suburb of La Celle-Saint-Cloud to talk about Ukraine, amid other issues. They discussed about reviving the Weimer Triangle, a long dormant regional grouping that was designed to promote cooperation between France, Germany and Poland.

5) MISSION ASPIDES

- **In Feb 2024**, EU launched 'Mission Aspides' to protect Cargo ships in Red Sea from Houthi attack.
 - » **Note:** ASPIDES is the Greek for "the Shield".
- It is a naval mission to help protect cargo ships.
- It will be run out of Larissa in Central Greece - which is home to the Hellenistic Air Force and a NATO headquarters.
- **Note:** Previously, the USA had launched Operation Prosperity Guidance with a similar mission.

3. IMPORTANT SUMMITS

1) SUMMIT FOR DEMOCRACY

- **Why in news?**
 - » PM Addresses Summit for Democracy virtually. (March 2024)
- The first summit of the Summit for Democracy was a virtual summit hosted by US in 2021.
- The second summit was held in March 2023 and was co-hosted by USA, Costa Rica, Zambia, Netherlands, and Korea.
- The **third Summit for Democracy** kicked off in March 2024 in Seoul, South Korea amid global declines in democracy and the resurgence of authoritarian tendencies.
 - » The ambition is to strengthen democratic institutions, reverse consequential backsliding globally, and tackle thorny problems, including corruption.

- » Implementing the commitments made at the S4D3 and other bilateral events is key to fully deliver concrete and sustainable democratic and anti-corruption reforms at local, national and global levels.

4. MISCELLANEOUS REPORTS

1) HENLEY PASSPORT INDEX

- **Why in news?**
 - » India has fallen one position from last year in the recently released Henley Passport Index (HPI) 2024 (Feb 2024)
- **DETAILS**
 - » Henley Passport Index ranks all the passports of the world according to the number of countries their holders can travel to without prior visa. The ranking is based on exclusive data from the International Air Transport Association (IATA) and lists the countries that can be accessed visa-free, with an electronic visa (e-TA) or with a Visa-on-Arrival.
- **Key Highlights of the 2024 Index:**
 - » The most powerful passports in the world now allow citizens of France, Germany, Italy, Spain, Japan and Singapore to travel to 194/227 countries.
 - » Indian passport rank 85th in the list. This came as a surprise as now Indian passport can get visa free access to 62 countries in 2024 when compared to 60 countries in 2023.
 - **Ranking of Neighbours:** Pakistan (106), BD (102), Maldives (58)
 - » China (rank - 64) is saw a marginal jump from last year (rank-66).

2) WORLD INEQUALITY LAB – A RESEARCH PAPER

- **India's top 1% income and wealth shares** have reached historical highs and are among the very highest in the world: Paper released by World Inequality Lab (March 2024)
 - » By 2022-23, the top 1% income share in India was 22.6% and top 1% wealth share rose to 40.1%, with India's top 1% income share among the very highest in the world, higher than even South Africa, Brazil and USA



TARGET PRELIMS 2024

BOOKLET-36

PRELIMS MASTERS PROGRAM 2024

INTERNATIONAL MAPPING AND PLACES IN NEWS-3

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1. INDIAN OCEAN

1) AGALEGA ISLANDS

Agalega Islands consist of two outer islands located in the Indian Ocean. It is located 1050 km north of Mauritius Island. Agalega is a dependency of Mauritius.

The two islands have a total area of 26 sq km and a native population of about 300 people.

Agalega is run directly by PM of Mauritius through the Prime Minister's Office to the Outer Island Development Corporation (OIDC).

In Feb 2024, PM of India, Shri Narendra Modi and Mauritian PM Pravind Jugnauth jointly inaugurated an airstrip and the St. James Jetty on North Agalega Island in the Indian Ocean.

- » The development of the islands is in the socio-economic and national interest of the Mauritius and also aligns with India's vision for Indian Ocean.
- » The new jetty and the air strip will enable a large and more credible government presence on the islands.
- » It will also enable stationing or forward deployment of ships of the Mauritius Coast Guard.

Benefits for India:

- » Increased trust between the two countries.
- » The joint development of the islands underscores India's commitment to the vision of Security and Growth for All in the Region (SAGAR), and its willingness to assist smaller maritime nations in building capacity and developing capabilities.



Will Agalega become India's military base?

No. India understands the importance of sovereignty, and the sensitiveness of smaller nations when they interact with larger one. (Vice Admiral Biswajit Dasgupta (Retd) is a former Commander in Chief of the Eastern Naval Command, Indian Navy).

2. ARAL SEA

The Aral sea is situated in Central Asia, between the southern part of Kazakhstan and Northern Uzbekistan.

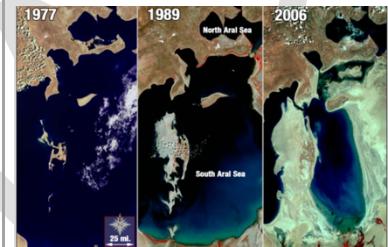
Till 1960s, it was the world's fourth largest saline lake (after Caspian, Balkash (Kazakhstan), Turkana (Kenya, Ethiopia)).

Two important rivers that feed into the lake are Syr Darya and Amu Darya rivers, reaching the sea through north and south respectively.

- Until the 1960s, the two rivers accounted for around 75-80% of the water supplied to the lake (rest was rainfall).



In 1960s, USSR decided to divert these rivers for irrigation purpose which has led to drastic reduction in the size of the sea.



Impact:

- Reduction in the size of the lake (the size of the lake has declined to less than 10% of its original size).
- Increase in salinity (lakes salinity level is risen from 10 gram/l to over 100 g/l);
- Death of marine species such as barbell, carps etc. (due to reducing water levels and salinity);

Restoration Strategy:

- The five central Asian countries adopted the Aral Sea Basin Program in 1994 as part of the restoration strategy. The program aimed to stabilize the basin's environment, rehabilitate the area around the sea, and improve the lake's water management.

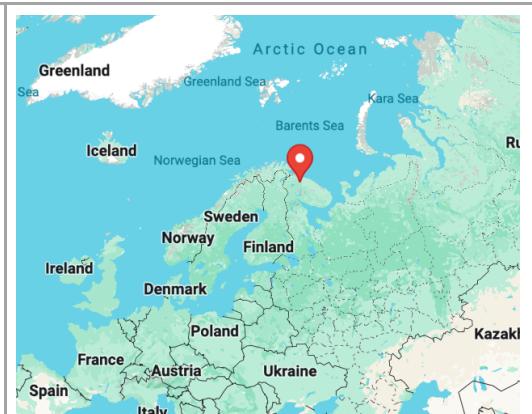
3. RUSSIA

1) MURMANSK PORT

Murmansk is a seaport located in the Northwestern Russia. It lies 200 km north of Arctic circle and is on the eastern shore of Kola Bay, 48 kms from the ice-free Barents sea.

The town was founded in 1915 as a supply port in WW-1. It was a base for the British, French, and American expeditionary forces against the Bolsheviks in 1918.

In WW-2 also the port served as the main port for the Anglo-American convoys carrying war supplies to the USSR through Arctic ocean.



Current scenario: Now, it is an important fish port having one of the largest fish processing facilities of Europe. It's ice-free harbour makes it Russia's only port with unrestricted access to the Atlantic and world sea route. From Dec - May it replaces the icebound St. Petersburg as the major port of the northwest. It is connected by railroad to St Petersburg and Moscow.

News: India's engagement with Russia's Arctic region has been strengthening with India-bound goods constituting the maximum share of cargo handled in 2023 (Jan-July) by Murmansk port.

- Coal was the main item imported in India from this Russian port.

Note: Kola peninsula is a peninsula in the extreme northwest of Russia, and one of the largest peninsula of Europe. It lies almost completely inside arctic circle and is bordered by Barent sea to the north and White sea to the east and north-east.

2) DAGESTAN (REPUBLIC OF DAGESTAN)

Dagestan is a province of Russia within the Russian Federation. Its official name is 'Republic of Dagestan'. It is the southernmost tip of Russia.

Dagestan translates as "land of the mountains". It is a mountainous territory located in the eastern part of the North Caucasus. It has Georgia and Chechnya to its west and Azerbaijan to its south. To its east is Caspian sea.

Diversity: The Republic of Dagestan has mainly Muslim population. It is linguistically and ethnically a varied region. It is Russia's most diverse region. There are at least 40 different ethnicities in the region along with more than 30 spoken languages.

News: Anti-Israel Protestors (numbered in 100s) stormed an airport in Makhachkala (capital of Dagestan) on 30th Oct 2023. This resulted in a chaos and injured more than 20 people. Israel expressed concern and urged Russia to protect Israelis in Dagestan and also inside the airport.



(Image: Wikimedia Commons)

Makhachkala, the capital of Republic of Dagestan is located on the Caspian sea coast.

3) CHECHNYA

Chechnya (officially the Chechen Republic) is a republic of Russia. It is located in North Caucasus region.

The republic forms a part of the North Caucasian Federal District. It is bordered by Russia proper on the north, Dagestan republic on the east and southeast, the country of Georgia on the southwest, and Ingushetia republic on the west.

Insurgency: History

Chechen-Ingush was designated as a republic in 1936.

Secessionist sentiments emerged in 1991 with the disintegration of USSR.

- A coup against local communist government was carried out in 1991, and the coup leader Dzhokhar Dudayev unilaterally declared **Chechnya's independence from Russian Federation** (subsequently Russia).
- In 1992, Chechnya-Ingushetia divided into **two separate republics** with Ingushetiya favoring Russia and Chechnya leader favoring independence.
- **Russian forces took over the capital of Chechnya (Grozny)** in March 1995 and Dudayev was killed in 1996. A peace treaty was signed in 1997.
- But after a bombing killed scores of civilians in Russia, the then PM Vladimir Putin blamed Chechnya and the **Russian forces re-entered Chechnya in 1999**.



Eventually in 2003, Chechan voters approved a new constitution that devolved great powers to the Chechen government, but kept the republic in the federation.

In 2004, Russian backed Ahmad Kadyrov became the President of Chechen. But he was killed in a bomb blast. With Russia's backing in 2006, his son Ramzan Kadyrov, gained the presidency. He had maintained support of Russia and in early 2009 he claimed that insurgency had been crushed.

As of 2023, Ramzan Kadyrov continues to be President of Chechnya.

Nevertheless, sporadic outbreak of violence including guerrilla attacks continue to occur. In addition, Jihadist group associated with IS exist in the region.

4) MOSCOW AND MARCH 2024 TERROR ATTACK

Moscow is the capital and the largest city of Russia. The city is located on Moskva River in central Russia. It is the most populous city of entire Europe and the largest city by land area on the European continent.

Note: In 1712, under the reign of Peter the Great, the Russian capital was moved to the newly founded St. Petersburg which diminished the Moscow's role and influence. But after, Russian revolution the capital was moved back to Moscow in 1918, where it became the political center of USSR and later of Russia.

March 2024 Terror Attack:

- The terror attack took place at Crocus City Hall on the outskirts of Russia on 22nd March and killed around 150 people. This is the deadliest terror attack Russia has seen in a decade.
- **Who has claimed the attack?**
 - Islamic State (IS) has claimed responsibility for the attack.
 - American officials have attributed it to ISIS-K, a branch of the group.
- **Russian authorities** have accused four men from Tajikistan of being behind the attack. Russian President Vladimir Putin have said that "Russian Islamists" carried out the attack, but also claimed without proof that a "window" had been prepared for the attackers to escape to Ukraine. Kyiv has denied the allegations.

Who are ISIS-K?

ISIS-K was formed in 2015 and has been active in AF, PAK, and Iran. It is branch of ISIS, the terror group that emerged in Iraq and Syria and at its peak, controlled a huge stretch of territory.

Why attack Russia?

Russia has been at the top or near the top of the list of ISIS for many years. Moscow's crucial role in the Syrian Civil War, when it intervened in support of the Syrian government and against ISIS is a primary reason.

ISIS propaganda has long targeted Russia for its brutal tactics in Chechen wars.



5) LAKE BAIKAL

It's a large rift lake in Russia. Lake Baikal is basically a rift valley, created by earth's crust slowly moving apart. In geological term is rift is young and active and widens about 4 mm per year. The fault zone is also seismically active.

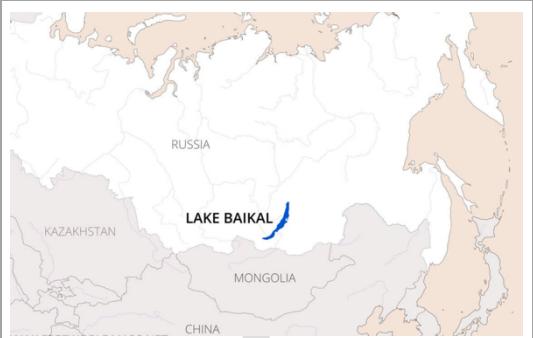
It is located in the southern Siberia.

7th largest lake in the world in terms of surface area and the largest in Asia.

It is also the world's largest freshwater lake in terms of volume of water. It stores more than 20% of world's fresh surface water. This is more than all the North America's great lake combined.

It is also the deepest lake (depth of 1620 km) in the world. (Lake Tanganyika (1436m); Caspian Sea (1,025 m); Vostok (900 m); Lake Martin (836 m));

It is also one of the UNESCO's World Heritage Site.



4. KACHIN PROVINCE

Location: It is the northernmost state of Myanmar bordering China in the north and east and India in the west.

China's claim: Various Chinese government over the years have claims over northern half of the Kachin state as Chinese territory since 18th century.

Reasons for insurgency in Kachin:

Removal of autonomy: When Kachin state was formed after the independence of Myanmar, it was allocated a lot of autonomy. But it changed after the 1962 Burmese coup d'etat. The Ne Win regime which came into power in 1962 unilaterally abrogated the Constitution.

Declaration of Buddhism as state religion: Kachin armed group was established in 1960, after the U Nu government announced the state religion as Buddhism. The Kachin people stopped believing in the government administration system, established after the federal union was agreed upon in 1947 agreement.

Kachin Independence Organization: With the unilateral abrogation of the Union of Burma Constitution by the Ne Win government in 1962, Kachin forces withdrew from Burmese army and formed the **Kachin Independence Army (KIA)** under the **Kachin Independence Organization (KIO)**.

The conflict between KIA and Myanmar forces have extended into 2020s.



5. GWADAR PORT

It is situated on Arabian Sea in Pakistan's Baluchistan Province. It is located around 170 km east of Chabahar Port.

It is under administrative control of the Maritime Secretary of Pakistan.

The port has substantial Chinese investment and features prominently in China Pakistan Economic Corridor.

News: On March 20, 2024, Pakistan security forces thwarted a complex coordinated attack on Gwadar Port Authority Complex in a



two hour long battle and claimed to have neutralized all eight militants. Two soldiers have been killed in action.

The Majeed Brigade of the Baluchistan Liberation Army (BLA), claimed the responsibility for the attack. They stressed that their fighters have targeted Pakistan's ISI and military intelligence facilities.

Note: Balochistan and Gwadar port are immensely important for Pakistan, especially for the army that has taken on responsibility of making the CPEC and its end port, Gwadar, a success story of China's BRI.

6. BALOCHISTAN PROVINCE

Balochistan is located in the southwest of Pakistan.

It is the country's largest and most sparsely populated province.

It has huge natural resources like oil reserves and abundant natural resources. But the ethnic Baloch are Pakistan's poorest and most under-represented people

Capital: Quetta



7. INSURGENCY IN BALOCHISTAN

1) HISTORY

- At the time of partition, Balochistan comprises of multiple chiefdoms owing allegiance to the British. Ahmed Yar Khan, the chief of Kalat, was the most powerful of these tribal chiefs, and hoped to secure an independent state for his people. However, he was forced to accede in 1948, after Pakistan invaded Kalat. This triggered the insurgency which continues even till today.
- **Other factors** which has fuelled insurgency in the region are:
 - » Economic deprivation
 - » Lack of political freedom
 - » Forced disappearance of thousands of men
 - » Extrajudicial killings of many of those reported missing
 - » Other forms of repression by Pakistani state.
- In many ways, China backed Gwadar port is a symbol of injustice for Balochi people. Despite rampant unemployment in the province, engineers and technical specialists were hired from Punjab, Sindh and even China. In recent years, Baloch militants have repeatedly targeted both Gwadar and Chinese nationals in the country.
- **Baloch armed groups** including, Baloch Liberation Army (BLA), Baloch Liberation Front (BLF), Baloch Nationalist Army (BNA), and Baloch Republican Guard (BRG) have created an operational umbrella

alliance under the banner of **Baloch Raaji Aajoi Sangar (BRAS)** in 2018 to coordinate their action on ground.

- » The BRAS have claimed more than 600 attacks and more than 600 casualties of armed forces in 2023.
- The Baloch insurgency in Pakistan is gaining momentum for the past two years and insurgents can regularly breach the perimeter security of Pakistan military and paramilitary installation across Balochistan in bold, frontal attacks.

2) MAJID BRIGADE

The Majeed Brigade is the separatist group of Baloch Liberation Army (BLA). It has claimed responsibility of the attack on complex outside Gwadar Port.

The Majed Brigade has been active since 2011 and is the BLA's dedicated suicide squad. The unit is named after two brothers, both of whom were called Majeed Langove (Sr and Jr).

History:

In May 1972, the National Awami Party (NAP) came to power in Balochistan. Nationally, the NAP sat in opposition to Prime Minister Zulfiqar Ali Bhutto's Pakistan People's Party (PPP). The NAP had long advocated for greater regional autonomy in Pakistan, and it was emboldened by the secession of BD in 1971.

But, Bhutto was not willing to give an concession and created problems in the functioning of NAP government in Balochistan. The NAP government was finally dismissed in Feb 1973. This led to both the insurgency and the Pakistani state repression becoming worse in Balochistan. Between 1973, thousands of insurgents and military officials were killed.

In this background, Majeed Langove Senior, then a young Baloch man, decided to assassinate Bhutto. In 1974, when Bhutto arrived in Quetta to attend a public gathering, Majeed senior waited atop a tree, a grenade in hand. He had no plans to escape and was most certainly going to die. He eventually died. The grenade burst in Majid Senior's hand as he waited for Bhutto's motorcade.

Junior's Sacrifice and formation of Majid Brigade:

The death of Majeed Senior was mythologized for posterity by the actions of his younger brother, Majeed Langove Junior, who was born two years after senior was killed. In 2010, Junior was killed in a fight against Pakistani forces. His death was mourned by nationalists across Balochistan. After it became widely known that he was the brother of Majid senior who too had given live four Balochi freedom, the Majeed Langrove brothers were raised to near mythical status.

When Aslam Achu, a BLA leader, decided to establish a suicide squad, he named it after 'Majeed' brothers as 'the Majeed Brigade'. The first attack by Majid brigade took place in 2011. After a long hiatus, the group became active again in 2018 and attacked Bus carrying chinese engineers in Dalbandin near the Pakistan-

Afghanistan border. The brigade has also attacked Chinese consulate in Karachi (2018), the Gwadar Pearl Continental Hotel (2019), and the Pakistani Stock Exchange in Karachi (2020).

8. EUROPE

1) CATALONIA

Catalonia is a historic region of Spain including north-eastern provinces of Girona, Barcelona, Tarragona, and Lleida. The autonomous community of Catalonia occupies a triangular area in the north-eastern corner of Spain.

It is bordered by France and Andorra to the north, the Mediterranean sea to the south and East. It also borders autonomous community of Valencia to the south and the autonomous community of Aragon, to the west.

The Pyrenees separate Catalonia from France.

Growing call for Independence: Since 2010s, there has been a growing support for Catalan independence.

- In Oct 2017, the Catalan Parliament unilaterally declared independence following a referendum that was deemed unconstitutional by the Spanish state.
- The Spanish senate voted in favor of direct rule by removing Catalan government and calling a snap regional election. The Spanish Supreme Court also imprisoned seven former ministers of the Catalan government on charges of rebellion and misuse of public funds. But in 2021, all those in Prison were pardoned by Spanish government.

In Dec 2023, Pere Aragones, the President of government of Catalonia wrote in Financial Times that Catalonia is a nation with a rich historical legacy, which is diverse and modern and is bound by its language, Catalan. A nation with persistent desire for self-governance dating back centuries. A nation that wants to be free, that wants to be able to be democratically and peacefully decide how it governs itself, want to create a new state, independent of Spain, but working together with it within the European Framework.



9. AFRICA

1) LAKE FAGUIBINE

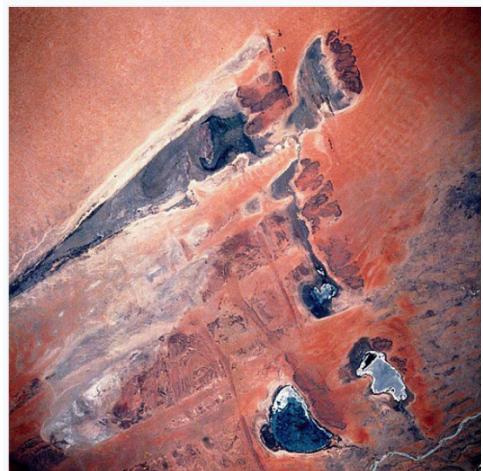
It was a lake in Mali on the southern edge of the Sahara desert. It was situated 75 km north of Niger river to which it is connected by system of smaller lakes and channels.

During heavy flooding the water from Niger river reaches the lake. But since the Sahel drought of 1970s and 80s the lake has mostly remained dry. Water has reached the lake in very few cases. All this has contributed to the partial collapse of the ecosystem of the region.

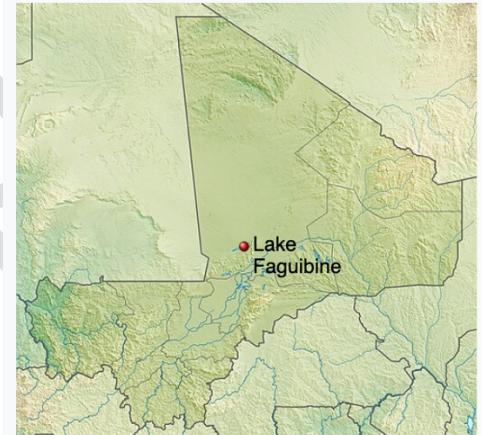
In the **year 2021**, the lake was completely dry.

The Lake Faguibine system: The lake forms a system of five interconnected low lying depressions which fill to different extent every year based on the level of rainfall and flood.

Lake Faguibine



Lake Faguibine (spear-shaped) from space, April 1991. The River Niger is shown at the bottom right hand corner, Lake Oro at the lower left and Lake Fati lower right



2) LAKE VOLTA

Lake Volta is an artificial lake in Ghana. It is formed by the Akosombo Dam over Volta river.

With a storage capacity of 153 Billion cubic meter, it is one of the largest artificial lakes in the world. It covers around 8502 sq km (3.6% of Ghana's area). The lake lies completely within Ghana.

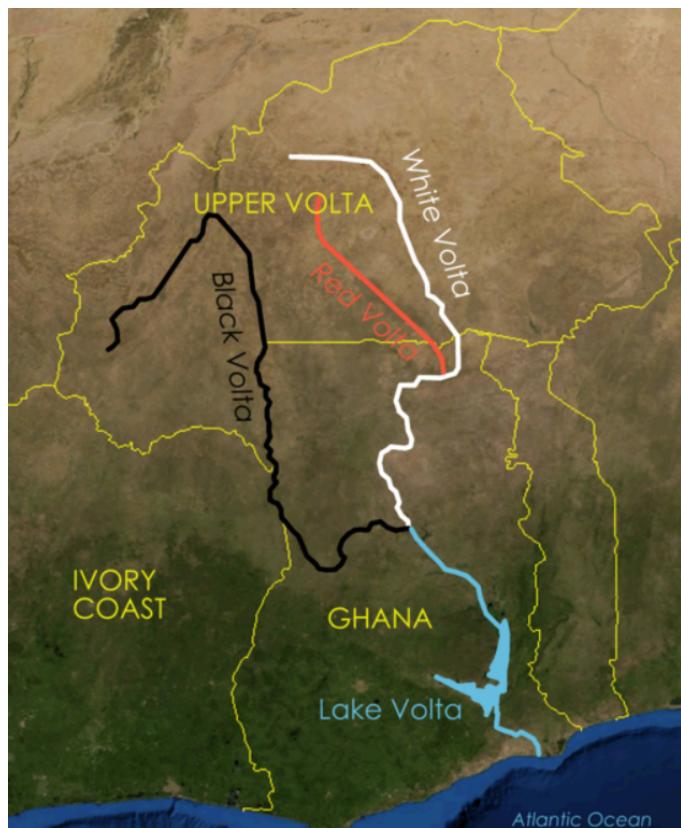
The lake is located on Prime Meridian.

Akosombo Dam holds back both the White Volta River and the Black Volta river which formerly converged where the middle of reservoir lies now, to form a single volta river.

The **present volta river** flows from the outlet of the dam's power house and spillways to the Atlantic Ocean in southern Ghana.



It is navigable and provides a cheap route connecting Ghana's Savanna to coastal region.



3) MOZAMBIQUE

It's a country located in south eastern Africa with capital as **Maputo**. It has a tropical climate. It has extensive coastline, fronting the Mozambique Channel, which separates mainland Africa from the Island of Madagascar.

Bordering countries: South Africa and Swaziland in south and southwest; It is bordered by Zimbabwe to its west; Zambia and Malawi on its north west and Tanzania to its north.

The **great Zambezi river** has provided ample water for irrigation and the basis for a regionally important hydroelectricity power industry.

It gained independence from Portugal in 1975. But it was soon engulfed in civil war.

1977-92: Civil War: Mozambican civil war between Frelimo government, with support from Cuba and USSR, and anti-communist Mozambican National



Resistance (Renamo) rebels, combined with sabotage from the neighbouring states of Rhodesia and South Africa. Over a million people die in the fighting and subsequent famines.

1990: Constitution was amended to allow multi-party system and first multi-party elections were held in 1994.

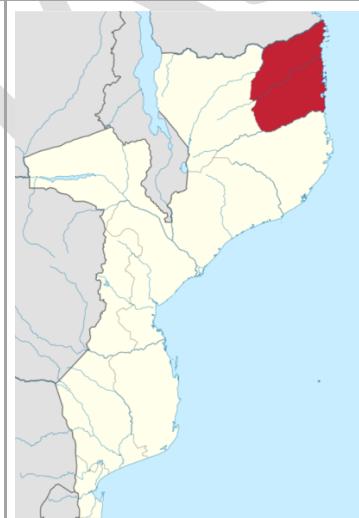
2017: A jihadist insurgency has begun in the northern side.

4) CABO DELGADO

Cabo Delgado: It is the northernmost province of Mozambique and borders Tanzania to its north and Indian Ocean to its east.

Starting 2017, armed Islamist extremists linked to the Islamic State of Iraq and Levant launched a jihadist insurgency in the Cabo Delgado region. The insurgent group sometimes referred itself as Shabaab. (Please note that they are different from Somali-Al Shabaab).

March 2024: More than 70 children are missing following recent jihadist attack in Mozambique's northern Cabo Delgado. They became separated from their family as thousands fled to a neighbouring province in recent weeks. There are fears that some of them may have been kidnapped by fighters linked to ISIS.



Cabo Delgado, Province of Mozambique

10. NORTH AMERICA

1) THE POPOKATEPETL VOLCANO

The Popocatepetl Volcano:

It is Mexico's most dangerous volcano. It is located just outside the Mexico city (72 kms southeast).

Note: Popocatepetl means "smoking mountain" in the Aztec Nahuatl language.

In Feb 2024, it erupted 13 times in a single day. It spewed thick plumes of volcanic ash into the sky causing flights to be grounded. It has also blanketed the capital and the surrounding area with thick plumes of ash.



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03

MENTORSHIP & PERSONAL GUIDANCE

04

11.PYQS

2023	
Q1	<p>Which one of the following is a part of the Congo Basin?</p> <p>(a) Cameroon (b) Nigeria (c) South Sudan (d) Uganda</p>
Q2	<p>Consider the following pairs:</p> <p>Area of conflict mentioned in news: Country where it is located</p> <ol style="list-style-type: none">1. Donbas: Syria2. Kachin: Ethiopia3. Tigray: North Yemen <p>How many of the above pairs are correctly matched?</p> <p>(a) Only one (b) Only two (c) All three (d) None</p>

3	<p>Consider the following countries:</p> <ol style="list-style-type: none"> 1. Bulgaria 2. Czech Republic 3. Hungary 4. Latvia 5. Lithuania 6. Romania <p>How many of the above-mentioned countries share a land border with Ukraine?</p> <ul style="list-style-type: none"> (a) Only two (b) Only three (c) Only four (d) Only five
4	<p>In the recent years Chad, Guinea, Mali and Sudan caught the international attention for which one of the following reasons common to all of them?</p> <ul style="list-style-type: none"> (a) Discovery of rich deposits of rare earth elements (b) Establishment of Chinese Military bases (c) Southward expansion of Sahara Desert (d) Successful coups
5	<p>Consider the following pairs:</p> <p>Regions often Reason for being in news</p> <ol style="list-style-type: none"> 1. North Kivu and Ituri : War between Armenia and Azerbaijan 2. Nagorno-Karabakh : Insurgency in Mozambique 3. Kherson and Zaporizhzhia : Dispute between Israel and Lebanon <p>How many of the above pairs are correctly matched?</p> <ul style="list-style-type: none"> (a) Only one (b) Only Two (c) All three (d) None

2022	
6	<p>Which one of the following lakes of West Africa has become dry and turned into a desert?</p> <p>(a) Lake Victoria (b) Lake Faguibine (c) Lake Oguta (d) Lake Volta</p>
7	<p>The term "Levant" often heard in the news roughly corresponds to which of the following regions?</p> <p>(a) Region along the eastern Mediterranean shores (b) Region along North African shores stretching from Egypt to Morocco (c) Region along Persian Gulf and Horn of Africa (d) The entire coastal areas of Mediterranean Sea</p>
8	<p>Consider the following countries:</p> <ol style="list-style-type: none"> 1. Azerbaijan 2. Kyrgyzstan 3. Tajikistan 4. Turkmenistan 5. Uzbekistan <p>Which of the above have borders with Afghanistan?</p> <p>(a) 1, 2 and 5 only (b) 1, 2, 3 and 4 only (c) 3, 4 and 5 only (d) 1, 2, 3, 4 and 5</p>
IB	<p>Consider the following countries:</p> <ol style="list-style-type: none"> 1. Armenia

	<p>2. Azerbaijan 3. Croatia 4. Romania 5. Uzbekistan</p> <p>Which of the above are members of the Organization of Turkic States?</p> <p>(a) 1, 2 and 4 (b) 1 and 3 (c) 2 and 5 (d) 3, 4 and 5</p>
9	<p>Which one of the following statements best reflects the issue with Senkaku Islands, sometimes mentioned in the news?</p> <p>(a) It is generally believed that they are artificial islands made by a country around South China Sea. (b) China and Japan engage in maritime disputes over these islands in East China Sea. (c) A permanent American military base has been set up there to help Taiwan to increase its defence capabilities. (d) Through International Court of Justice declared them as no man's land, some South-East Asian countries claim them.</p>
10	<p>Consider the following pairs: Region often mentioned in the news Country</p> <p>1. Anatolia – Turkey 2. Amhara – Ethiopia 3. Cabo Delgado – Spain 4. Catalonia – Italy</p> <p>How many pairs given above are correctly matched?</p> <p>(a) Only one pair (b) Only two pairs (c) Only three pairs (d) All four pairs</p>

2020	
11	<p>In which one of the following groups are all the four countries members of G20?</p> <p>(a) Argentina, Mexico, South Africa and Turkey (b) Australia, Canada, Malaysia and New Zealand (c) Brazil, Iran, Saudi Arabia and Vietnam (d) Indonesia, Japan, Singapore and South Korea</p>
12	<p>Consider the following pairs:</p> <p>River : Flows into</p> <ol style="list-style-type: none"> 1. Mekong : Andaman Sea 2. Thames : Irish Sea 3. Volga : Caspian Sea 4. Zambezi : Indian Ocean <p>Which of the pairs given above is/are correctly matched?</p> <p>(a) 1 and 2 only (b) 3 only (c) 3 and 4 only (d) 1, 2 and 4 only</p>
2019	
13	<p>Consider the following pairs:</p> <p>Sea : Bordering country</p> <ol style="list-style-type: none"> 1. Adriatic Sea : Albania 2. Black Sea : Croatia 3. Caspian Sea : Kazakhstan 4. Mediterranean Sea : Morocco 5. Red Sea : Syria <p>Which of the pairs given above are correctly matched?</p> <p>(a) 1, 2 and 4 only</p>

	<p>(b) 1, 3 and 4 only</p> <p>(c) 2 and 5 only</p> <p>(d) 1, 2, 3, 4 and 5</p>
14	<p>Which of the following has/have shrunk immensely/dried up the recent past due to human activities?</p> <ol style="list-style-type: none"> 1. Aral Sea 2. Black Sea 3. Lake Baikal <p>Select the correct answer using the code given below:</p> <p>(a) 1 only</p> <p>(b) 2 and 3</p> <p>(c) 2 only</p> <p>(d) 1 and 3</p>
15	<p>Consider the following pairs:</p> <p>Towns sometimes mentioned in news - Country</p> <ol style="list-style-type: none"> 1. Aleppo - Syria 2. Kirkuk - Yemen 3. Mosul - Palestine 4. Mazar-i-sharif - Afghanistan <p>Which of the pairs given above are correctly matched?</p> <p>(a) 1 and 2</p> <p>(b) 1 and 4</p> <p>(c) 2 and 3</p> <p>(d) 3 and 4</p>
16	<p>Consider the following pairs:</p> <p>Regions sometimes mentioned in news - Country</p> <ol style="list-style-type: none"> 1. Catalonia - Spain 2. Crimea - Hungary

3. Mindanao - Philippines

4. Oromia - Nigeria

Which of the pair given above are correctly matched?

(a) 1, 2 and 3

(b) 3 and 4 only

(c) 1 and 3 only

(d) 2 and 4 only

2017

17 Mediterranean Sea is a border of which of the following countries?

1. Jordan

2. Iraq

3. Lebanon

4. Syria

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 2 and 3 only

(c) 3 and 4 only

(d) 1, 3 and 4 only

18 Which of the following is geographically closest to Great Nicobar?

(a) Sumatra

(b) Borneo

(c) Java

(d) Sri Lanka

2015

19 The area known as 'Golan Heights' sometimes appears in the news in the context of the events related to

	<p>(a) Central Asia (b) Middle East (c) South-East Asia (d) Central Africa</p>
20	<p>Which one of the following countries of South-West Asia does not open out to the Mediterranean Sea?</p> <p>(a) Syria (b) Jordan (c) Lebanon (d) Israel</p>
2014	
21	<p>Consider the following pairs:</p> <p>Region often in news: Country</p> <p>1. Chechnya: Russian Federation 2. Darfur: Mali 3. Swat Valley: Iraq</p> <p>Which of the above pairs is/are correctly matched?</p> <p>(a) 1 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3</p>
22	<p>Turkey is located between</p> <p>(a) Black Sea and Caspian Sea (b) Black Sea and Mediterranean Sea (c) Gulf of Suez and Mediterranean Sea (d) Gulf of Aqaba and Dead Sea</p>

23

What is the correct sequence of occurrence of the following cities in South-East Asia as one proceeds from south to north?

1. Bangkok
2. Hanoi
3. Jakarta
4. Singapore

Select the correct answer using the code given below:

- (a) 4-2-1-3
- (b) 3-2-4-1
- (c) 3-4-1-2
- (d) 4-3-2-1

2013

24

Which one of the following pairs is correctly matched?

Geographical Feature : Region

- (a) Abyssinian Plateau : Arabia
- (b) Atlas Mountains : North-Western Africa
- (c) Guiana Highlands : South-Western Africa
- (d) Okavango Basin : Patagonia

2010

25

Which one of the following can one come across if one travels through the Strait of Malacca:

- a) Bali
- b) Brunei
- c) Java
- d) Singapore

2009

26

Consider the following countries:

	<p>1. Australia 2. Namibia 3. Brazil 4. Chile</p> <p>Through which of the above does the Tropic of Capricorn pass?</p> <p>a) 1 only b) 2, 3 and 4 c) 1, 2 and 3 d) 1, 2, 3 and 4</p>
2008	
27	<p>Which one of the following cities is nearest to the equator?</p> <p>a) Colombo b) Jakarta c) Manila d) Singapore</p>
28	<p>Which one of the following straits is nearest to the International Date Line?</p> <p>a) Malacca Strait b) Bering Strait c) Strait of Florida d) Strait of Gibraltar</p>
29	<p>In which one of the following is Malta located?</p> <p>a) Baltic Sea b) Mediterranean c) Black Sea</p>

	d) North Sea
30	<p>Which of the following countries share borders with Moldova?</p> <ol style="list-style-type: none"> 1. Ukraine 2. Romania 3. Belarus <p>Select the correct answer using the code given below:</p> <ol style="list-style-type: none"> a) 1 and 2 only b) 2 and 3 only c) 1 and 3 only d) 1,2 and 3
31	<p>Through which one of the following Straits, does a tunnel connect the United Kingdom and France?</p> <ol style="list-style-type: none"> a) Davis Strait b) Denmark Strait c) Strait of Dover d) Strait of Gibraltar
32	<p>Which one of the following cities does not have the same clock time as that of the other three cities at any given instant?</p> <ol style="list-style-type: none"> a) London (U.K) b) Lisbon (Portugal) c) Accra (Ghana) d) Addis Ababa (Ethiopia)
33	<p>Other than India and China, which of the following groups of countries border Myanmar?</p> <ol style="list-style-type: none"> a) Bangladesh, Thailand and Vietnam

	b) Cambodia, Laos and Malaysia c) Thailand, Vietnam and Malaysia d) Thailand, Laos and Bangladesh
2006	
34	Through which one of the following groups of countries does the Equator pass? a) Brazil, Zambia and Malaysia b) Colombia, Kenya and Indonesia c) Brazil, Sudan and Malaysia d) Venezuela, Ethiopia and Indonesia
35	Huangpu River flows through which one of the following cities? a) Beijing b) Ho Chi Minh City c) Shanghai d) Manila
2005	
36	Which one of the following countries does not have border with Lithuania? a) Poland b) Ukraine c) Belarus d) Latvia
37	Which one of the following is the correct sequence of the given town of Pakistan while moving from the North towards the South? a) Islamabad-Gujranwala-Peshawar-Multan b) Peshawar-Gujranwala-Multan-Islamabad c) Peshawar-Islamabad-Gujranwala-Multan d) Islamabad-Multan-Peshawar-Gujranwala
2004	
38	Latvia does not share its borders with which one of the following countries? a) Russia b) Estonia c) Lithuania d) Poland

39

Match List-I (Sea) with List- II (Country) and select the correct answer using the codes given below the Lists:

List-I (Sea) List-II (Country)

- A. Black Sea 1. Bulgaria
- B. Red Sea 2. China
- C. Yellow Sea 3. Eritrea
- D. Caspian Sea 4. Kazakhstan

Codes:

A B C D

- a) 1 4 2 3
- b) 2 3 1 4
- c) 1 3 2 4
- d) 2 4 1 3

40

Which one of the following does not border Panama?

- a) Costa Rica
- b) Pacific Ocean
- c) Colombia
- d) Venezuela

2003

41

Which one of the following countries is land locked?

- a) Bolivia
- b) Peru
- c) Suriname
- d) Uruguay

42

Israel has common borders with:

- a) Lebanon, Syria, Jordan and Egypt
- b) Lebanon, Syria, Turkey and Jordan
- c) Cyprus, Turkey, Jordan and Egypt

	d) Turkey, Syria, Iraq and Yemen
43	Which one of the following countries does NOT border the Caspian Sea? a) Armenia b) Azerbaijan c) Kazakhstan d) Turkmenistan
2002	
44	Consider the following countries: 1. Albania 2. Bosnia Herzegovina 3. Croatia 4. Macedonia Which of these countries has/have Adriatic Sea as a boundary? a) 1 and 2 b) 1, 2 and 3 c) 4 only d) 3 and 4
2001	
45	The given map shows four towns of the Central Asian region marked as 1, 2, 3, and 4. Identify these from the following list and select the correct answer using the codes given below:  Towns: A. Bishkek

B. Ashkhabad

C. Tashkent

D. Dushanbe

Codes:

a) A-3, B-1, C-2, D-4

b) A-3, B-1, C-4, D-2

c) A-1, B-3, C-2, D-4

d) A-1, B-3, C-4, D-2

46

Consider the following provinces of former Yugoslavia:

I. Bosnia

II. Croatia

III. Slovenia

IV. Yugoslavia

The correct sequence of these provinces from the east to the west is

a) IV, I, III, II b) IV, I, II, III

c) I, IV, III, II d) I, IV, II, III

47

Which one of the following lakes forms an international boundary between Tanzania and Uganda?

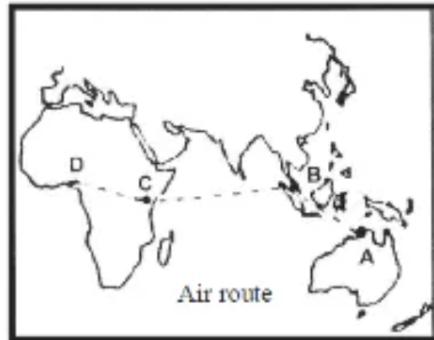
a) Chad b) Malawi

c) Victoria d) Zambezi

1999

48 Match the cities labelled as A, B, C and D in the given map with the names of cities and select the correct answer using the codes given below the names of cities:

Names of Cities:



1. Darwin
2. Kuala Lumpur
3. Lagos
4. Nairobi
5. Singapore

Codes:

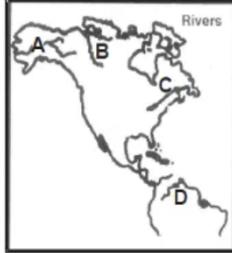
- a) A-1, B-2, C-4, D-3
- b) A-2, B-1, C-4, D-3
- c) A-1, B-4, C-5, D-2
- d) A-4, B-3, C-5, D-2

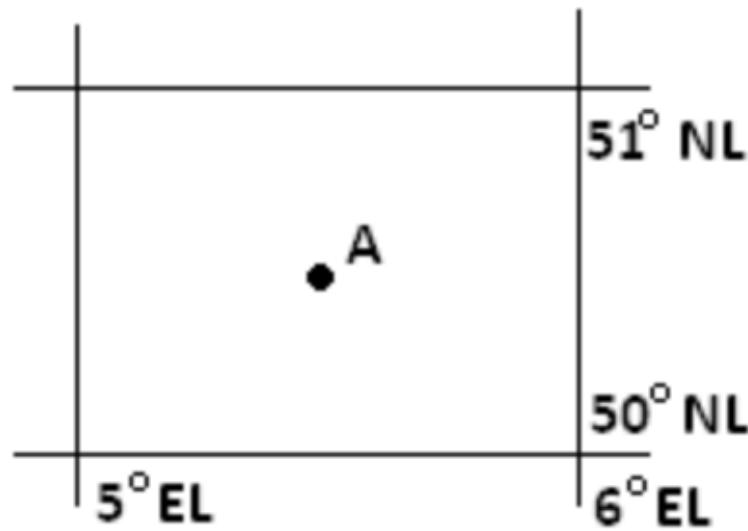
49

The physical regions marked as 1, 2, 3 and 4 on the given map are respectively:



- a) Andes, Brazilian Shield, Guyana Highlands and Amazon Basin

	<p>b) Andes, Guyana Highlands, Brazilian Shield and Amazon Basin</p> <p>c) Amazon Basin, Guyana Highlands, Brazilian Shield and Andes</p> <p>d) Guyana Highlands, Brazilian Shield, Andes and Amazon Basin</p>
1998	
50	<p>Match rivers labelled A, B, C and D on the given map with their names given in the list and select the correct answer using the codes given below the list:</p> <p>1. St. Lawrence</p> <p>2. Orinoco</p> <p>3. Mackenzie</p> <p>4. Amazon</p> <p>5. Yukon</p>
	<p>List-I</p> 
	<p>a) A-4, B-3, C-2, D-1</p> <p>b) A-5, B-3, C-1, D-2</p> <p>c) A-5, B-4, C-1, D-3</p> <p>d) A-3, B-1, C-4, D-2</p>
1997	
51	Consider the geographical details given in the following figure:



The point marked by A in the above figure indicates a country in:

- a) North America b) South America
- c) Europe d) Asia

52	One will NOT have to pass through the Suez Canal while going from Mumbai to: a) Alexandria b) Suez c) Port Said d) Benghazi
----	---

53	During a flight from Delhi to Tokyo the following are the landing airports: I. Hong Kong II. Hanoi III. Taipei IV Bangkok
----	---

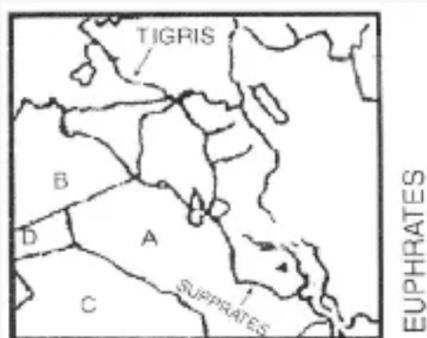
The correct sequence of the landing at these airports during an onward journey is

- a) I, II, III, IV b) IV, II, I, III
- c) III, IV, I, II d) IV, I, II, III

1996

54

The rough outline map shows a portion of the Middle East. The countries labelled A, B, C and D are respectively:



- a) Syria, Iraq, Jordan and Saudi Arabia
- b) Syria, Iraq, Saudi Arabia and Jordan
- c) Iraq, Syria, Saudi Arabia and Jordan
- d) Iraq, Syria, Jordan and Saudi Arabia

1995

55

Consider the map given below indicating four places frequently figuring in the news:



Which one of them is Chechenya?

Choose the correct answer from the codes given below:

- | | |
|------|------|
| a) 1 | b) 2 |
| c) 3 | d) 4 |

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BIOLOGY BASICS-2

CLASSIFICATION OF LIFE

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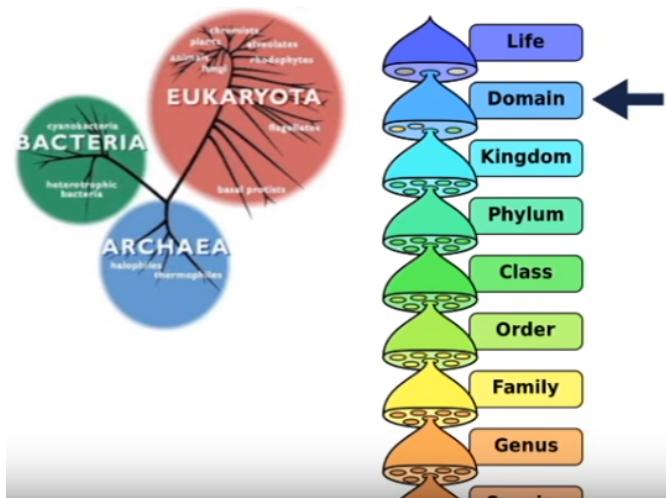
2. DIVERSITY IN LIVING ORGANISMS

1) INTRODUCTION

- Attempts at classifying living things into groups have been made since time immemorial.
 - Greek thinker **Aristotle** classified animals according to whether they lived on land, in water or in the air. This was a simple way of looking at life but misleading too.
- **Classification and Evolution**
 - Classification of life forms is closely related to the evolution. The living organisms which have evolved from same ancestor would tend to fall in the same group during classification.

2) THE HIERARCHY OF CLASSIFICATION GROUPS

- Various biologists have tried to classify all living organisms into broad categories, called the **Kingdoms**.
 - The classification Robert Whittaker (1969) proposed is widely used and has **five kingdoms**
 - Monera
 - Protista
 - Fungi
 - Plantae
 - Animalia
 - The number of Kingdoms were **expanded to 7 in 2015 by Ruggerio**. These are Monera, Archaea, Protozoa, Chromista, Fungi, Plants and Animals.
 - This classification also has **two super kingdoms** (Prokaryota and Eukaryota)
 - In 1990, a **three-domain system** (Archaea, Bacteria and Eukaryota) of biological classification was introduced by Carl Woese.
 - **More About Archaea** (or archaea bacteria)
 - Almost 10% of the life is found in the form of archaea. They are found almost everywhere (human gut, gut of a cow, extreme environment etc.)
 - **Key features**
 - They are prokaryotes (no nucleus or cell organelles)
 - **Cell wall present** (like bacteria)
 - **Membranes**

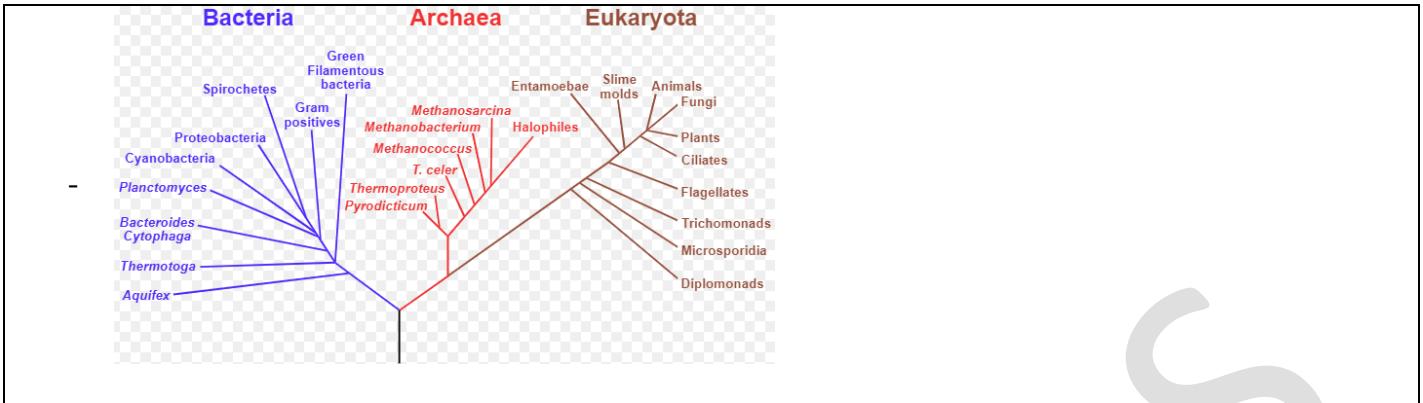


- **Metabolism** -> Phototrophs (e.g. halobacterium), Lithotroph (e.g. methanogen), Organotrophs (e.g. sulfolobus)
- **Many of these Archaea** are **extremophiles** (organisms that can thrive in extreme environments where most other forms of life can't live). This include glaciers, acid mine drainage and deep sea hydrothermal vents. Some categories of extremophiles are thermophiles, Psyhcrophiles, radio-resistant microbes, halophiles etc.
- The above groups have been formed based on the cell structure, mode and source of nutrition and body organization.
- **Further classification is done by naming the sub-groups at various levels** as given in the following scheme:
 - **Kingdom**
 - **Phylum** (For animals) / **Division** (for plants)
 - Class
 - Order
 - Family
 - Genus
 - Species
 - **Humans**
 - Kingdom: Animalia
 - Phylum: Chordata
 - Class: Mammalia
 - Order: Primates
 - Family: Hominidae
 - Genus: Homo
 - Species: Homo Sapiens
 - Thus, by separating organisms on the basis of a hierarchy of characteristics into smaller and smaller groups, we arrive at a basic unit of classification, which is a **species**.
 - Broadly, a species includes all organisms that are similar enough to breed and perpetuate.

In some recent classification mechanism **Domain** is considered the highest classification of life. The concept of domain was only introduced in 1990s, before which Kingdom held the highest rank of classification.

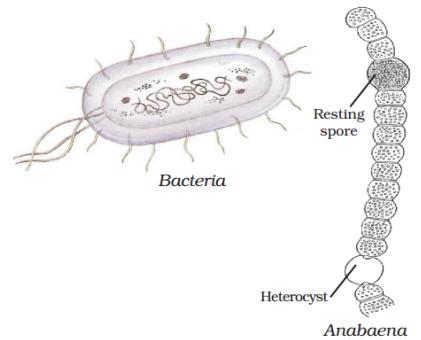
Need of this classification:

- Earlier all living organisms were divided into Prokaryotes (bacteria) and Eukaryotes (everything else).
- But, later it was found that some of the organisms which were earlier classified as bacteria, were from a completely different lineage. Though they were prokaryotes, they were not bacteria.
- This led to creation of three domains: **Eukarya, Bacteria and Archaea**.
- The domains highlight the enormous evolutionary differences among organisms. It was **Carol Woese** who separated Monera into bacteria and archaea and proposed a **three domain system**.
-



1) MONERA (MONERA AND ARCHAEA)

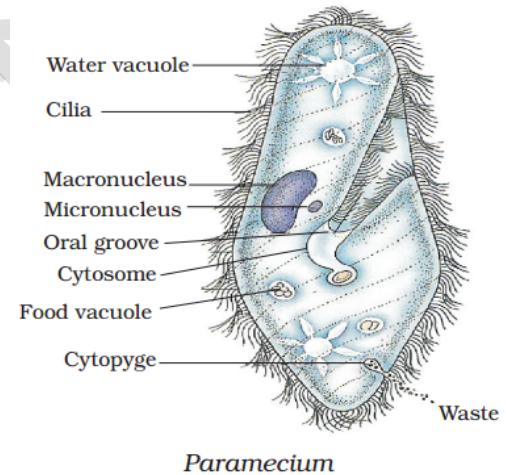
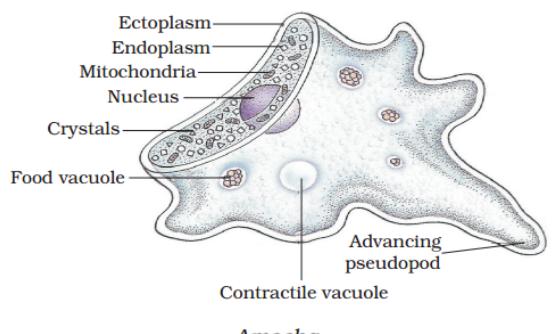
- All Prokaryotes are found in this Kingdom. Don't have a defined nucleus or organelles. Don't show multicellular body design.
 - Note: All Kingdoms except Monera have Eukaryotes
 - Show diversity based on other characteristics
 - Cells walls - some have some not.
 - Autotrophic or heterotrophic
 - E.g.: **bacteria**, blue green algae or cyanobacteria (it is considered a bacterium, and the term algae is reserved for Eukaryotic organisms only, it is autotrophic), mycoplasma (lacks a cell wall around their cell membrane), Anabaena (a genus of filamentous cyanobacteria, that exists as plankton)
 - **Spirulina: A wonder Food Supplement**
 - Spirulina is a blue green alga (family: Monera) that was earlier classified as a plant (algae) because of its richness in plant pigments as well as its ability to photosynthesize.
 - New understanding of its genetics, physiology and biochemical properties caused scientists to move it to the Bacteria Kingdom and the Cyanobacterium Phylum.
 - It is a free floating filamentous micro-algae that grow generally in oceans and salty lakes in subtropical climate.
 - It is cultivated worldwide and has been consumed for centuries for its high nutritional content and health benefits.
 - The nutritional value of Spirulina is well-recognized with its unusual high protein content (60-70% by dry weight) and its richness in vitamins (particularly B12) minerals, essential fatty acids, and other nutrients.
 - It is consumed in the form of capsules, tablets, flakes, syrups, or powder.
 - However, there is still not enough evidence to determine if spirulina supplements are safe. Medical studies are currently underway to verify spirulina as a dietary supplement and its potential health effects.
 - **Composition of Spirulina**
- | | |
|---------|--------|
| Protein | 60-70% |
|---------|--------|



Carbohydrate	16-20%
Lipid	5-7%
Mineral	6-9%
Moisture	2.5%-6%

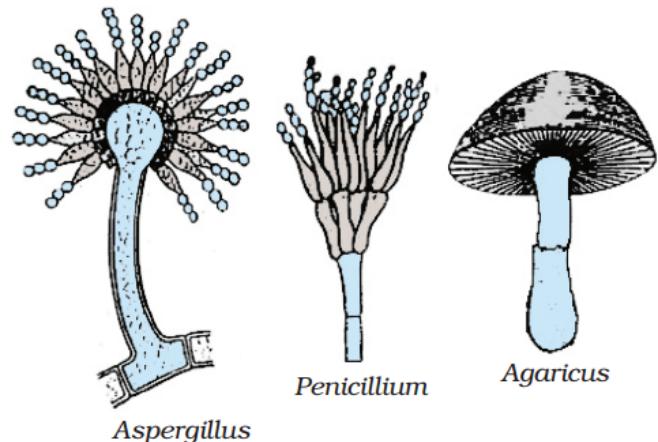
2) PROTISTA (OR PROTOZOA)

- Protista is a diverse group of Eukaryotic organisms that are not plants, animals, or fungi (It's a **hodgepodge category**, and eukaryotes that don't fit in plants, animals, and fungi are included in this category)
- They can be unicellular, multicellular or colonial. They can also be found in almost every habitat on earth.
- They can be autotrophic, heterotrophic, or mixotrophic and can produce both sexually and asexually.
- There are several major groups of Protists including:
 - i. **Algae:** Photosynthetic protists that range from single celled organisms to large multi-cellular seaweeds (it lacks cellular characteristics of plants and hence not classified as plants). They can be found in freshwater or marine ecosystems and are very important primary producers of aquatic ecosystem.
 - ii. **Protozoa:** They are heterotrophic protists and are typically unicellular and motile. They can be free living or parasitic. They play a significant role in nutrient cycling and as prey for other organisms. Some protozoa can cause diseases in humans and animals such as Malaria (Plasmodium falciparum) and sleeping sickness.
 - iii. **Slime Molds:** Protists that can exist as single cells or as large, multicellular aggregates. They are important decomposers in forest ecosystem.
 - iv. **Water Molds:** They are mostly parasitic and can cause diseases in plants and animals.
- They have significant economic and ecological importance (for e.g. algae are used as food sources for animals and humans. Others play significant role in health and biotechnology sector. Some of these organisms use appendage, such as hair like cilia or whip like flagella for moving around.



3) FUNGI

- These are heterotrophic, Eukaryotic organisms.
- They use decaying organic material as food and are therefore called **saprophytes**.
- Many of them have the capacity to become multicellular organism at some stage of life.
- They have cell walls made of tough complex sugar called chitin.
- **E.g.**
 - i. Yeast, Mushrooms, molds etc.
- Some fungal species live in permanent mutually dependent relationship with blue-green algae (or cyanobacteria). Such relationships are called Symbiotic. These symbiosis life forms are called **lichens**.
 - i. We have all seen lichens as slow-growing dark coloured patches on the bark of trees.



▫ Recent Development

i. **Kirajadi / Yarsagambu / Yartsa gunbu**

- Scientific Name: Ophiocordyceps Sinesis (O. Sinesis)
- It is classified as medicinal mushroom.
- It is an entomopathogenic fungus (a fungus that grows on insects) found in mountainous regions of India, Nepal and Tibet
- It parasites larva of ghost moths and produces a fruiting body which is valued as an herbal remedy.
- The fungus germinates in the living larva, and kills and mummifies it, and then a dark brown stalk-like fruiting body which is a few centimetres long emerges from the corpse and stands upright.
- **Uses**
 - Used in traditional Asian medicines in countries such as Nepal, China, Bhutan etc.
 - In 2012, BBC magazine reported how it is transforming local economies in Himalayas.
- **Endangered in China**
 - Overharvesting and overexploitation has led to the classification of the specie as endangered in China.
- **Other names**
 - Caterpillar fungus, Yartsa Gunbu, etc.



4) PLANTAE

- **Autotrophic, Eukaryotic, mostly Multicellular with cell walls.**
 - They use chlorophyll for photosynthesis.

- Thus, all plants are included in this group.
- They all have cell walls made of cellulose.
- **Note:** Algae are classified under Protista, but some biologists classify multi-cellular algae under Plantae
- **Note:** Three of the five kingdoms have cell walls.
 1. **The Plant Kingdom:** All Plants have cell walls made up of cellulose.
 2. **The Fungi Kingdom:** Most fungi have cell walls made of Chitin, a complex carbohydrate that provides structural support and protection
 3. **The Monera Kingdom:** Bacteria and Cyanobacterium (also known as blue green algae) in Monera kingdom have cell walls made of peptidoglycan, a polymer made of sugars and amino acids that provides support and protection.

5) ANIMALIA

- Organisms which are multicellular eukaryotes without cell walls.
- They are all Heterotrophic.

Note: **Viruses** are not classified in any kingdom yet because they are not really alive. They only show signs of life

2) ANIMAL KINGDOM: ANIMALIA

- These are organisms which are Eukaryotic, multicellular, and heterotrophic.
The Animal Kingdom is classified into several phyla, each with distinct characteristics and traits. The following are the major phyla of the Animal Kingdom:
 1. **Porifera (Sponges)**
 2. **Cnidaria**
 3. **Platyhelminthes (Flatworms):** These are bilaterally symmetrical animals with flattened bodies and primitive nervous systems.
 4. **Nematoda (Roundworms):** These are unsegmented, cylindrical animals with a complete digestive system.
 5. **Annelida (Segmented Worms):** These are bilaterally symmetrical animals with a segmented body and a closed circulatory system.
 6. **Mollusca (Snails, clams, octopuses):** These are soft-bodied animals with a muscular foot and a mantle that secretes a shell in some species.
 7. **Arthropoda (Insects, spiders, crustaceans):** These are segmented animals with jointed legs and an exoskeleton made of chitin.
 8. **Echinodermata (Starfish, sea urchins):** These are radially symmetrical animals with a spiny exoskeleton and a water vascular system.
 9. **Chordata:** These are animals with a notochord, a dorsal nerve cord, and pharyngeal gill slits at some point in their development. Chordates include vertebrates and non-vertebrates like tunicates and

lancelets. Chordates are divided into three subphyla: Urochordata or Tunicata, Cephalochordata and Vertebrata.

Chordata:

Chordates are a major phylum within the Animal Kingdom that includes animals that have a number of shared characteristics, including:

- 1) **Notochord:** It is a flexible rod-like structure that runs along the dorsal (back) side of the body, providing support and allowing for movement.
 - In vertebrate subgroup of chordates, the notochord develops into spine, and in wholly aquatic species this helps the animal swim by flexing its tail.
- 2) **Dorsal Nerve Chord:** A nerve cord that runs along the back of the body, and in some cases develops into spinal cord in vertebrates.
- 3) **Phryngeal Gill Slits:** Pouches in the pharynx region of the body that are used for respiration in aquatic species and may be modified for other functions in terrestrial species.
- 4) **Post-Anal Tail:** A tail that extends beyond the anus, present at some point in the life cycle of many chordates.
 - **Note:** In humans and apes, the tail is reduced to a tiny tailbone called 'Coccyx'.

- They can be broadly classified as **Vertebrates and Invertebrates**.
- **Vertebrates** are animals with backbones and spinal columns i.e. these animals have a **true vertebral column and internal skeleton**, allowing for a completely different distribution of muscle attachment points to be used for movement.
 - Vertebrates are bilaterally symmetrical, triploblastic (derived from three embryonic cell layers – ectoderm, mesoderm and endoderm), coelomic and segmented, with complex differentiation of body tissues and organs.
 - All chordates (Phylum) possess the following features
 1. Have a notochord
 2. Have a dorsal nerve cord
 3. Are triploblastic
 4. Have paired gill pouches
 5. Are coelomate
 - Vertebrates are the most advanced organisms on Earth. Although they represent a very small percentage of all animals, their size and mobility often allow them to dominate their environment. Vertebrates can further be classified into following **5 groups**
 - Fishes
 - Amphibians
 - Reptiles
 - Birds
 - Mammals



2) IN-VERTEBRATES

- Invertebrates are animals without backbones. More than 98% animal species in the world are invertebrates. Invertebrates **don't have internal skeleton made of bone**.
 - Many invertebrates have a **fluid-filled, hydrostatic skeleton**, like the jelly fish or worm.
 - Others have a **hard-outer shell**, like insects and crustaceans.
- **Invertebrates can be classified as:**

PORIFERA:

- The word porifera means organisms with holes.
- These are non-motile animals attached to some solid support.
- There are holes or pores all over the body. These lead to canal system that helps in circulating water throughout the body to bring food and oxygen.
- These animals are covered with hard outside layers or skeleton.
- **The body design** involves very minimal differentiation and division into tissues. They are commonly called sponges and are mainly found in marine habitats.
- They are considered one of the simplest forms of multicellular animals and are found in both fresh water and marine environments.
- They are important aquatic animals – They provide habitat for other organisms and help filter water. They are also used in various industrial applications such as cleaning and polishing.

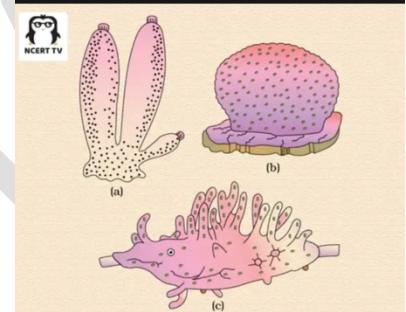
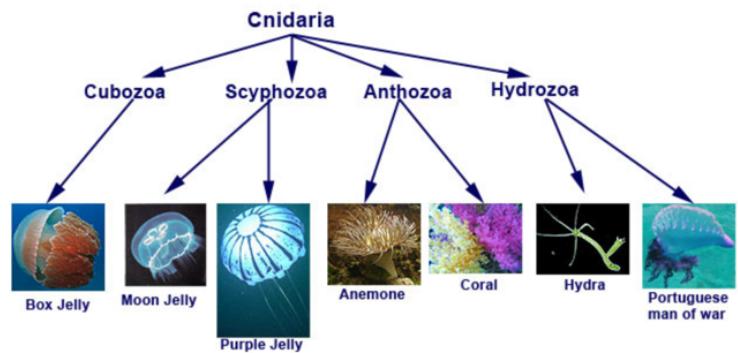


Figure 4.5 Examples of Porifera : (a) Sycon (b) Euspongia (c) Spongilla

B) COELENTERATE (CNIDARIA)

- It is the phylum of organisms that include corals, anemones, hydroids and jelly fish.
- They were the first animals to move, sense and hunt.
 - They are characterized by tentacles. These tentacles allow organisms to move around and sense the surrounding environment. The cells on tentacles are called Cnidocytes. They are used to inject venom and paralyze the prey. It is due to the presence of Cnidocytes that the phylum is called Cnidaria.
- They are aquatic and mostly live in marine water and some in fresh water (e.g. Hydra).
- Some of these Cnidarias live attached life and are called Polyp (Greek word for attached).
- Other Cnidarians like jelly fish can move around.
- Their body is radially symmetrical.
- They show more body design differentiation.

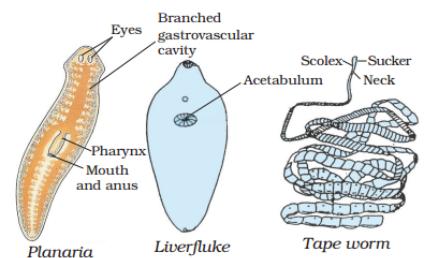
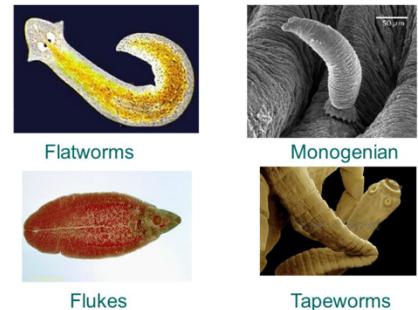


- They are **diploblastic organisms** as their embryonic body is made up of **two layers** of cells (outer Ectoderm and Inner Endoderm). One makes up the **cells on the outside of the body**, and the other **makes the inner lining of the body**.
- They have **tissue level organization** and were first animals to develop this. These animals also show **gastrovascular cavity** and **primitive nervous system**. The gastrovascular cavity has a **single opening**. Because of the presence of cavity, they are also called **Coelenterate** (Coel -> Cavity; and Enteron -> Intestine).
- Some of these species live in **colonies (Corals)**, while others have a **solitary lifespan (Hydra)**.

C) PLATYHELMINTHES (PLATY -> FLAT AND HELMINTH-> WORM)

- **More complex** than Porifera and Coelenterate.
- The body is **bilaterally symmetrical**, meaning that the left and the right half of the body has the same design.
- There are **three layers of cells** (Ectoderm, Mesoderm and Endoderm) from which **differentiated tissues can be made**, which is why such animals are called **triploblastic**.
- This **allows outside and inside body linings** as well as some organs to be made. There is thus **some degree of tissue formation**.
- However, there is **not true internal body cavity** or **Coelom**, in which well-developed organs can be accommodated.
 - **Note:** Flat worms are the **only triploblastic organism**, which **don't have Coelom**.
 - Some flatworms have **rudimentary organs**.
- The body is **flattened dorsiventrally** (like ribbon), meaning from top to bottom, which is why these animals are called **flatworms**.
- **Either free living or parasitic**.
- Some of the members of this phylum are **harmful and can cause diseases**. They live like **endo-parasites** in humans or other organisms.
 - E.g. **Tape worm (Taenia solium)**, Liverflukes (*Fasciola*) -> infects liver
- Some of them can be useful as well **for e.g. Planaria** is used to feed on mosquito larvae and can be used to control mosquitoes.
- Some flatworms are **very long** (upto 90 feet)

Phylum Platyhelminthes



D) NEMATODA (ASHCHELMINTHES)

- The nematode body is also bilaterally symmetrical and triploblastic.
- However, the body is cylindrical rather than flattened. Thus, it is this phylum which saw the beginning of Coelom, but coelom is not truly developed and thus it is the only phylum which has false coelom or pseudo coelom.
- There are tissues, but no real organs, although a sort of body cavity or a pseudo-coelom, is present.
- These are very familiar as parasitic worms causing diseases, such as the worms causing elephantiasis (filarial worms) or the worms in the intestines (roundworms or pinworms).

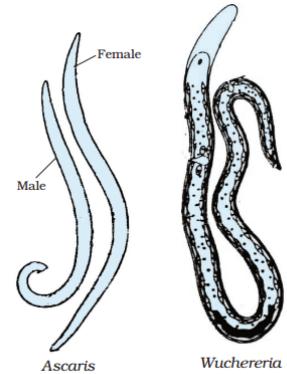
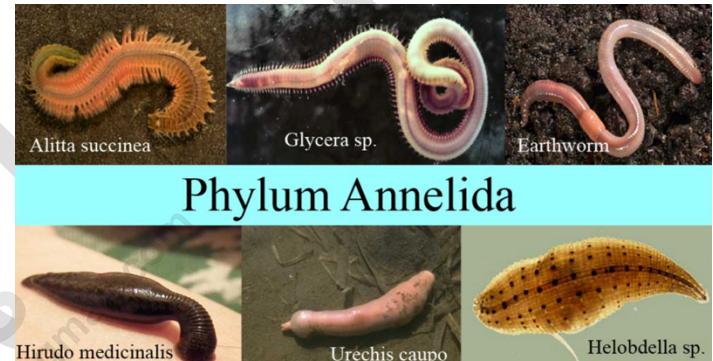


Fig. 7.15: Nematodes (Aschelminthes)

E) ANNELIDS

- They are defined as triploblastic, bilaterally symmetrical, metamerically segmented, a coelomate worm with a thin flexible cuticle around the body.
- They show a very important step in animal evolution -> Segmentation. Segments on annelids are usually ring like (Annulus is the Greek word of ring and hence the name Annelida)
- They are mostly aquatic; marine or fresh water; some are terrestrial, burrowing.
- Body organization is that of an organ system level.
- E.g.
 - **Earthworms** -> which help in ploughing of the land
 - **Leech** -> It sticks to the animal body to suck blood.



Phylum Annelida

E) ARTHROPODS (ARTHRO -> JOINTED; PODS -> APPENDAGES)

- Probably the largest group of animals. They make upto 75% - 80% of the world's animal species and thus are most abundant.
-
- These animals are bilaterally symmetrical and segmented.
- They have jointed legs (the word arthropods mean jointed legs).

Segmentation (Head, Thorax and Abdomen): This segmentation helps an organism to travel and protect its sensitive organs. Each segment has a pair of legs attached for smooth locomotion.	<p>A diagram of a beetle with labels: 'Head' points to the front part, 'Thorax' points to the middle section with legs, and 'Abdomen' points to the rear section.</p>
---	---

- They are triploblastic, and Coelomic (i.e., they possess true coelom or body cavity). There is an open circulatory system so the blood doesn't flow in well-defined blood vessels. The coelomic cavity is blood filled (therefore there Coelom is also called **Haemocoel**).

- They also have **an exoskeleton** which is hard, external skeleton made up of **Chitin**.
- They include cockroaches, crabs, butterflies, beetles, scorpions, shrimp, spider, lobster, lice, ticks, termites, potato bugs, and sea monkeys.
- Reproduction:**
 - Most of them are oviparous (egg laying) (e.g., butterfly)
 - Some are viviparous (give birth to young ones) (e.g., scorpions)

<p>Indirect Development: In most arthropods, young ones are <u>totally different from adults</u> (these young ones are called Larvae) [E.g. Butterfly].</p> <p>The process of development of Larvae into an adult is called <u>Metamorphosis</u>.</p>	
<p>Direct Development: Here larval stage is not included</p>	<p>E.g. Scorpions</p>

- Arthropods include animals such as **insects, crustaceans and arachnids**. Largest group of arthropods are the insects. The next largest group are crustaceans, including lobsters and crabs. The arachnids include spiders and ticks.
- **Insects** are the largest group of arthropods. Very adaptable, living almost everywhere in world. Exoskeleton that covers their entire body. Insects body consists of three parts: the head, thorax and abdomen.
 - e.g. Beetle, butterfly, moth, dragonfly, bee etc.
- **Crustaceans** live mostly in ocean or other waters. **Hard external shell** which protects their body.
 - E.g. Crab, lobsters and barnacle.
- **Arachnids: Spiders, Ticks and Scorpions**
 - Like other arthropods, the arachnids have a hard exoskeleton and joint appendage for walking. Most have four pairs of legs. Unlike other arthropods, arachnids do not have antenna.
 - E.g. spider, scorpion etc

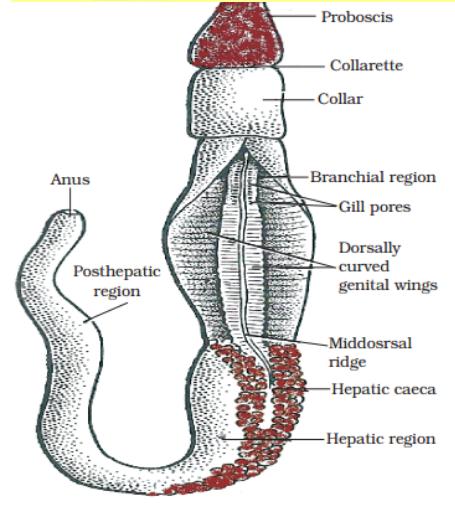
F) MOLLUSCA

- This is the second largest phylum of the animal kingdom.
- In the animals of this group, there is bilateral symmetry (they can be asymmetric also)
- The coelomic cavity is reduced.
- Little segmentation
- There is an open circulatory system and kidney like organ for excretion.
- There is a foot that is used to move around.
- Most mollusks have a soft, skin like organ covered with a hard-outside shell.
- Some live on land such as snail or slug.
- Other mollusks live in water, such as the oyster, mussel, clam, squid octopus etc.



G) ECHINODERMS (ECHINA -> SPINY; DERM -> SKIN)

- **Exclusively free-living marine animals** (All echinoderms are exclusively marine) [i.e. there are no freshwater or terrestrial echinoderms known yet]
- They are **triploblastic** and have a **coelomic cavity**.
- **Most have arms that radiate from the centre of their body.** Centre body contains **organs** and mouth for feeding.



H) PROTOCHORDATES

- They are **informal category of animals**, named mainly for convenience to **describe invertebrate animals that are closely related to vertebrates**.
- These animals are **bilaterally symmetrical**, **triploblastic** and have a **coelom**.
- In addition, they show **a new feature of body design**, namely a **notochord**, atleast at some stages during their lives.
- The notochord is a **long-rod like support structure** (chord= string) that runs along the back of animal separating the nervous tissues from the gut. It provides **a place for muscle to attach for ease of movement**.
- Protochordates may not have a proper notochord present at all stages in their lives or for entire length of the animal.
- They are **marine animals**
- e.g. *Balanoglossus*, *Herdmania* and *Amphioxus*.

3) VERTEBRATES

Phylum Vertebrata can be divided into five classes (Fishes, Amphibians, Reptiles, Bird and Mammals)

A) FISHES (PISCES)

- **Exclusively aquatic** (live in water)
- **Breathe in water using gills**, not lungs

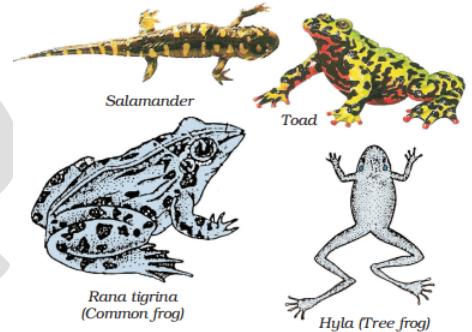
- **Cold blooded** (there body temperature change with change in environmental temperature)
- Have scales and fins
- **Lay many eggs.**
- **2 chambered heart**
- Body is streamlined, and a muscular tail is used for movement.
- **Many kinds of fish**
 - Some with skeletons made entirely of cartilage, such as sharks
 - Some with skeleton made of both bone and cartilage, such as tuna or rohu.

Note: Sometimes fish are divided into two different classes (based on the presence and absence of jaws; **Cyclostomes** -> Jawless fishes, they have sucker mouth e.g. Hag fish; **Pisces** -> Jawed fishes)

Other differences: Cyclostomes are only found in marine water. They don't have scales or paired fins.

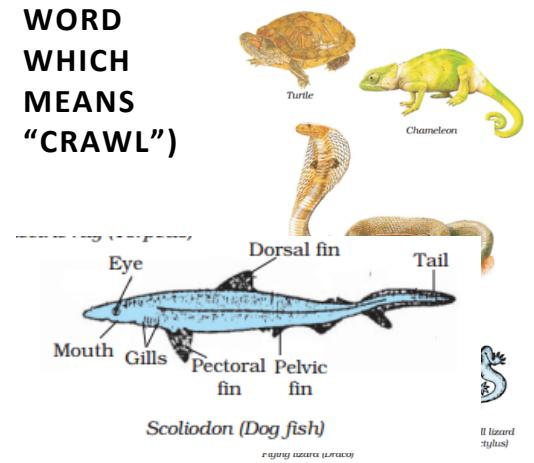
B) AMPHIBIANS (AMPHI – DUAL; BIO - LIFE)

- **Differ from fish in lack of scale** and have a 3-chambered heart.
- Have Mucus glands on Skin -> Moist smooth skin
- **Cold blooded**
- Live on land & water
- Webbed feet
- Breathe with lungs and gills
- Four legs (sometimes none)
- **Lay many eggs**
 - These eggs are laid in water to avoid dehydration. Thus, the larvae initially have gills to breathe in water. These gills will be replaced by lungs in adult stage.
- **3 chambered hearts:** (Note: larvae has 2 chambers and adults have 3 chambers)
- E.g.
 1. Frogs, toads, and salamanders are some examples



C) REPTILES (REPT IS A LATIN WORD WHICH MEANS "CRAWL")

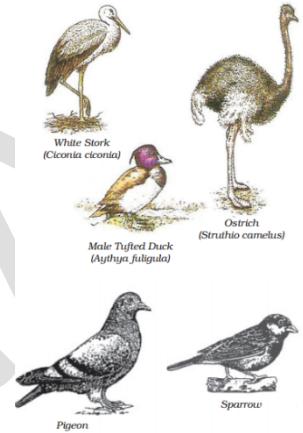
- These were the first terrestrial vertebrates.
- **Cold Blooded**
- Have scales (to protect them from sun and from abrasions while moving on ground)
- Have dry skin
- Usually lay eggs with tough coverings
 - Don't need to lay eggs in water, unlike amphibians.
- **Ear holes instead of ears**
- 4 legs or no legs.



- **Heart:** Most reptiles have **a three chambered heart**. Crocodilians have 4 chambered hearts, turtles have a three-chambered heart but with an incomplete wall in a single ventricle, so their heart is functionally four chambered.
- **E.g**
 - Snakes, turtles, lizards, and crocodiles are some examples

D) AVES

- **Have feathers:** Feathers are actually modification of scales from their ancestor reptiles. The older scales can still be spotted on the legs of birds. Feathers help in insulation and keep them warm.
- **Warm blooded:** Feathers allow birds to keep themselves at constant temperature. This warm blooded nature allow birds to face their environmental nature.
- **Wings:** In birds, the fore limbs are modified into wings. This helps birds to fly. They have hollow bones which reduce their body weight and allow them to fly easily.
- Lay eggs
- Have 2 legs
- Earholes instead of ears
- Breathe through lungs.
- **Four chambered heart** (all birds) -> to provide them continuous supply of large quantity of oxygen.



E) MAMMALS

- **Warm blooded**
- Have hairs or fur
- Skin has hairs as well as sweat and oil glands.
- Most give birth to live young mostly
 - **However**, a few of them, like the platypus and echidnas lays eggs and some like Kangaroos give birth to very poorly developed young ones.
- **Mammary glands:** Mammal mother's nurse the young ones with milk i.e. mammals have glands to give milk
- Breath with lungs
- Mammals live on all sorts of environment including the ocean, underground and on land.
- **Ears that stick out** (external ears evolved for the first time in Mammals)
- **Heart: 4 chambered heart (all mammals)**
- Blue whale is also mammal, so is bat.

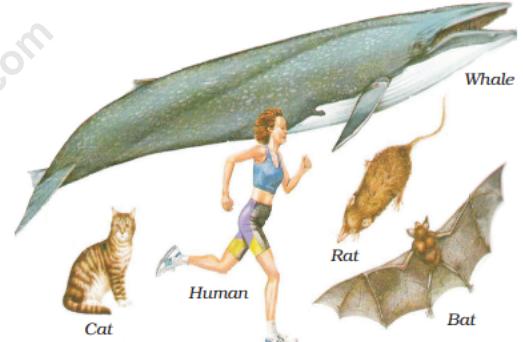


Fig. 7.25: Mammalia

Note: Amphibians, Reptiles, Birds and Mammals are together called **Tetrapods**. They have two forelimbs and two hindlimbs.

Adult snakes don't have limbs, but extremely young snake embryos do). Ancestors of today's snakes once sported full-fledged arms and legs, but genetic mutations caused the reptiles to lose all four of their limbs about 150 million years ago.

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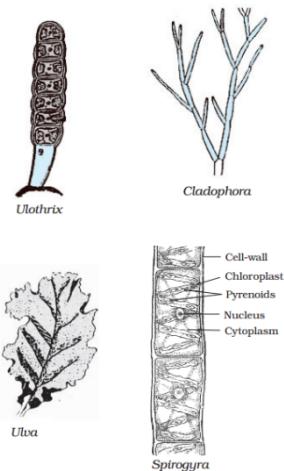
4) FLORAL DIVERSITY: PLANT KINGDOM

- **General Features:**
 - » Eukaryotic
 - » Multicellular
 - » Non-motile (Sedentary)
 - » Cell walls (Cellulose)
 - Thus, the most abundant sugar on earth is cellulose.
 - » Autotrophic
- In terms of **plant diversity**, India ranks tenth in the world and fourth in Asia. India represents nearly 11% of the world's known floral diversity.
- **Plant Kingdom** is classified in various sub-categories on the basis of following features:
 - » Extent of Differentiation of plants parts like stem, roots, leaves etc.
 - » Presence of special tissues (Xylem and Phloem)
 - » Ability to bear seeds
 - » Naked Seeds and Fruits enclosed seeds
 - » Ability to produce **flowers**
- **On the above grounds**, plants have been classified into five divisions:



THALLOPHYTA (DERIVED FROM UNDIFFERENTIATED PLANT BODY)

- Plants that **don't have well differentiated body design** fall in this group. They are not differentiated between roots, stems and leaves. The plants in this group are commonly called algae. The plants are predominantly aquatic.
 - Please note: In Protista we have unicellular algae, and generally all multicellular algae are put in Plantae Kingdom.
- **Features:** Eukaryotic, Multicellular, non-motile, cell walls made of cellulose, autotrophic.
- E.g. Spirogyra, Ulothrix, Cladophora, Ulva, Chara etc.
- **Usefulness of Thallophyta in our life:**
 - Seaweeds can be used for food purpose (soup made of sea weeds is popular in Korea and Japan)
 - Production of Biofuels



- Anti-biotics development
 - Gellies that we get in icecreams and other sweets are extracted from an organism called Gelatin which is a Thallophyta.
- **Harmful Algae's:**
- **Karenia Brevis** is an alga which produces toxin and is harmful for aquatic life.
 - **Eutrophication (algal bloom)**

BRYOPHYTES (BRYON -> MOSS; PHYTON -> PLANT)

- They are part of Bryophyta division of Kingdom Plantae.
- Have **well differentiated body parts** like stems and leaves.
- However, no specialized tissue for conduction of waters and other substances from one part of the plant body to another.
- **Reproduction through Spores** (not seeds). All Bryophytes reproduce through spores and not seeds.
- E.g. Moss (Funaria), Marchantia, Liverworts, Hornworts, Mosses)

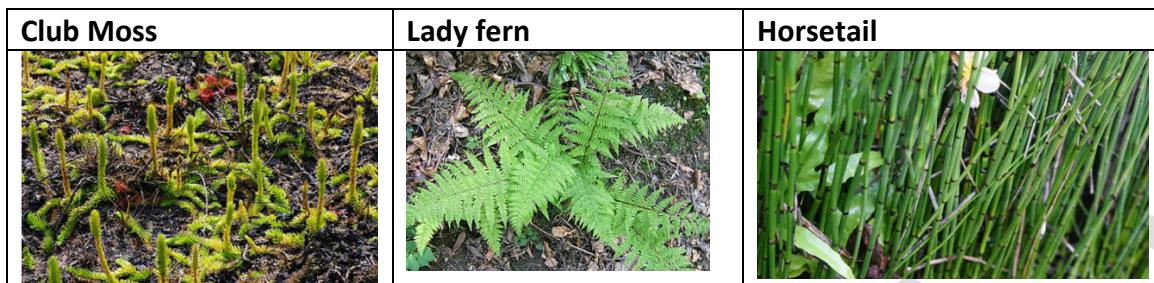
Mosses	Liver Worts
	

- They cannot circulate rainwater through their stems and leaves but must absorb it from environment that surrounds them. Therefore, they would be found in moist environments and not dry conditions. The plant body is differentiated into a small stem and simple leaves, but true roots are absent.
- **Note:** Ally Bryophytes reproduce through spores and not seeds.
- Bryophytes are the second largest group of green plants in India distributed largely in Eastern Himalaya, North-Eastern India, Western Himalaya and the Western Ghats.
- Mosses consist of the major component of Indian bryo flora followed by liverworts and hornworts.

C) PTERIDOPHYTE (PTERIS -> FERNS; PHYTONS -> PLANT)

- They are the most basic vascular plants – having simple reproductive system lacking flowers and seeds.
 - **Vascular Plants:** Have specialized tissues for conduction of water and other substances from one part of the plant body to another. (Xylem and phloem).
- **Well Differentiated body parts:** Well differentiated plant body into **roots, stem and leaves**.
- **Reproduction through Spores.** Produce **neither flowers nor seeds**, so they are referred to as **Cryptogams**.

- Most of them are terrestrial plants flourishing well in moist and shady places (thus avoiding sunlight), and some of them are aquatic. This group include vascular cryptogams like club-mosses, horse-tails and ferns which are universally distributed all over the world.



- Note:** About 1/3rd of the Pteridophytes are epiphytes (i.e., they grow on other plants)
- Note:** **Thallophyte, Bryophytes and Pteridophytes** are called Cryptogams. This is because they have hidden (Crypto) reproductive organs. These plants are flowerless and seedless.
- In India**, the north-eastern region (including eastern Himalaya) is rich in pteridophytes diversity, followed by south India (including eastern and western Ghats) and north India (including western Himalayas)

SPERMATOPHYTES (DISPERSED BY SEEDS)

A) GYMNOSPERMS (SEEDS NOT ENCLOSED) E.G., CONIFERS

- Group of seed producing plants that include conifers, cycads, Ginkgo and Gnetales. (Origin of word: Greek, gymnos: naked, sperma: seed). This is named so after the unenclosed condition of their seeds. The naked condition of seeds of gymnosperm stands in contrast to the seeds and ovules of flowering plants (angiosperms), which are enclosed within an ovary. In Gymnosperms ovules are present on the surface of the megasporophylls and are directly pollinated by the pollen grains. There is nothing like ovary, style, and stigma, and naturally there is no fruit.
- E.g., Pines, Deodar, Cycads (look like palm tree, but they are not. Palms are angiosperms)



B) ANGIOSPERMS (SEED ENCLOSED) E.G. FLOWERING PLANTS

- The word is made from two Greek words: angio means covered, and sperma - means seed.
- Angiosperms, the flowering plants are the most diverse group of land plants. Angiosperms are the seed producing plants like the gymnosperms and can be distinguished from the gymnosperms by characteristics including flowers, endosperm within the seeds, and the production of fruits that contain the seed.
- These are the most highly developed plants which bear flowers having conspicuous accessory and essential whorls.
- Carpels have the ovary, style and stigma. With the stimulus of fertilization the ovary generally develops into fruit and the ovules in seeds. Thus, the seed remains within the fruit.

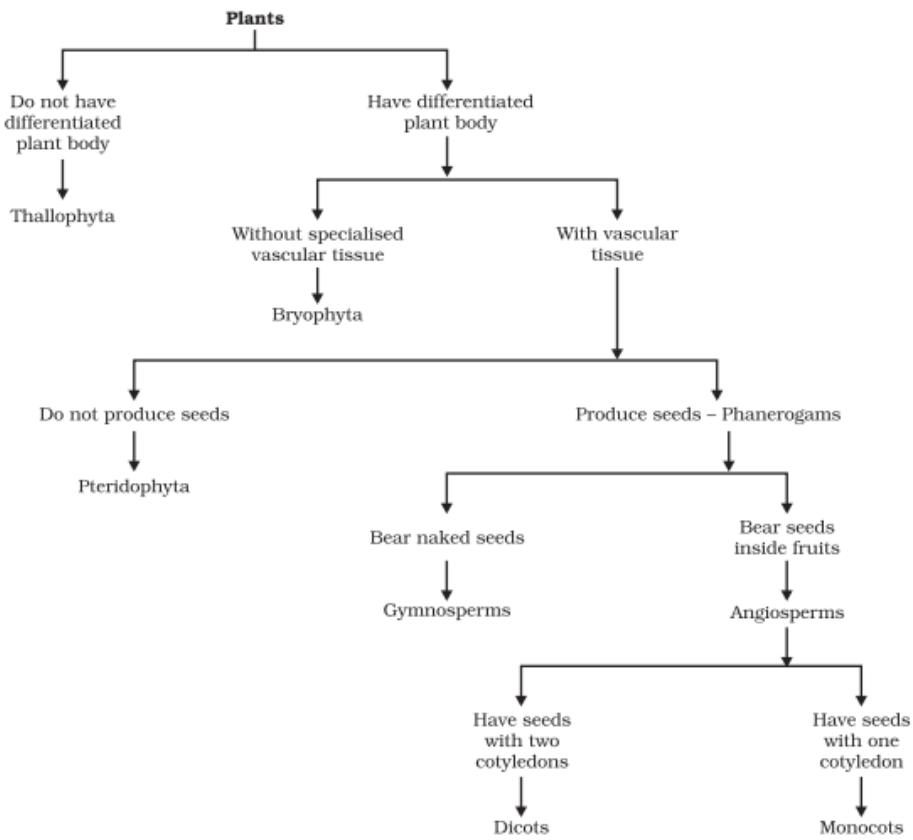
- Plant embryos in seeds have structure called **cotyledons**. Cotyledons are called 'seed leaves' because in many instances they emerge and become green when the seed germinates.
 - Thus, cotyledons represent a bit of pre-designed plant in the seed.
- The angiosperms are divided into **two groups on the basis of number of cotyledons** present in the seed.
 - **Monocotyledons/ monocots:** Plants with seeds having a single cotyledon (embryonic leaf). They are generally grass and grass-like flowering plants. (E.g. wheat, rice maize etc are a monocotyledons). Other economically important monocotyledons include Palms, Bananas, gingers, turmeric, onion, garlic etc.
 - **Dicots:** Plants with seeds having two cotyledons are called dicots.



Monocots				
Embryos	Leaf venation	Stems	Roots	Flowers
 One cotyledon	 Veins usually parallel	 Vascular bundles usually complexly arranged	 Fibrous root system	 Floral parts usually in multiples of three
Dicots				
 Two cotyledons	 Veins usually netlike	 Vascular bundles usually arranged in ring	 Taproot usually present	 Floral parts usually in multiples of four or five

- India has more than 7% of the world's known flowering plants

3. SUMMARY CHART: CLASSIFICATION OF PLANTS





TARGET PRELIMS 2024

BOOKLET-38; S&T-12

CA UPDATES ON S&T

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1. SPACE

1) GSLV-F14/INSAT-3DS MISSION (FEB 2024)

- GSLV-F14 (**GSLV-MK-II**) was the 16th mission of GSLV, and it deployed the INSAT-3DS meteorological satellite in GTO. This mission is fully funded by Ministry of Earth Science.
- **INSAT-3DS:** It is a follow-on mission of Third Generation Meteorological Satellite for Geostationary Orbit. It is designed for enhanced meteorological observations and monitoring of land and ocean surfaces for weather forecasting and disaster warning.
- The satellite will augment the Meteorological services along with the presently operational INSAT-3D and INSAT-3DR satellites.
- **Note:** GSLV MK-II is nicknamed '**Naughty Boy**'. It is because it has had a rather patchy track record.
 - » So far (including GSLV F14), GSLV has had 16 launches so far, and four of them have been failures.
 - » **What is the core issue?**
 - The main problem is the Cryogenic engine that powers the third and final stage. GSLV-MK-II uses a cryogenic engine which is a reverse-engineered version of a Russian technology.
 - **Why?** Russia couldn't supply technology to India due to MTCR restrictions. But it supplied a few of the engines. Initially India used these engines and later tried to reverse engineer the same.
 - **Note:** Now India has its own cryogenic engine as well, a result of decades of R&D. This engine has entirely Indian design, developed within ISRO, and uses a different process to burn fuel. It is closer to the designs of the Arianne rockets that were used by ISRO till a few years ago to launch its heavier rockets. This engine is being used in LVM-3.

2) CARTOSAT-2 BROUGHT DOWN (FEB 2024)

- **Background:** The satellite was launched in 2007 in SSPO. Until 2019, the satellite equipped with over 12,000 coupled charged devices used its “panchromatic and multi-spectral cameras” to generate high resolution images that were extensively used for urban planning, monitoring of road networks, and water distribution, creation of land use maps, among others.
- 17 years after its launch, Cartosat-2, the first of India's second generation of high-resolution imaging satellites primarily used in urban planning has been deorbited.
- With a descent into earth's atmosphere, all of its components would be disintegrated. It has led to reduction of collision risk and safe end-of-life disposal of the satellite.

3) GAGANYAAN

- **Introduction**
 - **Gaganyaan project** envisages demonstration of human spaceflight capability by launching crew of 3 members to an orbit of 400 km for a 3-day mission and bring them back safely to earth, by landing in India sea waters.
 - Assuming two important test flights (unmanned) in 2024 and 2025 are successful, the first crewed flight of the mission is scheduled for 2025.
 - The GSLV MK-III launch vehicle will be used to launch the Gaganyaan mission.
 - **Technically, it is a demonstration mission:** It will test various technologies required for human spaceflight, which remains the most complicated form of spaceflight, and demonstrate India's familiarity with their production, qualification and use.
- **Significance/ Need of HSP**
 - **First step towards future space programs** like having India's own space station and sending humans to moon and on other interplanetary mission. PM Modi has set the target of having a space station by 2035 and landing an Indian on Moon by 2040.
 - **More R&D in space** – ISRO will be able to conduct micro-gravity experiment.
 - **Advances in Science and Technology**
 - **Strengthen India's Soft power:** So far, only three countries USA, Russia and China have executed Human Spaceflight at their own.
 - **Technological spin-offs will benefit other sectors.**
 - **Improvements in Higher Education** in the field of aeronautical engineering, aerospace engineering and physics.
 - **Employment Opportunities**
 - **Symbolism: Great power status** – Achievements in outer space are a marker of great power status.
- **Key components of Human Space Program (HSP)**
 - **Human Space Flight Centre (HSFC)** – A body set up by ISRO as a coordinating body for Gaganyaan called the Human Space Flight Centre (HSFC).

- Development of **Human rated launch vehicles** for carrying crew safely to space.
 - All systems in LVM3 launch vehicles are-reconfigured to meet human rating requirements and christened **Human Rated LVM3** (HLVM3). It will be capable of launching the orbital module to an intended LEO of 400 km.
 - HLVM3 also consist of **Crew Escape System (CES)** powered by a set of quick acting, high burn rate solid motors which ensure that Crew module along with crew is taken to safe distance in case of emergency either at launch pad or during ascent phase.
- **Orbital Module:** It is the object that LVM-3 rocket will launch and place in LEO. It will be orbiting earth and comprises of **Crew Module (CM)** and **Service Module (SM)**. It is fit with adequate redundancy considering human safety.
 - CM is the habitable space with Earth like environment in space for the crew. It can house upto three astronauts for a week.
 - **Technical details of crew module:**
 - It is of double walled construction consisting of pressurized metallic Inner Structure and unpressurised External Structure with Thermal Protection System (TPS).
 - It houses the crew interfaces, human centric products, life support system, avionics and deceleration systems.
 - It is also designed for re-entry to ensure safety of the crew during descent till touchdown. It includes parachutes to slow its descent to the ground once it descends from orbit.
 - It also include a gynoid (feminine robot) named '**Vyomamitra**' fit with sensors to track the effects of radiation and weightlessness, monitor capsule conditions, and sound alarms in the event of an impending emergency, aside from being able to perform some task.
 - SM will be used for providing necessary support to CM while in orbit. It is an unpressurized structure containing thermal system, propulsion system, power systems, avionics systems and deployment mechanisms.
 - **Life Support System (Habitable Modules)** to provide an earth-like environment to crew in space.
 - Building a habitable module in which astronauts will live and work. Such environmental control systems are being developed.
 - **Other life support systems** – Space suits etc.



- **Precursor Missions** for demonstrating the technology preparedness levels before carrying out the actual mission. This includes Integrated Air Drop Test (IADT), Pad Abort Test (PAT), and Test Vehicle (TV) flights.

- **Crew Training Facility established** in Bengaluru caters to Classroom training, Physical Fitness Training, Simulator Training and Flight suit training.
 - **Training Modules** cover academic courses, Gaganyaan Flight Systems, Micro-Gravity familiarization through parabolic Flights, Recovery & Survival training etc. **Aero medical training**, Periodical Flying Practice and Yoga are also included as part of the training.
 - **Note:** A shortlist of candidates was sent to Russia for advanced training.

- **Astronaut Training** – to live in a gravity less environment.
- **Capabilities for recovering astronauts safely**.

- **Other Steps taken so far:**
 - **Space Borne Assistance and Knowledge Hub for Crew Interaction (SAKHI):** A multipurpose app developed by Vikram Sarabhai Space Centre that will help astronauts on Gaganyaan space flight mission carry out a range of tasks such as looking up vital technical information or communicating with one another. It will also monitor the health of astronauts, alert them about their dietary schedule etc. It will also help them stay connected with Earth. It will keep the crew connected with the onboard computer and ground-based stations, guaranteeing a seamless communication link.

 - **Pilots have been selected** and the identities of the four astronaut-designates, all IAF test pilots, were revealed in Feb 2024. The final crew for the mission will be chosen from among the four. **Prashanth Balakrishnan Nair, Ajit Krishnan, Angad Pratap and Shubhanshu Shukla** – are all airforce pilot.

 - In 2018, the Union Cabinet had allocated Rs 10,000 crore for the program.

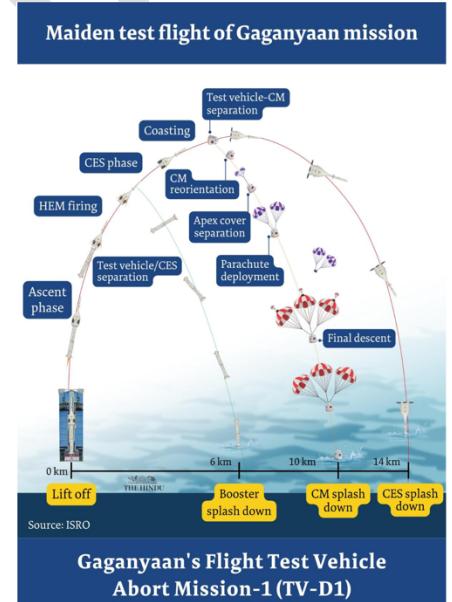
A) CE-20 CRYOGENIC ENGINE IS NOW HUMAN RATED (FEB 2024)

- **Human rating** refers to rating a system that is capable of safely transporting humans.

- ISRO has achieved a major milestone in the human rating of its CE20 cryogenic engine which powers the cryogenic stage of the human rated LVM3 launch vehicle for Gaganyaan missions, with completion of the final round of ground qualification tests.
- The final test was carried out on Feb 13, 2024. It was the seventh in the series of vacuum ignition test carried out at High Altitude Test Facility at ISRO propulsion Complex, Mahendragiri, to simulate flight conditions.
- According to ISRO, the ground qualification tests for the human rating of the CE20 engine involved life demonstration tests, endurance tests and performance assessment under nominal operating conditions as well as off-nominal conditions w.r.t thrust, mixture ratio, and propellant tank pressure.
- **All the ground qualification test** of the CE20 engine for the Gaganyaan programme have been successfully completed.

B) GAGANYAAN FIRST FLIGHT TEST VEHICLE ABORT MISSION-1 (TV D-1) WAS SUCCESSFULLY ACCOMPLISHED (OCT 2023)

- The purpose of the TV-D1 mission was to demonstrate the Crew Escape System for the Gaganyaan program through a test vehicle demonstration in which the vehicle went up to a Mach number, which is slightly above the speed of sound, and initiated an abort condition for the Crew Escape System to function.
- **Outcome:** TV-D1 Mission was fully achieved and that the Crew Escape System (CES) performed as intended.



4) SHIVA SHAKTI

- **What happened?**
 - The IAU working group for Planetary System Nomenclature has approved the name '**Station Shiva Shakti**' for the landing site of **Chandrayaan-3's Vikram lander**. The approval was given on 19th March 2023.
- **About International Astronomical Union:**

- The International Astronomical Union (IAU) was founded in 1919. It's an **NGO** with mission to promote and safeguard the science of astronomy in all its aspects, including research, communication, education and development, through international cooperation.
- The IAU consists of **Individual members**, who include both **professional astronomers and junior scientists**, and **national members**, such as professional associations, national societies, or academic institutions.
- Its **individual members** – structured into Divisions, Commissions, and Working Groups – are **professional astronomers from all over the world**, at the Ph.D. level and beyond, who are active in professional research, education and outreach in astronomy. It also has **junior members**.
- Among other tasks of the IAU are the **definition of fundamental astronomical and physical constants**, **unambiguous nomenclature** and **informal discussions on the possibilities for future international large-scale facilities**.
- Further, the **IAU serves as international authority for assigning designations** to celestial bodies and **surface features** on them. This authority was also **recognized by the United Nations** in 1982 in **UN Resolution 13 on Extraterrestrial features names**.
- The IAU also work **to promote research, education, and public outreach activities** in astronomy for the public.

- **How astronomical sites are named?**

- **Why naming?**
 - According to the **Gazetteer of Planetary Nomenclature**, planetary nomenclature, like terrestrial nomenclature, is used to uniquely identify a feature on the surface of a planet or **satellite** so that it can be **easily located, described, and discussed**.
 - This gazetteer **contains detailed information about all names of topographic and albedo features on planets and satellites** (and some planetary ring- and ring-shaped systems) that the **IAU has named from its founding in 1919 through the present time**.
- **IAU Rule 4 states:** "**Solar system nomenclature** should be **international in its choice of names**. Recommendations submitted to the **IAU national committees** will be considered, but **final selection of the names is the responsibility of the International Astronomical Union**. Where appropriate, the [working group] **strongly supports an equitable selection of names from ethnic groups, countries, and gender on each map**; however, **a higher percentage of names from the country planning a landing is allowed on landing site maps**.
- **IAU's Rule 9 states:** "No names having political, military or religious significance may be used, except for names of political figures prior to the 19th century."
- **Note:** The **Astrogeology Science Centre of the U.S. Geological Survey** maintains the **Gazetteer of Planetary Nomenclature** on behalf of the IAU with funding from NASA.

- **About Station Shiv-Shakti:**

- In Aug 2023, **PM Modi announced that the point where the moon lander of Chandrayaan-3 touched** will be called '**Shiv Shakti**'.
- IAU has accepted this name.

- The citation for the name in the **Gazetteers** reads: “Compound word from Indian mythology that depicts the masculine (“Shiva”) and feminine (“Shakti”) duality of nature; Landing site of Chandrayaan-3’s Vikram Lander”.

5) SKYROOT SUCCESSFULLY TEST FIRES STAGE-2 OF VIKRAM-1 SPACE LAUNCH VEHICLE (MARCH 2024)

- **About Skyroot Aerospace:**
 - » It is an Indian, private sector, space enterprise based in Hyderabad, Telangana, India. In 2020, when GoI announced opening up of the space sector, it became the first startup to sign an MoU with ISRO to launch a rocket.
- **Rockets being Developed by Skyroot:**
 - » It is producing a series of Vikram Rockets named after Dr. Vikram Sarabhai. The goal is to launch small satellites using this rocket.
 - » **Vikram-S:** In 2022, Skyroot created history by launching India's first privately developed rocket Vikram-S.
 - It is a single stage sub-orbital rocket. It is India's first privately developed cryogenic hypergolic liquid and solid fuel-based rocket engine. It was developed using advanced composite and 3-D printing technologies.
 - In its first flight, in Nov 2022, it carried three customer payloads in a sub-orbital flight. It was launched from the sounding rocket complex of the ISRO's Satish Dhawan Space Centre in Sriharikota, Andhra Pradesh. It achieved a peak altitude of 89.5 kms and has met all flight parameters. This mission was called **Prarambh Mission**.
 - » **Vikram-1** is being developed to carry 480 kg payload to Low inclination Orbit.
 - In March 2024, Skyroot has successfully test fired the Stage-2 of Vikram-1 space launch vehicle, called **Kalam-250**, at the propulsion test bed of the ISRO, at its SDSC, in Sriharikota, Andhra Pradesh.
 - Stage-2 is a critical stage for space launch vehicles as it carries the launch vehicle from atmospheric phase to the deep vacuum of outer-space.
 - **KALAM-250** is a high strength carbon composite rocket motor, which uses solid fuel and a high-performance Ethylene-Propylene-Diene terpolymers (EPDM) Thermal Protection System (TPS). It also houses a carbon ablative flex nozzle along with high-precision mechanical actuators for thrust vector control of the vehicle, which helps the rocket achieve the desired trajectory.
 - **Note:** EPDM is a durable material made to withstand the toughest conditions. It can withstand high temperature and abrasive chemicals.
 - The test also had an important contribution from Vikram Sarabhai Space Center (VSSC), which supplied its proprietary head-mounted safe arm (HMSA) for the test, used for the safe operation of the rocket stage.

- The Solid propellant in Kalam-250 was processed by Solar Industries at their Nagpur facility.
 - The test lasted for 85 seconds and recorded a peak sea-level thrust of 186 KN.
 - **Note:** Skyroot have already tested the stage-3 of Vikram-1 called Kalam-100 in June 2021.
 - **Note:** Vikram-1 is the first private orbital rocket launch.
 - **Testing of Stage-2** is a milestone for Indian Space Industry, marking the successful test of the largest propulsion system ever designed and developed by the Indian private sector so far.
 - **Skyroot** team expects to reach its maiden orbital launch of the Vikram-1 by 2024.
- » **Vikram-2** which will follow Vikram-1, will carry 595 kg to low inclination orbit.
- » **Vikram-3** will carry 815 kg to Low inclination orbit.
- Skyrocket also says that the rockets will be able to undertake multi-orbit insertion and inter-planetary missions as well as offer “customized, dedicated and ride share options covering a wide spectrum of small satellite customer's needs”.
 - **Significance of these initiatives**
 - » Step towards privatization in space sector. This will bring innovation and youthful energy in the sector and is also expected to increase investment.
 - » Huge future potential as the demand for launching small satellites is growing.
 - » Scope to increase India's share in space sector. India's current share in the space economy is only 2%. PM Modi has been calling it to be increased to 10%.

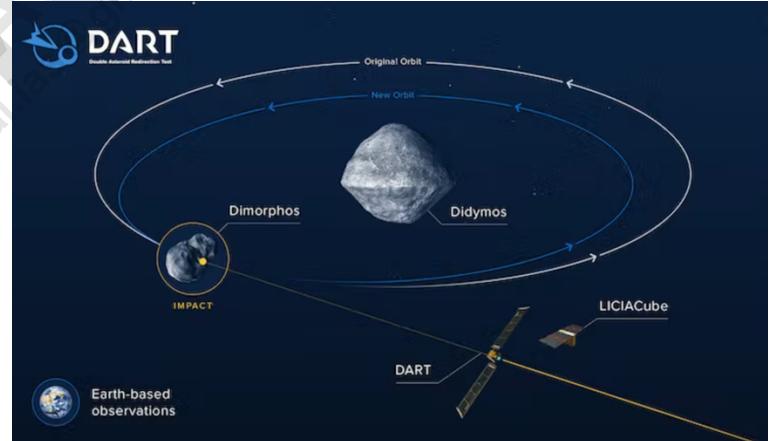
6) INTUITIVE MACHINE – 1 (IM-1) (ODYSSEUS): USA'S PRIVATE SPACECRAFT ODYSSEUS LAND ON MOON (FEB 2024)

- **Why in news?**
 - » US achieves first moon landing in 50 years with private spacecraft Odysseus (Feb 2024)
- **The Intuitive Machines 1 (IM-1, TO2-IM) mission objective was to place a NOVA-C lander, called Odysseus, at Crater Malapert A near the south pole of the Moon.**
 - » **Rocket:** The uncrewed mission was sent on its way to the moon atop Falcon 9 rocket launched by Elon Musk's company SpaceX from NASA's Kennedy Space Center in Cape Canaveral, Florida.
- **Success:**
 - » **Spacecraft Odysseus** built and flown by Texas-based company Intuitive Machines landed near the south pole of the moon. This is the first US touchdown on lunar surface in more than 50 years. Before this a US Spacecraft to land on Moon was Apollo 17 in 1972, when NASA's last crewed moon mission landed there with astronauts Gene Cernan, and Harrison Schmitt.

- » This is the first ever achieved entirely by private sector.
- » This is also the first landing under NASA's Artemis lunar program. A host of small landers like Odysseus are expected to pave the way under NASA's Commercial Lunar Payload Services (CLPS) program, designed to deliver instruments and hardware to the moon at lower costs than the US Space Agency's traditional method of building and launching those vehicles itself.
- » The robotic lander is dubbed Odysseus and consists of six legs. It landed at a crater named Malapert A near the moon's south pole.
- **Payloads:** The vehicle is carrying a suite of scientific instruments and technology demonstration for NASA and several commercial customers designed to operate for seven days on solar energy before the sun sets over the polar landing sites.
- **Note:** So far, spacecrafts from only five countries have landed on Moon – USA, USSR, China, India and Japan.

7) DART MISSION CHANGED THE SHAPE OF DIMORPHOUS (MARCH 2024)

- **Why in news?**
 - Collision with NASA spacecraft altered shape of asteroid Dimorphos (March 2024: Source: TH)
- **Introduction**
 - DART is a planetary defense-driven test of technologies for preventing an impact of Earth by a hazardous asteroid.
 - Under this NASA launched a mission in Nov 2021, aboard Space X Falcon 9 rocket. It sent a space capsule of the size of a fridge towards an asteroid to shoot it off course. The target asteroids were 11 million kms away from Earth and DART mission reached here after 11 months of journey.
 - **Target Asteroid:**
 - DART's test target was an asteroid (Dimorphos/Didymos B) that passed the earth in 2022 and will come back two years later.
 - Its primary body (Didymos A) is approx. 780 meters across, its secondary body (or "moonlet") – Dimorphos/ Didymos B is about 160 meter in size, which is more typical of the size of asteroids that could pose the most likely significant threat to Earth.
 - NOTE: DART's target asteroid was **NOT** a threat to earth, and it is only a test mission.
 - In Sep 2022, this space capsule was crashed into Dimorphous/Didymos-B.
 - It used autonomous targeting, using images of the asteroids it acquires as it approaches. DART needed to recognize the asteroid itself, automatically lock onto Dimorphous, and adjust its trajectory to hit it. This is while it was moving at a speed of 24,000 km per hour.



- **Aim of the project:** Prepare to save earth from future threat of asteroids.
- **Technology**
 - » DART is the first mission to demonstrate the **Kinetic Impactor Technique** - striking the asteroid to shift its orbit - to defend against potential future asteroid impact.
- **Aim of this test:** Evaluate whether Kinetic Impactor technique can be used to deflect an object (Dimorphous/Didymos B) from its orbit.
- **Why Didymos system was chosen?**
 - Because it is a binary pair, it will be possible for astronomers on Earth to **assess the results of the impact**.
 - These asteroids pose **no risk to Earth** and have been chosen as the target for partly due to that fact.
- **How observations were made:**
 - Measurements from telescopes on Earth.
 - **LICIACube:** It is an Italian Space Agency CubeSat (a small type of satellite) that was deployed from a spring-loaded box aboard the craft on 11th Sep. LICIACube followed along and photographed the collision and its aftermath.
- **Outcome:**
 - For the **first time**, humans have demonstrated that it was possible to change celestial object's trajectory, if needed, to protect earth. The impact shortened Dimorphos' orbit time by 32 minutes.
 - » **Proof:** The test was a proof of concept for many technologies, that NASA has invested over the last few years.
 - **Collision** has also changed asteroid's shape.
 - » Before the DART encounter, the Asteroid was a bit plump in the waist, now appears to be shaped more like a watermelon – or, technically, a triaxial ellipsoid.
 - » Scientists say that the **shape change was so dramatic** because of its rubble-pile composition.
 - **DART** has also given some fascinating data about both asteroid properties and the effectiveness of a kinetic impactor as a planetary defence technology.

8) JAPAN'S SLIM (SMART LANDER FOR INVESTIGATING MOON)

- **Japan** has become the fifth country to land on Moon when its spacecraft SLIM landed on the Lunar surface in Jan 2024. Before this, USA, USSR, China and India had reached moon.
- **SLIM** (nicknamed **Moon Sniper**) is a lightweight spacecraft about the size of a passenger vehicle.
- It aimed for a pinpoint target. While most previous probes have used landing zones about 10 kms wide, **SLIM was aiming at a target of just 100 meters** (330 feet). It was a product of 2 decades of work on precision technology by Japan Aerospace Exploration Agency, JAXA.

- **Successful:** Japan has confirmed that its moon lander successfully achieved its pin-point landing on the moon on 19th Jan 2024

9) COSMIC MICROWAVE BACKGROUND RADIATION (CMBR)

- Cosmic Microwave Background (CMB) is a cooled remnant of the first light that could ever travel freely throughout the universe. This fossil radiation is the 'furthest that any telescope can see' and was released soon after the 'Big Bang'.
- CMBR is electromagnetic radiation as a remnant from an early stage of the Universe in Big Bang Cosmology. It is an all-pervasive, but weak, electromagnetic radiation from early universe, when matter was still to be formed.
- **This radiation doesn't come from any of the object that we see in the universe around us** (like stars and galaxies). It is coming from the time when these things were still to be formed. Thus, they are relic from an early universe when matter and radiation were in Thermodynamic Equilibrium.
- It was first discovered in 1964 and since then has emerged as an important source of information on the early universe.
- **Spectrum of CMBR**
 - Spectrum produced by CMB is very smooth. It does, however, contains some wiggles, or deformities, in its shape.
 - These wiggles encode information about specific events that can be expected to be found from in the CMB spectrum in different scenarios.
 - It is believed that the neutral hydrogen pervading the cosmos during dark ages absorbed some of the CMB radiation to produce an extremely small dip in the frequency of spreading radio waves.
 - **Thus far** theory and actual observations of CMB spectrum have matched perfectly.
- **Key things that scientists have learned from CMBR.**
 - From CMBR, scientists have inferred that the early Universe was filled with hot, dense and extremely uniform gas, mostly hydrogen and that the first stars were formed when these blobs of gases came together. That is when visible light also made its first appearance. Scientists refer this phase as **cosmic dawn**.
 - It also gives evidence that Universe expanded from an initial violent explosion. Cosmic Microwave radiation have become less energetic due to the redshift which also gives evidence of expanding universe.

10) SOME TELESCOPES PLANNED ON THE FAR SIDE OF THE MOON TO STUDY COSMIC MICROWAVE BACKGROUND (CMB) RADIATION (APRL 2024)

- **Need:** Terrestrial telescopes can't properly detect the frequency drop in the CMB radiation.
- **Advantages of placing telescopes on the far side of the moon (rather than on earth)**
 - » **No atmosphere:** On earth, the telescope has to peer through layers of atmosphere.
 - » **No pollution or artificial lighting:** On earth, it is becoming difficult for telescope to see through pollution or artificial lighting.
 - » **Long night of Moon:** On moon, one night lasts 14 days thus ensuring dark skies for observation for longer period.
 - » **Earth's ionosphere** also blocks radio waves from reaching earth. And an orbiting telescope also receive radio noise from the whole planet along with signals from outer space.
- **Therefore, scientists are seriously considering an idea they have toyed with since the 1950s:** Placing optical and radio-telescopes on the far side of the moon, which always faces away from earth.
- **Different agencies working towards sending satellite on far side of the moon:**
 - » **NASA-Berklee Joint Project – LuSEE Night** (Lunar surface electromagnetic Experiment): It is scheduled for launch in Dec 2025 and will launch on the far side of the moon and almost exactly opposite from the earth. This location is useful because it best shields radio frequency noise coming from the earth.
 - » **NASA's Long Baseline Optical Imaging Interferometer** is scheduled to be launched in parts before this decade is out.
 - » **China** also plans to send a moon orbiting radio telescope scheduled for launch by 2026.
 - » India's **PRATUSH** (Probing ReionizATion of the Universe Using Signal from Hydrogen) plans to orbit the moon and study the background radiation when it is on the far side of the moon. The telescope is being built by Raman Research Institute (RRI) in Bengaluru with active collaboration from ISRO.
 - Initially, ISRO will be put around earth. After some fine-tuning, the space agency will launch it moonward. It will carry a wideband frequency-independent antenna, a self-calibrating analog receiver and a digital correlator to catch radio noise in the all-important signal from the Dark ages.

11) MOONS IN SOLAR SYSTEM

- **How Many Moons are there in our Solar System**
 - » According to the latest data by NASA, planets together have 293 confirmed moons now.
 - **Saturn (146) and Jupiter (95)**, with total 241 account for more than 80% of these.
 - **Uranus (28)** and **Neptune (16)** are other planets with a greater number of Moons.
 - **Mars (2)** and **Earth (1)** are other planets with Moon in the solar system.
 - **Pluto** (It is a dwarf planet and not planet) also have five moons.
 - » **Why this kind of distribution?**

- » **Mercury** is too close to sun and its gravity will not be able to hold on its own moon. The moon there would crash into Mercury or start orbiting around Sun.
 - » Scientists are **not yet sure about why Venus doesn't have a moon.**

- » **Moons are classified into two separate categories.**
 - » **Regular Moons:** Moons which have prograde orbits (they orbit in the direction of the planet rotation) and lie close to plain of their equators.
 - » **Irregular Moons** can have pro or retrograde orbits and often lie at extreme angles to the planet's equators. Irregular moons are probably minor planets that have been captured from surrounding space. Most irregular moons are less than 10 kms in diameter.

- **Important Moons**
 - » Largest: **Ganymede** (Jupiter), Titan (Saturn), Callisto (Jupiter) etc.
 - » **Note:** Ganymede (though a moon) is bigger than Mercury and Pluto.

- **Number of Moons by dwarf planets:**

Dwarf Planet	Number of Moons
Ceres	0
Pluto	5
Haumea	2
Make make	0
Eris	1

A) GANYMEDE

- **About Ganymede:**
 - » It is the largest moon of our solar system, larger than planet Mercury and dwarf Planet Pluto.
 - It is the only natural moon in the solar system with a known magnetic field. The magnetic field causes auroras.
 - » It's an ice-covered world that may hold more water than all the earth's water combined. But unlike Earth, Ganymede's oceans are below its 100-mile-thick icy crust.

- **Details of Water Vapor at Ganymede:**
 - » Astronomers using archival data from NASA's Hubble Space Telescope found evidence of water vapor in the thin atmosphere of Jupiter's Moon Ganymede. This water vapor may have come from sublimation of ice occurring on the surface of the moon.

B) CALLISTO

- **Why in news?**

- » An international team of scientists, including from India, has discovered strong evidence indicating the presence of ozone on Jupiter's Moon Callisto. (March 2024)
- **About CALLISTO:** Callisto is the 2nd largest moon of Jupiter (3rd largest of the solar system). More than its size, it is distinguished by its composition. Despite being as big as planet mercury, it is half as much mass. It is primarily composed of water ice, rocky materials, sulphur dioxide, and some organic compounds. These substances make moon a potential candidate for supporting life in the Solar System beyond the earth.
- **A study was published in March 2024** issue of the journal Icarus. It outlines the researchers' investigation into the chemical evolution of "SO₂ astrochemical ice", which is ice primarily composed of SO₂ in the presence of ultraviolet irradiation. This shed light on the chemical process and composition on the surface of Callisto. By analyzing the data of the UV absorption spectra of the irradiation ice samples, the team was able to identify a distinct signature indicating the formation of ozone.
- **Significance of Ozone:** the presence of ozone is crucial for life to exist. In the absence of ozone layers, UV-B and UB-C radiation reaching the surface will make the possibility of life less probable.
 - » The discovery of ozone also suggests presence of oxygen, which in turn is a fundamental ingredient required for the formation of complex molecules, required for life (as we know it), such as amino acids, raising question about moon's habitability. This extends to other icy moons in our Solar System, potentially informing our understanding of habitable conditions beyond Earth.

12) BINARY STARS EATING THEIR OWN PLANTS

- **Why in news?**
 - » A study of 91 pairs of stars finds that about 8%, or 1/12, swallowed up a planet at some point in their lives (March 2024)
- **Understanding Twin Stars (Or Binary Stars):**
 - » A binary star or binary star system is a system of two stars that are gravitationally bound to and in orbit around each other. Binary stars in the night sky that are seen as a single object to the naked eye are often resolved using a telescope as separate stars, in which case they are called visual binaries.
 - » Stars in binary system don't necessarily have the same mass, size or brightness. The larger star of a binary couple is called the primary star, while the smaller one is known as the secondary star or the companion star.
 - » **Note: Binary stars are not rare.**
 - » It is estimated that around 85% of stars exist in binary star systems or systems with three or more stars. Single stars account for just 15% of all stars.

- **Twin Stars** born at the same time should have a virtually identical composition, as they are both born from the same parent cloud of gas and dust.
 - » Any major chemical differences between these so-called “co-natal” stars may thus be a sign that one devoured a world.
- **A new study** by researchers used the European Space Agency’s Gaia satellite to identify 91 pairs of stars.
- **How is composition of a star understood?**
 - » Within each travelling pair, the stars sit relatively close to one another – less than a million astronomical unit apart – and are likely co-natal. Scientists analyzed lights coming from distant stars. When molecules are heated, they give off unique spectrum of light wavelengths corresponding to the element’s they are made up of. Scientists analyzing light coming from distant stars can therefore deduce the stars’ elemental composition as stellar molecules are exposed to very high temperatures.
 - » The scientists utilized the European Southern Observatory’s Very Large Telescope in Chile, the Magellan Telescope, also found in Chile, and the Keck Telescope in Hawaii to analyze the light from these co-natal stars. They found that about 8% of these pairs – about one in 12 – had one star that displayed signs it had engulfed a planet. In other words, its chemical makeup differed from its twin.
 - » **Note:** The study was analyzing stars in their prime phase engulfing the planets (not the Red-Giant phase) engulfing the planet.
- **Significant Understanding:** Stable Planetary Systems like our own solar system might not be a norm.

13) HIGH ALTITUDE PSEUDO SATELLITES (HAPS)

- **Why in news?**
Why India wants to develop high-altitude pseudo-satellite vehicles, powered by the Sun (Feb 2024)
- **In Feb 2024**, the Bengaluru based **National Aerospace Laboratories (NAL)** successfully flew a prototype of new generation unmanned aerial vehicle (UAV). It is being seen as a huge breakthrough as it can fly at Great Heights, about 20 km above ground and runs entirely on Solar Energy. It can also remain in the air for months on end. Such UAV belong to the class of flying objects called HAPS, or High-Altitude Pseudo Satellite Vehicles, or ‘**HALE**’ High Altitude Long-endurance vehicles.
- **Uses of HALES/HAPS:**
 - Surveillance and Monitoring
 - Disaster Management
- **Advantages of HAPS over UAVs and Satellites.**

- **UAVs** are battery powered and thus can't stay in air for long duration.
- **Drones** fly at relatively low height, and thus their vision is restricted to small areas.
- **Satellites** in LEO move very fast and thus can't continuously watch the same point and Satellites in Geo stationary orbit are too expensive for these purposes and are very far to give a clear picture of ground.
- **HAPS** will overcome these challenges.
- **HAPS technology** is still under development. Several countries, and companies, have developed and flown such vehicles with encouraging success, but none has mastered the technology yet. The world record for a vehicle of this class is held by the **Airbus-manufactured Zephyr**, which flew for continuously 64 days in 2022 before crashing.
- **What about prototype tested by NAL?**
 - It flew for 8.5 hours. Next time, NAL wants to go for 24 hours. The full-scale machine that NAL is planning to build by 2027, would be aiming to remain in the air for 90 days at a stretch.
- **HAPS** is another technology where India is entering the race at a relatively early stage.

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NANO-TECHNOLOGY, ROBOTICS

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1. NANOTECHNOLOGY

- Nanotechnology is science, engineering, technology, conducted at the nanoscale which is 1 to 100 nanometers. Nanotechnology and Nanoscience involve the ability to see and to control individual atoms and molecules. In other words, nanotechnology is the engineering of the functional system at molecular scale.
- Richard Feynman, the father of nanotechnology, in his 1959 talk described nanotechnology as a field which can manipulate and control things on the scale of a nanometer. He expected that matter will have surprising properties at Nano level and thus provide for enormous number of applications.

1) APPLICATIONS OF NANOTECHNOLOGY

- **Carbon Nanotubes** are used in various products ranging from paints and textiles to medical diagnostics tools and components of future quantum computers because of remarkable properties such as very high elastic strength alongside low mass density or very high current densities with no heat loss.
- **Electronics**
 - **Graphene** is used in transparent electrodes for solar cells, LCD, robust non-volatile atomic switches, chemical and biological sensors and in spintronic devices.
 - **Semiconducting nanowires** are highly versatile optoelectronic components, for a wide variety of applications such as nano-LEDs and nano-Lasers, solar cells, and biomedical sensors.
- **Health**
 - **Nanoparticles of silver** embedded into fibers have anti-microbial action. It is used in food packaging, clothing, disinfectants and household appliances. Bandages are being infused with silver nanoparticles to heal cuts faster.
 - **Gold Nanoparticles** have anti-bacterial properties
 - **Nanomedicines – Diagnosis and Treatment** (see details separately)
 - **Water Purification: Special Filters using nanomaterials** can remove objects as tiny as viruses from water.
- **Nanotechnology in Agriculture** – Better fertilizers, pesticides, insecticides, feeds, better treatment for domesticated animals.
 - **Nano-Fibre based Agriculture Inputs:** For e.g., **FIB-SOL** provides a five-gram fiber that is soluble in water and can be applied on field using conventional or modern irrigation practices. The product addresses the demand for live bacteria that could rejuvenate the soil. It could also increase the nutrient utilization efficiency, allowing plants to assimilate nutrients in a better way.
- **Environmental Applications:**
 - **Iron nanoparticles** can be used to effectively clean-up organic solvents that are polluting the ground water. The nanoparticles disperse throughout the water and decompose the organic solvents in place.
 - Adding a **little boron to Carbon** while creating nanotubes produce solid, spongy, reusable blocks that can absorb large quantities of oil spilled in water.

- **Nanotechnology based smart windows** have energy saving, easy cleaning, UV controlling and photovoltaic properties.
- **Renewable Energy Generation**
 - New and Cheap Solar Cells use nanoparticles of **Titanium oxide** coated with dye molecules to capture the energy of visible light and convert it into electricity.
 - A **novel catalytic nanosheet** from of a nickel molybdenum-nitride, a thousand time cheaper than traditional platinum, is the new model for harvesting hydrogen from water for use as fuel.
- **Structural Engineering Applications**
 - **Nano-enhanced Cement** contained by addition of nanoparticles like nano silica (silica fume), nanostructured metals, CNTs and carbon nanofibers give stronger, more durable, self-healing, air purifying, fire resistant, easy to clean quick compacting structure.
 - **Nano-enhanced Construction Ceramics** such as floor and wall tiles and sanitary ware have self-cleaning, anti-bacterial, hygienic and scratch resistant features.
 - **Nano-enhanced paints** can reduce emission of Nitrogen-di-oxide, hydrocarbons, and carbon monoxide in the atmosphere. It can also make paint scratch proof, easy cleaning, air purifying, UV resistant, water repellent, flame resistant, and anti-bacterial.
 - **Nanotechnology based smart windows** have energy-saving, easy cleaning, UN controlling and photovoltaic properties.
 - **Fire resistant glasses** are produced by addition of fumed silica nanoparticles in glasses.
- Nanotechnology can promote **different forms of insulation solutions** like coatings, vacuum insulations glazing and nanofoams.
- **Nano whiskers** on clothes create a cushion of air around the fabric so that liquids can't stain them.
- **Cosmetics:** Nanoparticles like Zinc oxides and titanium oxides are used in sunscreen and related products. They provide protection from UVA rays.

2) FUTURE POTENTIAL APPLICATIONS

- Advancements like **nano-machines** will lead to development in the field of nano-medicines, more advanced electronics circuitry, quantum computing etc.

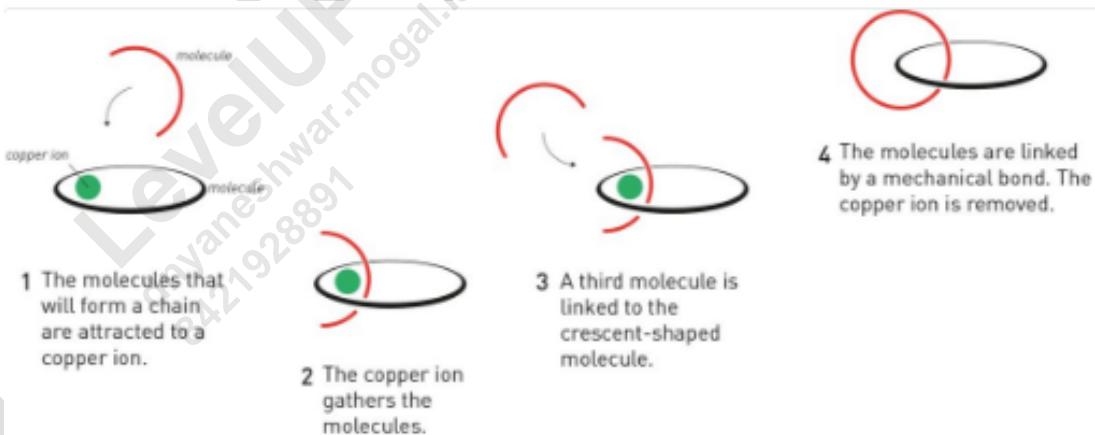
3) CONCERNS AND LIMITATIONS

- Due to their extremely small dimensions, large surface area and high reactivity, they have the **potential ability to penetrate living cells** quite readily. As a result, their unique nano-features may also make them potentially hazardous for human health and environmental safety.
- **Health**
 - Inhaling airborne nanoparticles and nanofibers may lead to a number of pulmonary diseases, e.g. fibrosis. Some form of carbon nanotubes could be as harmful as asbestos if inhaled in sufficient quantities.
 - Experiments with rats have also shown impact on skin (ageing) and brain.
- **Toxicity**
 - Lack of investment on nanotoxicology research

- **Environmental impact**
 - **Lack of research on potential harmful impact:** Lack of study on Impact of nanomaterial on non-human species, on ecosystem or the global environment.
 - e.g. bacteriostatic silver nanoparticles used in socks to reduce foot odor are being released in the wash. These particles are then flushed into the wastewater stream and may destroy bacteria which are critical component of natural ecosystem, farms and wastewater treatment processes.
- **More dangerous Weapons**
 - As a general-purpose technology, it will be **dual use**, meaning it will have many commercial uses and it also will have military uses - making for more powerful weapons and tools of surveillance.
 - A technology this powerful could easily be misused. The rapid development cycle and massive manufacturing capability may lead to an unstable arms race between competing powers.
- **Other Concerns**
 - May lead to loss of jobs in traditional farming and manufacturing sector
 - May bring about crash in certain markets due to lowering of oil and diamonds due to possibility of developing alternative source of energy that are more efficient and won't require use of fossil fuels. Also, because people would be able to develop products at molecular level, diamond will lose its significance.
 - Atomic weapons may become more accessible and more powerful and more destructive.

4) MOLECULAR MACHINES OR NANO MACHINES

- Molecular Machine, or nano-machine, is any discrete number of molecular components that produce quasi-mechanical movements (output) in response to specific stimuli.
- **The 2016 Nobel Prize for Chemistry was awarded to 'Molecular Machine' trio:**
 - For the **design and synthesis of molecular machines**
 - **Details about their contributions**
 - » Sauvage in 1983 took the first step by linking two ring shaped molecule to form a chain



» Stoddart in 1991 developed a rotaxane, a dumbbell-shaped molecular structure that enabled him to build molecular lift, a molecular muscle and a molecule based computer chip

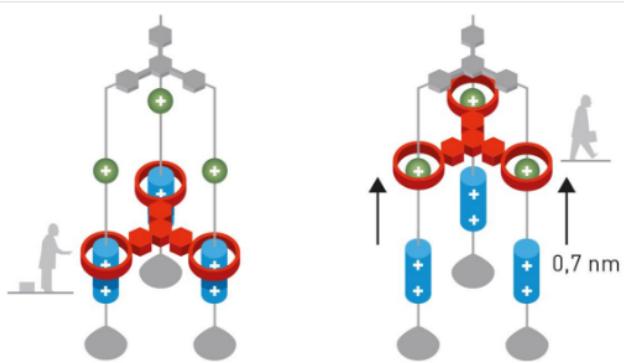


Illustration: ©Johan Jarnestad/The Royal Swedish Academy of Sciences

- » Feringa in 1999 was the first person to develop a molecular motor and in 2011 designed a four-wheeled nano-car

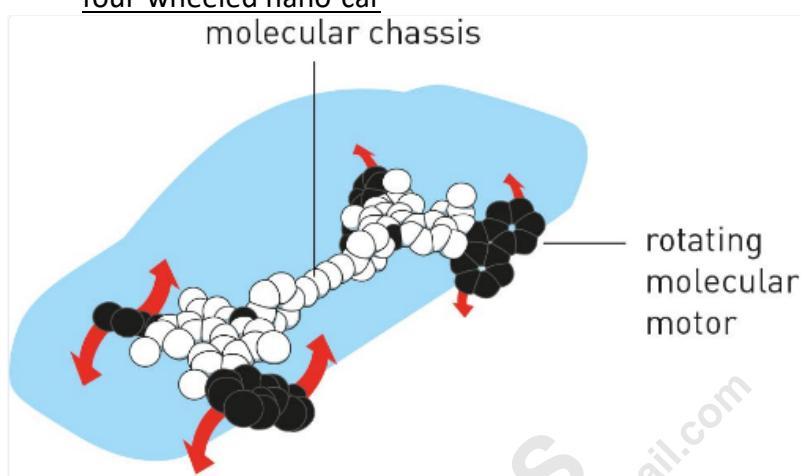


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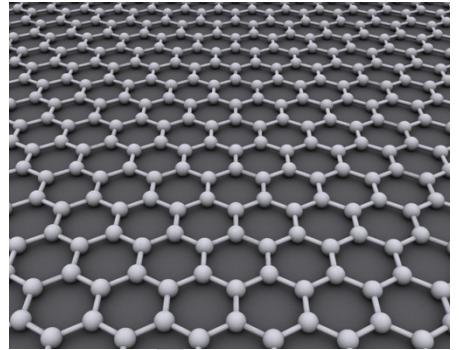
- **Significance of those nano-machines**
 - These tiny machines that we can't even see have enormous potential.
 - » **Medicine and treatment**
 - Molecular technology could lead to development of machines that are so small they could be swallowed or implanted into human bodies with little negative effect.
 - They could be used to fight disease in the body, to repair damaged tissues, and even to probe DNA structure.
 - Such precise drug delivery will **minimize adverse side-effects**.
 - » **Smart materials** able to adapt to their environment, small sensors that can be controlled remotely, and drugs that are activated on command
 - » **Efficient energy storage devices**

5) EXAMPLES OF SOME MATERIAL

A) SCHWARZITE – NEW FORM OF CARBON CREATED – CLASS DISCUSSION

B) GRAPHENE

- It is an **allotrope of carbon** which is a one-atom thick layer of pure carbon. Carbon atoms are bounded together in a hexagonal honeycomb lattice.



- How is it produced?**

- By separating a single atom layer film from graphite.

- Properties: Physical**

- 2D** – world's first 2D material
- Graphene is **harder** than diamond, **more elastic** than rubber, **tougher** than steel and yet **lighter than aluminum**.
 - In fact, it is 200 times stronger than steel (100 times stronger than the strongest steel).
- Thickness:** 1 million times thinner than a human hair
- Stretchable as well as transparent, flexible and impermeable.
- It can also act as **perfect barrier** – not even helium can pass through it.

- Properties: Thermal, Electrical and Magnetic Properties**

- Highest electronic conductivity** of any material in the world.
- Best Heat conductivity** of any material in the world
- Shows a **large and nonlinear diamagnetism**.

- Applications:** Graphene's unique combination of extraordinary properties offer a fascinating material platform for the development of next-generation technologies in many areas.

- Energy Harvesting and Storage:** It can be used for better rechargeable batteries; superior capacitors; newer methods of making solar cells etc. Further, proton transfer in graphene shows promise for artificially mimicking photosynthesis.
- Electronics:** Very high electron conductivity allows graphene to be used for low-cost printable electronics, high performance transistors; thermal management and heat dissipation in nano-electronic devices.
 - The optical properties** of graphene can also be controlled by doping and make it well suited for optoelectronic devices.
- Composites and Coatings:** Its low mass and low loading requirements make graphene standout as a reinforcing agent in composites. It can be used for making lubricants with enhanced anti-wearing capabilities; radiation shielding and lighting strike protection; superhydrophobic coating; transparent, flexible and conductive thin films etc.
- Membranes** – It can improve the quality of filters used in desalination or other water purifying instruments. Graphene oxide is used for the purpose.
 - It can also act as gas barrier for e.g., in food packaging.
 - It can be used for separation of organic solvent with water.
- Biomedical Technologies:** Very high surface area, electron mobility etc. is paving the way for novel biomedical technologies. Graphene bioelectronics (transistors and electrode arrays) has become a ground-breaking field that offers existing opportunities for developing new

- kinds of biosensors. Key **applications include** Thermal ablation of highly resistant cancer cells; Bioelectronics (bionics); Electronic interface to living cells and nerve tissues; etc.
- **Sensors:** Since every atom of graphene is exposed, it is an ideal material for biological, gas and chemical sensors. It can be used for explosive detection; detecting biomarkers for Parkinson's disease; selective gas sensing; self-healable, multifunctional electronic sensor tattoos; environment monitoring etc.
 - Wearable technologies
 - Light weight cars, planes etc.

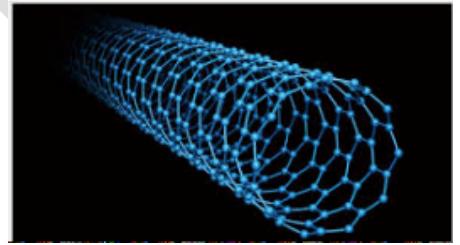
- **Health Risks:** Extensively debated.

- Toxicity depends on several factors such as shape, size, purity, post-production processing steps, oxidative state etc.

C) CARBON NANOTUBES (CNT)

- **Intro**

- » Carbon nanotubes are allotropes of carbon with a cylindrical nanostructure. These cylindrical carbon molecules have unusual properties, which are valuable for nanotechnology, electronics, optics and other fields of material science and technology.



- **Properties**

- » Strength: One of the most tensile and elastic material discovered yet.

- **Wettability**

- » Exhibits a super hydrophobic property.
- » By applying a low voltage as low as 1.3 V, the extreme water repellants surface can be switched into super hydrophilic.

- **Electrical Properties**

- » CNT are either metallic or semiconducting along the tubular axis.

- **Thermal Properties**

- » All nanotubes are expected to be very good thermal conductors along the tube, exhibiting a property known as "ballistic conduction", but good insulators lateral to the tube axis.

- **Application**

- » **Current uses and application** of nanotubes has mostly been limited to the use of bulk nanotubes, which is a mass of rather unorganized fragments of nanotubes.
- » Used as composite fibers in polymers to improve the mechanical, thermal and electrical properties of the bulk product.
- » Tips for atomic force microscope probes
- » In tissue engineering, carbon nanotubes can act as scaffolding for bone growth.

- **Concerns:** Toxicity, health risk not clear yet.

6) ELABORATING ON SOME NANOTECHNOLOGICAL APPLICATIONS

A) NANOTECHNOLOGY IN HEALTH:

- **Medical Applications:**
 - » **Prevention of disease:**
 - **Nanoparticles of silver** embedded into fibers have anti-microbial action. It is used in food packaging, clothing, disinfectants, and household appliances. Bandages are being infused with silver nanoparticles to heal cuts faster.
 - **Gold Nanoparticles** have anti-bacterial properties.
 - **Water Purification: Special Filters using nanomaterials** can remove objects as tiny as viruses from water.
 - » **Diagnostics**
 - **By** studying and identifying individual molecules, it is possible to diagnose disease in time to improve the prognosis for the patient.
 - » **Improved Treatment**
 - Indian Institute of Nano Science and Technology (INST) is developing **Magnetic Hyperthermia mediated cancer therapy** - delivery and localization of magnetic material within the targeted tumour site followed by subsequent application of an alternating Magnetic Field (AMF), thereby generating heat at the tumour site.
 - E.g: **Scientist** are using gold **nanoparticles to target prostate cancer**. Here the nanoparticles or nano shells are made of small layers of Silica glass formed into a sphere and wrapped in a thin layer of gold. This is made to reach the tumour site and then harnessed to cause the tumorous tissue to pulse with extreme temperature when light is applied through a laser specifically designed to excite the particles
 - A team of scientists from IISc Bengaluru have developed nano robots to be used in dental procedure (like root canal therapy).
 - With more advancement in **Nanomachines** – complex surgical procedures would become less intrusive and less complicated.

USING NANOROBOTS FOR DENTAL PROCEDURE

- **Background/Need**
 - A significant percentage of root canal treatments fail, because the procedure leaves out some bacteria that are located deep within the dentinal tubules.
- **The new method:**
 - Scientists have developed **Spiral Silica robots** measuring 300 nanometers to travel through dentinal tubules and target bacteria.

MAGNETIC HYPERTERMIA-MEDIATED CANCER THERAPY (MHCT)

B) ENVIRONMENTAL NANOTECHNOLOGY

▪ **Key areas where nano-material researchers are working:**

- i. **Ensuring Potable Drinking Water** – Use of Graphene based water filters are expected to increase the accessibility of clean drinking water in coming future
- ii. **Removing pollutants from water**
 - **Cleaning up organic chemicals polluting ground water**
 - Iron nanoparticles can be used to effectively clean-up organic solvents that are polluting the ground water. The nanoparticles disperse throughout the water and decompose the organic solvents in place. This method is more effective and costs significantly less than treatment methods that require the water to be pumped out of ground.
 - **Cleaning up of oil spills**
 - Using photocatalytic cooper tungsten oxide nanoparticles to break down oil into bio-degradable compounds.
- iii. **Generating Less pollution during manufacturing of materials**
 - E.g. Use of silver nano particles as catalysts can significantly reduce the polluting by products in the process used to manufacture propylene oxide.
 - Propylene oxide is used to produce common materials such as plastics, paint, detergents and brake fluid.
- iv. **Producing solar cells that generate electricity at competitive cost**
 - E.g. Silicon nanowires embedded in a polymer result in low cost but high efficiency solar cells.
- v. **Increasing the electricity generated by windmills**
 - E.g. use of carbon nanotubes in windmill blades results in stronger and lower weight windmill blades. This helps in more amount of electricity generated by each windmill.
- vi. **Reducing cost of fuel cells**
 - Changing the spacing of platinum atom in fuel cells increases the catalytic ability of the platinum. This allows the fuel cells to function with 80% less platinum, significantly reducing the cost of the fuel cells.

C) NANOTECHNOLOGY IN AGRICULTURE

i. Nano-Fertilizers

- **Introduction:**

- India has become the first country in the world to have developed and roll out nano-fertilizers.
 - » So far, it has launched nano-versions of two fertilizers – Urea and Diammonium Phosphate (DAMP).
 - » While nano-Urea has been made available to farmers since late 2021, nano-DAP was launched in April 2023.

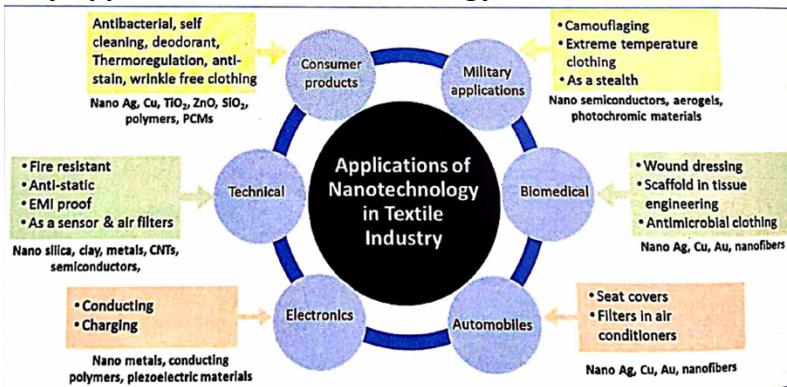
- The Indian Farmers Fertilizer Cooperative Limited (IFFCO), which had developed the variants using propriety technology, claims that Nano-UREA and Nano-DAP have several advantages over their conventional granular counterparts.
- **More Details:**
 - Both Nano-Urea and Nano-DAP come in liquid form.
 - IFFCO claims that a 500 ml bottle of nano-urea can replace at least a 45 kg bag of granular urea and a bottle of 500 ml nano-DAP can replace a 50 kg bag of granular DAP.
- **Advantages:** The Parliamentary Standing Committee on Chemicals and Fertilizers (2022-23), headed by Shashi Tharoor have enumerated several advantages of nano-fertilizers in its March 2023 report:
 - **Soil Health:** Nano-UREA can address the imbalanced and excessive use of conventional urea in the country, which accounts for around 82% of nitrogenous fertilizers applied to majority of the crops.
 - It costs less than subsidized conventional fertilizer thus reducing the cost for farmers.
 - They also result in better productivity and higher income for farmers.
 - » The PSC report notes that it has average 8% higher crop yield.
 - Experts also believe that these nano-fertilizers will lead to reduced import dependency of fertilizers and save forex reserves.
 - It will also contribute to reduced fiscal burden of government because of reduced fertilizer subsidy cost.

- **What is NANO UREA**
 - Fertilizer Minister, Mansukh Mandaviya has claimed that by 2025, India's domestic urea production as well as that of nano-Urea would together mean India would be "self-sufficient", in the manufacture of Urea and wouldn't require 90 lakh tonnes that it imported every year and would save the country close to Rs 40,000 crore.
 - **When is Urea used in agriculture and when can it be replaced by Nano Urea?**
 - Urea is used on two occasions – at the time of sowing (or transplantation); and the second is done when the plant has sprouted a canopy of leaves and is approaching the reproductive phase of plant growth.
 - It is to be noted that traditional Urea is still necessary during the initial stage, as basal nitrogen, of crop development. The nano Urea could be useful once the plant grew after which the product could be sprayed on its leaves.

- **Limitations:**
 - **Doubts about Yield gain:** DTE has reported interviews of several farmers who had to resort back to traditional fertilizers after, nano-fertilizers didn't give good results.
 - **Labour cost for spraying fertilizer** is increasing the overall input cost for farmers.
 - **Complaints** about farmers being forced to buy Nano-Urea.
 - **Issue of Evaluation/Trial:** ICAR has given results of field trial based on a year (two seasons) of experiments in its affiliated labs. This was an exception as ICAR normally tests a new fertilizer for 2 years (or three seasons) before giving go ahead to a new fertilizer.

D) NANOTECHNOLOGY IN TEXTILES

Key Applications of Nanotechnology in textile sector



7) NANOTECHNOLOGY IN INDIA

- Policies/Schemes/Programs

a. Mission on Nano Science and Technology (Nano Mission)

▪ Introduction

- It is an umbrella program of GoI for overall development in the field of Nanotechnology.
- It was launched in 2007 with an allocation of Rs 1,000 crore which was further extended during the 12th five-year plan.
- It is structured in a fashion to **achieve synergy** between the national research efforts of various agencies in Nano Science and Technology and launch new programs in a concerted fashion.
- Department of Science and Technology is the nodal agency for the mission.

▪ Objectives of the Nano-Mission

- **Basic Research Promotion** – funding of basic research by individual scientists or groups of scientists and creation of centre of excellence for pursuing this research.
- **Infrastructure Development** for Nano Science and Technology Research -> development of a chain of facilities across the country.
- **Human Resource Development** – Providing effective education and training to researchers and professionals in diversified fields. Launching of M.Sc./M.Tech programmes, create national and overseas post-doctoral fellowships, chairs in universities etc.
- **International Collaborations** – Exploratory visits of scientists, organization of joint workshops, conferences and joint research projects, facilitate access to sophisticated research facilities abroad, forge academia-industry partnership.
- Development of **product and processes for national development**
 - Especially in areas of national relevance like
 - Safe Drinking Water
 - Materials Development
 - Sensors Development
 - Drug Delivery

- **Achievements of the Mission**

- The mission has resulted into more than 5,000 research papers and some useful products like nano-hydrogel based eye drops, pesticide removal technology for drinking water, water filters for arsenic and fluoride removal and nano-silver based on anti-microbial textile coating.
- India has moved from the fourth to the third position in the world in terms of scientific publications in nano-science and technology.
- **Institute of Nanoscience and Technology (INST):** It is an autonomous institute of the Department of Science and technology, Gol.

2. ROBOTICS

1) LAWS OF ROBOTICS:

- Isaac Asimov gave the three laws of robotics as:
 - A robot must not harm a human being, or, through inaction, allow a human being to come to harm
 - A robot must always obey the human beings unless it is in conflict with the first law.
 - A robot must protect itself from harm unless it is in conflict with the first and/or second law.

1) WHERE ARE ROBOTS BEING USED CURRENTLY AND AREAS WHERE THERE IS A POTENTIAL TO USE ROBOTS

- Robotics is being used across a range of sectors such as:
- **Warehouse Automation**
- **Automotive manufacturing**
 - » They add precision, tirelessness and continuity in the manufacturing process.
- **Search and Rescue after Disaster**
 - » From collapsing building (due to faulty construction) to earthquake to flooding.
 - » IIT Hyderabad is working on a search-and-rescue robot called **SARP (Snake like articulated platform)**. The engineering institute is applying several technologies in building **SARP**: navigation, camera, infrared, haptic feedback (to identify survivors) and collaboration (multiple snake robots can communicate with one another)
- **Defence & National Security**
 - » Whether it is with Pakistan or China, our borders are unsafe for border forces and human lives are getting lost whenever there is firing or illegal movement of people at LoCs.
 - » Government is looking at DRDO to develop next generation of robotic soldiers.
 - » **Other dangerous security tasks** like **bomb disposal, reconnaissance** etc can be performed by Robots.
 - » For e.g. **Daksha** is one of India's current military robots. It is used to locate, handle, destroy, risky objects safely and even can climb stairs.
- **Hazardous Industries**
 - » BARC is using robots to clean radioactive water tanks.
- **Mining and Mineral Extraction**
- **Marine Engineering**
 - » **Amogh** is an autonomous underwater vehicle. It is designated to inspect and repair bridges, pipelines and hulls of ships at the depth of upto 15 meters. The robot has an endurance capacity of upto 3 hours.
- **Space**
 - » Robots are used for exploration when humans can't be used.
 - » E.g., Fedor of Russia, Vyomamitra of India etc.
- **Health Sector**
 - » Robots are being used in operation theatres and rehabilitation centres to augment the quality of life.

- » Robots can also assist **surgical procedures** like removing gallbladders, performing hysterectomies and repairing knee ligaments.
- **Agri-Robots**
 - » Can replace costly human labor and add precision in agriculture.
- They can be used anywhere to improve productivity.

2) ADVANTAGES OF USING ROBOTS

Accuracy

Untiring nature of robots

Non-complaining

Safety in hostile environments

Reducing cost of production

Industries facing global competition can't survive without robots

For e.g. the automobile industry can't actually survive without use of robotics

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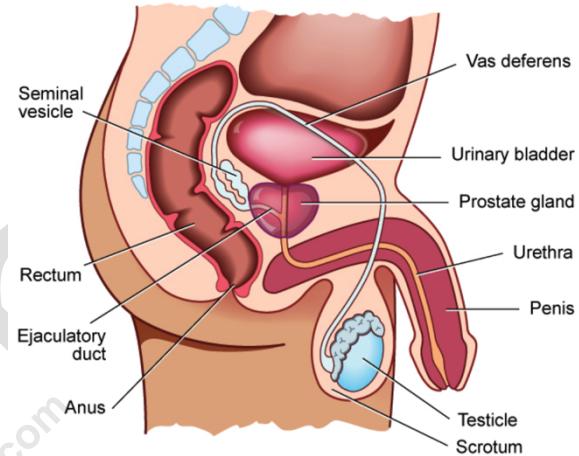
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1. HEALTH

1) PROSTATE CANCER

- **What is Prostate?**
 - » Prostate is a gland which is part of male reproductive system.
 - » **What is the function of Prostate?**
 - Prostate contributes additional fluid to your semen (ejaculate). Ejaculate is a whitish grey fluid that release from your penis when you get orgasm. It contains enzymes, zinc and citric acid, which help nourish sperm cells and lubricate your urethra.
 - Prostate muscle also helps push semen into and through your urethra when you orgasm.
 - » **Location:** Prostate gland is located below the bladder and in front of your rectum. The urethra runs through the centre of the prostate.
 - » **Note:** Women doesn't have prostate gland. Women and people Assigned Female at Birth (AFAB) have Skene's gland. However, some people refer to Skene's gland as the female prostate gland.
 - » **Note:** Sperm is produced by Testes and not in Prostate.
 - » **Urethra:** It is the tube through which ejaculate and pee flow out of your body.
- **Prostate Cancer:** It is the one of the most common type of cancer that affects men and people assigned male at birth (AMAB).
- **Lancet Report (April 2024)**
 - » **Situation in India:**
 - » **Prostate cancer** accounts for 3% of all cancers in India, with an estimated 32K to 42K new cases diagnosed annually.
 - » Large proportion of cases are diagnosed in advanced stage which means that the cancer has spread at the time of diagnosis. Therefore, 65% of the patients die of the disease.
 - » **Prostate Cancer cases in India will double to 71,000 new cases per year by 2040.**
 - **Why?**
 - Ageing population and increasing life expectancy means there will be higher number of older men in the coming years.
 - The main risk factors are age and genetics, which, according to him, are aggravated by additional factors like smoking, obesity, a poor diet and lifestyle.
 - » **Global Scenario:**
 - » Globally cases are expected to double from 1.4 million per year in 2020 to 2.9 million per year by 2040 with low and middle income countries predicted to see the highest increase.
 - » **Recommendations:**



- » Early testing in men over 60 as prostate cancer account for 3% of high risk cancers in India. This will pickup cancer at treatable stage.

2) H5N1 (BIRD FLU)

- Since 2020, a highly pathogenic version of bird flu, H5N1, has been spreading across the globe. It is becoming an existential threat to birds and wildlife.
- The virus has infected birds in more than 80 countries (as of Dec 2023) and resulted in culling of millions of chickens and turkeys at commercial poultry farm. It also struck numerous species of wild birds, such as gulls and terns, killing them by thousands.
- The flu is also spreading to mammals. Tens of thousands of seals and sea lions in different parts of the world have died due to the disease.
- The infection has also infiltrated mainland Antarctica for the first time in history.
- Factor behind large scale spread: Largely unknown. Climate change could be one of the reasons. Soaring global temperature impact the behavior of birds in such a way that it exacerbates the spread of flu. These birds are forced to move to new territories and mix with species that they usually don't interact with, which possibly boosts the chances for the virus to spread even further.

3) INDIA TB REPORT, 2024: RELEASED BY MOH&FW IN MARCH 2024

- Decline in 16% in TB incidence (new cases emerging each year) since 2015.
 - » The incidence rate has fallen from 23.7 lakh population in 2015 to 19.9 million per lakh in 2022.
- Decline in mortality due to TB by 18% since 2015.
 - » Mortality rate has declined from 28 per lakh population in 2015 to 23 per lakh population in 2022, according to the India TB report 2024.
- The gap between estimated number and actual cases of TB is closing.
 - » There were only 2.3 lakh missing cases in 2023, as compared to 3.2 lakh the year before.
 - » This gap has been reducing over the years, specially with the government's Ni-Kshay portal tracking all TB patients.
- Notification from Private sector: Of all the TB cases notified in 2023, nearly 32% of notification came from the private health care sector which is an increase of 17% from the previous year.
- Key Initiatives:

- » After the COVID-19 pandemic, the National TB Elimination Program (NTEP) embarked on a journey towards accelerating TB elimination, guided by the National Strategic Plan (NSP) 2017-25.
- » **NTEP:** It continued providing free diagnostic services, conducting approx. 1.89 crore sputum smear test and 68.3 lakh nucleic acid amplification tests (NAAT) in 2023.
- » **DBT under the Nishay Poshan Yojana** continued to provide financial support to TB patients, with approx. Rs 2,781 crore disbursed to approximately one crore beneficiaries. It added that more than 1.5 lakh Nikshay Mitras have come forward and committed support persons affected with TB.

2. DEFENCE

1) AGNI-P (OR AGNI-PRIME)

- **Why in news?**
 - » New Generation Ballistic Missile Agni-Prime successfully flight tested by Strategic Force Command & DRDO (April 2024: Source - PIB)
- **Details**
 - » Agni P is a new generation advanced variant of Agni class of missiles. It is a two stage, surface to surface, solid fueled, canisterized missile with range capability between 1,000 and 2,000 kms. It is being developed by DRDO and will be successor of Agni-1 and Agni-2 missiles.
 - » It is the sixth missile in the Agni Series of **ballistic missile**. Since it is canisterized, it can be transported on train or stored in canister.
 - » It is also lighter than earlier Agni Missiles.
- **April 2024 Test:** Strategic Force Command (SFC), along with DRDO, conducted the successful flight-test of the New Generation Ballistic Missile Agni-Prime from Dr APJ Abdul Kalam Off the coast of Odisha. The test met all the trial objectives validating its reliable performance.
 - » Note: The missile was first tested in June 2021. Then in June 2023, the first pre-induction night launch was conducted by the users after three successful development trials of the missile, validating the accuracy and reliability of the system.
- **Background:**
 - » **Agni class of missiles** are the mainstay of India's nuclear launch capability which also includes the Prithvi short range ballistic missiles, submarine launched ballistic missiles and fighter aircraft. The longest of the Agni series, Agni-V, an Inter-Continental Ballistic Missile (ICBM) with a range of over 5,000 km, has already been tested several times and validated for induction.

2) AKASHTEER SYSTEM

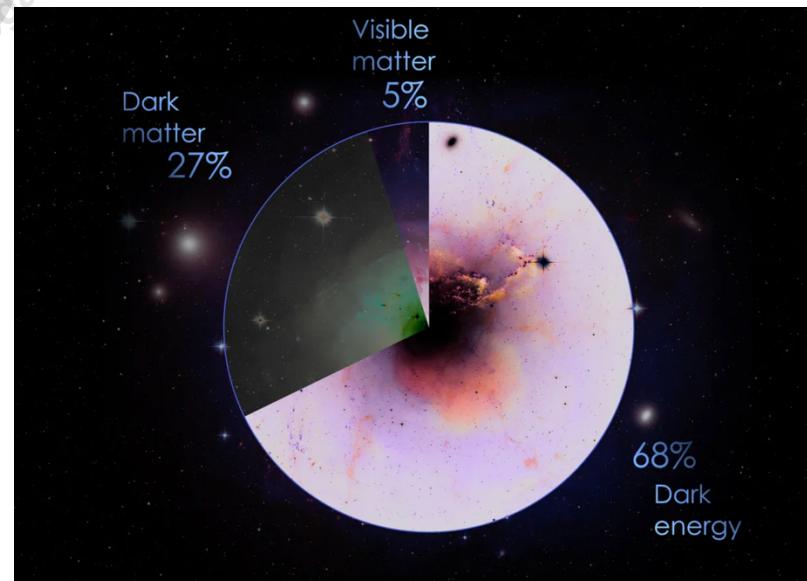
- **Why in news?**
 - » Army inducts indigenous Akashteer system (April 2024)

- **About Akashteer:**
 - » The Automated Air Defence Control & Reporting System 'Project Akashteer' is an initiative to automated air defence control and reporting processes by digitizing the entire process.
 - » It will empower the Air Defence Unit of Indian Army with an indigenous, state of art capability, to effectively operate in an integrate manner. It will enhance the operational efficiency and integration of the Army's air defence mechanisms.
 - » It will enable monitoring of low-level airspace over the battle areas of Indian army and effectively control the Ground Based Air Defence Weapon Systems.
- In April 2024, Army started induction of control and reporting systems under 'Project Akashteer' to bolster its air defence capabilities.
- Earlier in May 2023, Ministry of Defence had signed a contract with Bharat Electronics Limited (BEL) for procurement of Automated Air Defence Control and Reporting System 'Project Akashteer' worth Rs 1,982 crore for the Indian Army.

3. SPACE

1) BUILDING BLOCK OF THE UNIVERSE: NORMAL MATTER, DARK MATTER AND DARK ENERGY

- **Introduction:** Everything that we can observe in the universe is made of matter. **Matter** is defined as any substance that has mass and occupies space. But there is more to the universe than the matter we can see. **Dark Matter** and **Dark Energy** are mysterious substances that affect and shape the cosmos, and scientists are still trying to figure them out.
- **Normal Matter:** It makes up everything that we can observe. This matter can be seen by us in visible light with our own eyes or through a telescope that can detect light we can't see, like ultraviolet or infrared. It can exist as a gas, liquid, or plasma of charged particles. While normal matter is everywhere in our daily lives, it composes less than 5% of the total universe.
- **Dark Matter:** Like ordinary matter, dark matter takes up space and holds mass. But it doesn't reflect, absorb, or radiate light – at least not enough for us to detect yet. While scientists have measured that dark matter makes up about 27% of the cosmos, they're not sure what it is. **Theories** include several kinds of as-yet unidentified types of particles that rarely interact with normal matter.



- » **How was Dark matter first understood:** In the 1930s, Swiss astronomer Fritz Zwicky coined the term while studying the Coma galaxy cluster. It contains more than 1,000 galaxies. The speed at which galaxies within a galaxy cluster move depends on the cluster's total mass and size. Zwicky noticed that galaxies in the Coma Cluster were moving faster than could be explained by the amount of matter astronomers could see.
- **Dark Energy:** It may be comprising roughly 68% of the universe, but scientists know even less about it than they do about dark matter. But something like dark energy must exist to explain the universe's accelerating expansion.
- Since the late 1920s, astronomers have known that the universe is expanding. In the 1990s, observations of distant star explosions, called supernova, showed that the universe expanded more slowly in the past than it does now. The reason for this remains unclear, but the leading explanation is that the universe contains something that has a repulsive gravitational effect – it pushes the universe apart instead of pulling it back together. This phenomenon is called dark energy.

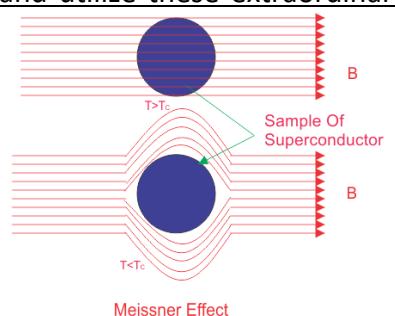
1) DARK ENERGY SPECTROSCOPIC INSTRUMENT (DESI)

- An international team of scientists has released the most comprehensive “three dimensional” map of the Universe, which, scientists hope, could reveal some clues about dark energy, the mysterious force that is believed to be causing the universe to expand uncontrollably.
- The researchers, including a team from India's TIFR, has published its findings from the first year of observation by the Dark Energy Spectroscopic instrument, or DESI.
 - » DESI is a unique piece of equipment that, once fitted over a telescope, can capture light from 5,000 galaxies at the same time.
 - » DESI is measuring the effect of dark energy on the expansion of the Universe. It is obtaining optical spectra for 10s of millions of galaxies and quasars, constructing a 3D map spanning the nearby universe to 11 billion light years.
 - » **The survey** is being conducted on the Mayall 4-meter telescope at Kitt peak national observatory, Arizona, USA.
- **The key thing** is that scientists have been able to measure the distance between these galaxies with a very high degree of accuracy. This is why scientists are calling it a 3-D Map. Knowing the precise distances of the galaxies is crucial because that allows us to calculate the expansion rate of the Universe. This can offer first clues into the mystery of dark energy.
- **Some important information provided by DESI:**
- The DESI collaboration has measured that the expansion rate of the Universe was increasing by 68.5 km/s after every 3.26 million light year of distance, a unit astronomers define as megaparsec. This expansion rate can give first clue into the behavior of dark energy.
- **Future:** So far scientists have analyzed only 1 year of observational data from DESI. On 31st March 2024, DESI has been collected data for 3 years and it is scheduled to run for five years.

4. PHYSICS: MISCELLANEOUS TOPICS

1) SUPERCONDUCTIVITY

- **Why in news?**
 - » In Aug 2023, two South Korean researchers posted two related papers on the internet, not yet peer-reviewed, claiming that a lead based compound they had developed had shown superconducting properties at room temperature, under normal pressure conditions. (Aug 2023)
- **Definition**
 - » Some materials when they are cooled below certain temperatures ($T_{critical}$), they lose all electrical resistivity. This is called superconductivity.
 - It is one of the nature's most intriguing quantum phenomenon and was first discovered more than 100 years ago in mercury cooled to temperature of liquid helium (-270 degree C) by Heike Kamerlingh-Onnes in 1911. He received 1913 physics Nobel Prize.
 - **How many elements show superconductivity.**
 - Almost half of the elements in the periodic table display low temperature superconductivity, but applications of superconductivity often employ easier to use or less expensive alloys. For e.g., MRI machines use an alloy of niobium and titanium.
 - » **At what temperature superconductivity is achieved:** The first material to have been discovered to show superconductivity was mercury. Most of the other materials commonly used as superconductors - Lead, Aluminium, Tin, Niobium, and several others also become superconducting at comparable temperatures, called **Critical temperature**.
 - » **In some cases**, superconductivity is achieved at slightly higher temperature but that is under increased pressure conditions.
 - » Even the materials that are classified as '**high temperature superconductors**', as of now, show superconductivity properties only well below -150 degree C.
 - » The temperature at which the metals change from normal conducting state to superconducting state is called **Critical/Transition** temperature.
 - For e.g. below 4-degree Kelvin the metal mercury becomes a superconductor, therefore critical temperature for mercury is 4 K.
 - The transition from normal conducting stage to superconducting stage is reversible.
 - The super conducting material shows **some extra ordinary properties** which make them very important for modern technology. The research is still going on to understand and utilize these extraordinary properties of superconductors in various fields of technology.
 - **Infinite conductivity** (zero electric resistance)
 - » **Persistent current**
 - **Meissner Effect:** a superconductor, expel the magnetic field and doesn't allow the magnetic field to penetrate inside it. This phenomenon in superconductors is called Meissner effect.
 - **Critical temperature**
 - **Critical magnetic field**



- Critical Current
- Applications of Superconductivity
 - » **Medical Sector:** Used in magnetic resonance imaging, Magnetic Source imaging etc.
 - » **Electric Engineering:** For generation of high performing generators, motors, transformers, relays, superconducting magnets etc.
 - » **Electronics:** **Quantum Computing**, high quality sensors, filters, circuitry radar etc.
 - » **Transportation:** Magnetically levitated trains, Marine propulsion motors etc.
 - » **Fundamental Physics:** Particle accelerators, Magnets, Plasma / fusion research etc.
- Superconductivity at Room Temperature???
 - » The holy grail of superconductivity today is to find or create materials that can transfer energy between each other in a non-pressurized container.
 - If an efficient superconductor becomes possible at room temperature, it would revolutionize power transmission system for industry, commerce, and transportation.
 - » **Several Wrong Claims and Skepticism:** In recent years several claims of achieving superconductivity at room temperature has been found to be wrong. This has made scientific community a bit skeptic about any such new claim.
 - For e.g. in July 2023 only a research paper published in Physical Review Letters in 2021, by a US-based researcher making a similar claim had to be retracted.
 - Scientists at IISc Bengaluru had made similar claims in 2018, only to be sent for more reviews. The case is still unresolved.
 - » **In July 2023**, the South Korean researchers have posted two related papers on internet, not yet peer reviewed, claiming that a lead-based compound that they had developed had shown superconducting properties at room temperature, under normal pressure conditions. They are calling this material to be LK-99.

2) QUANTUM MECHANICS

- Introduction
 - » Quantum mechanics is the science of very small. Quantum mechanics explains the behaviour of matter and its interaction with energy on the scale of atoms and subatomic particles.
 - » **Three revolutionary principles**
 - **Quantized Property**
 - » Some properties, such as position, speed and color, can sometimes only occur in specific set amounts.
 - **Particles of Light**
 - » Light can sometimes behave as particles.
 - **Waves of Matter**
 - » Matter can also behave like wave.
 - » **Differences between Classical Mechanics and Quantum Mechanics**

Concept	Classical Mechanics	Quantum Mechanics
	Continuous , everything is allowed	Discrete , discontinuous, not all allowed

	All wavelength available in light	Each element is unique, not every wavelength is possible
	Something is wave or particle	Both - everything is wave and particle
Heisenberg's uncertainty principle	Know position and velocity precisely	Know either position or velocity precisely. We can't know both accurately

» Uses

- Since the breakthrough of renormalization, QFT has served as the foundation for developing quantum theories about four fundamental forces of nature
 - » Electromagnetism
 - » The weak nuclear force
 - » The strong nuclear force
 - » Gravity

» Uses for real life.

- **Ultra-Precise Clocks**
 - » Atomic clocks, are able to use principle of quantum theory to measure time
- **Uncrackable codes: Quantum Cryptography**
- **Superpower Computers**
 - » Quantum computers supercharge processing power because they use quantum bits, or qubits, which exist in a superposition of states - until they are measured, qubits can be both 1 or 0 at the same time.
- **Improved Microscopes**
 - » This type of microscopes fires two beams of photons at a substance and measures the interference pattern created by the reflected beam - pattern change based on whether they hit flat or uneven surface.
- **Biological Compass**
 - » A light sensitive protein called cryptochrome, which may contain entangled electrons.

3) ATOMIC CLOCK

- An atomic clock is a clock device that uses an electronic transition frequency in the microwave, optical, or ultraviolet regions of the electromagnetic spectrum of atoms as a frequency standard for its timekeeping element.
- They are the most accurate time and frequency standards known and are used as primary standards for international time distribution services, to control the wave frequency of television broadcasts, and in global navigation satellite systems such as GPS.
- **Principle**
 - » Based on atomic physics. It uses the microwave signal that electrons in atoms emit when they change energy levels.
 - » When exposed to certain frequencies of radiation, such as radio waves, the subatomic particles called electrons that orbit an atom's nucleus will "jump" back and forth between energy states.

Clocks based on this jumping within atoms can therefore provide an extremely precise way to count seconds.

- » Currently the most accurate atomic clocks first cool the atoms to near absolute zero temperature by slowing them with lasers and probing them in atomic fountains in a micro-wave filled cavity.
- » Since 1967, the official definition of a second is 9,192,631,770 cycles of the radiation that gets an atom of the element called cesium to vibrate between two energy states.
 - Inside a cesium atomic clock, cesium atoms are funneled down a tube where they pass through radio waves. If this frequency is just right 9,192,631,770 cycles per second, then the cesium atoms "resonate" and change their energy state.
- » **Accuracy**
 - The NIST-F1 cesium clock can produce a frequency so precise that its time error per day is about 0.03 nanoseconds, which means that the clock would lose one second in 100 million years.

- **Where is atomic clock used -> Wherever accurate timings are required:**

- » Satellite navigation services
 - E.g. GPS
- » CERN lab for precisely timing the collision.
- » Standard organization (to provide accurate time)

4) NOBEL PRIZE IN CHEMISTRY: QUANTUM DOTS

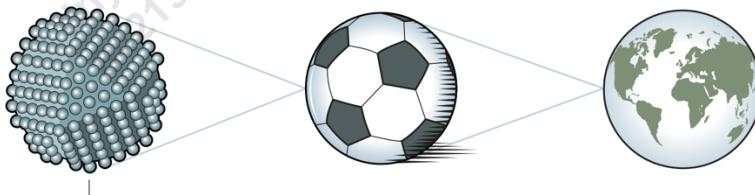
- **Quick Summary:**

- » The Royal Swedish Academy of Sciences has decided to award the Nobel Prize in Chemistry, 2023 to:
 - a. **Moungi G. Bawendi** (MIT, USA)
 - b. **Louis E. Brus** (Columbia University, USA)
 - c. **Alexei I. Ekimov** (Nanocrystals Technology Inc., New York, NY, USA)

"**For the discovery and synthesis of "Quantum Dots".**

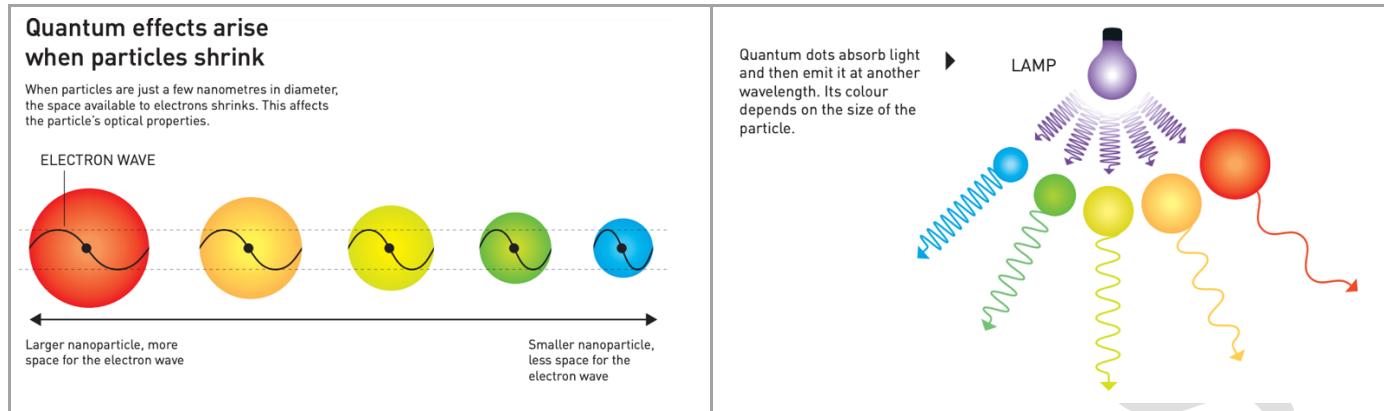
- **Details:**

- » **Quantum Dots** are nanoparticles so tiny that their size determines their properties.
 - **Understanding Size of Quantum Dots:**



A quantum dot is a crystal that often consists of just a few thousand atoms. In terms of size, it has the same relationship to a football as a football has to the size of the Earth.

- **Understanding Properties:** They have many fascinating and unusual properties. Importantly, they have different colors depending on their size.



- **For decades**, Quantum phenomena in the nanoworld were just a prediction.
- **Contributions:**
 - » **In the early 1980s**, Alexie Ekimov and Louis Brus succeeded in creating - independently of each other - quantum dots, which are nano-particles so tiny that quantum effects determine their characteristics.
 - **Alexie Ekimov**, in early 1980s, succeeded in creating size-dependent quantum effects in colored glasses.
 - The color came from nanoparticles of copper chloride and Ekimov demonstrated that the particle size affected the color of the glass via quantum effects.
 - This was the first time someone had succeeded in deliberately producing quantum dots - nanoparticles that cause size-dependent quantum effects.
 - **Louis Brus**, a few years later, was the first scientist in the world to prove size-dependent quantum effects in particles floating freely in a fluid.
 - » **Moungi Bawendi**, in 1993, revolutionized the chemical production of quantum dots, resulting in almost perfect particles. This high quality was necessary for them to be utilized in applications.
 - **Applications:**
 - » Researchers have primarily utilized quantum dots to create colored light.
 - The luminous property of quantum dots are utilized in computer and television screens based on QLED technology, where the Q stands for quantum dot.
 - In these screens blue light is produced using the energy-efficient diodes that were recognized with the Nobel Prize in Physics 2014. Quantum dots are used to change the color of some of the blue light, transforming it into red or green. This makes it possible to produce three primary colors of light needed in a television screen.
 - » **LED Lamps**: Quantum dots are used in LED lamps to adjust the cold light of the diodes. The light can then become as energizing as daylight or as calming as the warm glow from a dimmed bulb.
 - » **Biochemistry and Biomedicine**: Biochemists attach quantum dots to biomolecules to map cell and organs. Doctors are also investigating the potential use of quantum dots to track tumour tissue in the body. Chemists instead use the catalytic properties of quantum dots to drive chemical reactions.
 - » **Health Sector**: These can guide surgeons when they remove tumour tissues, among many other things.
 - » **Future Applications**: Researchers believe that in the future they could contribute to flexible electronics, tiny sensors, thinner solar cells, and quantum cryptography.

5) THE NOBEL PRIZE IN PHYSICS 2023: ATTOSECOND PHYSICS

- **Quick Summary:**
 - » Anne L'Huillier, Pierre Agostini and Ferenc Krausz have been awarded Nobel Prize in Physics, 2023.
 - » **What did they do?**
 - Through their experiments, they have created flashes of light that are short enough to take snapshots of electrons' extremely rapid movements.
 - Anne L'Huillier discovered a new effect from laser light's interaction with atoms in a gas.
 - Pierre Agostini and Ferenc Krausz demonstrated that this effect can be used to create shorter pulses of light than were previously possible.
- **Background: Understanding the Problem:**
 - » Human eyes cannot clearly see hummingbird's beating its wings which can be around 80 times per second. We are only able to perceive this as a whirring sound and blurred movement. It is because extremely short events are impossible to observe by human eyes.
 - » **High Speed photography** can capture detailed images of fleeting (short) phenomena. **A highly focused photograph of a hummingbird in flight requires an exposure time that is much shorter than a single wingbeat**.
 - » **The faster the event, the faster the picture needs to be taken if it is to capture the instant.**
 - » Atom's natural timescale is that of femtoseconds (10^{-15} sec). These movements can be studied with the very shortest pulses that can be produced with a laser.
 - A **femtosecond** was, in the 1980s, regarded as the limit for the flashes of light it was possible to produce.

Explanation:	Light consists of waves – vibrations in electrical and magnetic fields – that move through a vacuum faster than anything else. These have different wavelengths, equivalent to different colours. For example, <u>red light has a wavelength of about 700 nanometres</u> (4.29×10^{14} Hz), one hundredth the width of a hair, and it cycles at about <u>four hundred and thirty thousand billion times per second</u> . We can think of the <u>shortest possible pulse of light as the length of a single period in the light wave</u> , the cycle <u>where it swings up to a peak, down to a trough, and back to its starting point</u> . In this case, the wavelengths used in ordinary laser systems are never able to get below a femtosecond, so in the <u>1980s this was regarded as a hard limit for the shortest possible bursts of light</u>
---------------------	--

- But, electrons natural timescale is further lower in attoseconds (10^{-18} sec) i.e. in the world of electrons, positions and energies change at speeds of between one and a few hundred attoseconds. Therefore, flashes of light produced at femtosecond was not enough to see processes occurring on the timescale of electrons.
- **Development of Attosecond Pulses:**
 - » The mathematics that describes waves demonstrate that any wave form can be built if enough waves of the right sizes, wavelengths, and amplitudes (distance between peaks and troughs) are

used. The **trick to attosecond pulses** is that it is possible to make shorter pulses by combining more and shorter wavelengths.

- » In 1987, **Anne L' Huillier and her colleagues** at a French laboratory passed an infrared laser beam through a noble gas. The beam's interaction with atoms in the gas produced **overtones** (overtones are waves of light whose wavelength was an integer fraction of the beam. For e.g, if the beam had a wavelength of 100, the overtones would have wavelength of 10, 25, 50 etc.)
 - By finetuning the setup used to produce the overtones, scientists realized that it should be possible to create intense pulses of light each a few attosecond long.
- » In 2001, **Pierre Agostini** and his research group in France successfully produced and investigated a series of 250-attosecond light pulses, or a pulse train.
- » At the same time, **Ferenc Krausz** and his team in Australia developed a technique to separate an individual 650 second pulse from a pulse train.
 - Using this researcher were able to measure the energy of some electrons released by some krypton atoms.

- **Applications of attosecond physics:**

- » It allows scientists to capture images of activities that happen in incredible short spans. This can be used for exploring short-lived atomic and molecular processes implicated in fields like material, science, electronics, and catalysis.
- » In **medical diagnostics**, attosecond pulses can be used to check for the presence of certain molecules based on their fleeting signatures.
- » These pulses could also be used to develop faster electronic devices, and better telecommunication, imaging and spectroscopy.

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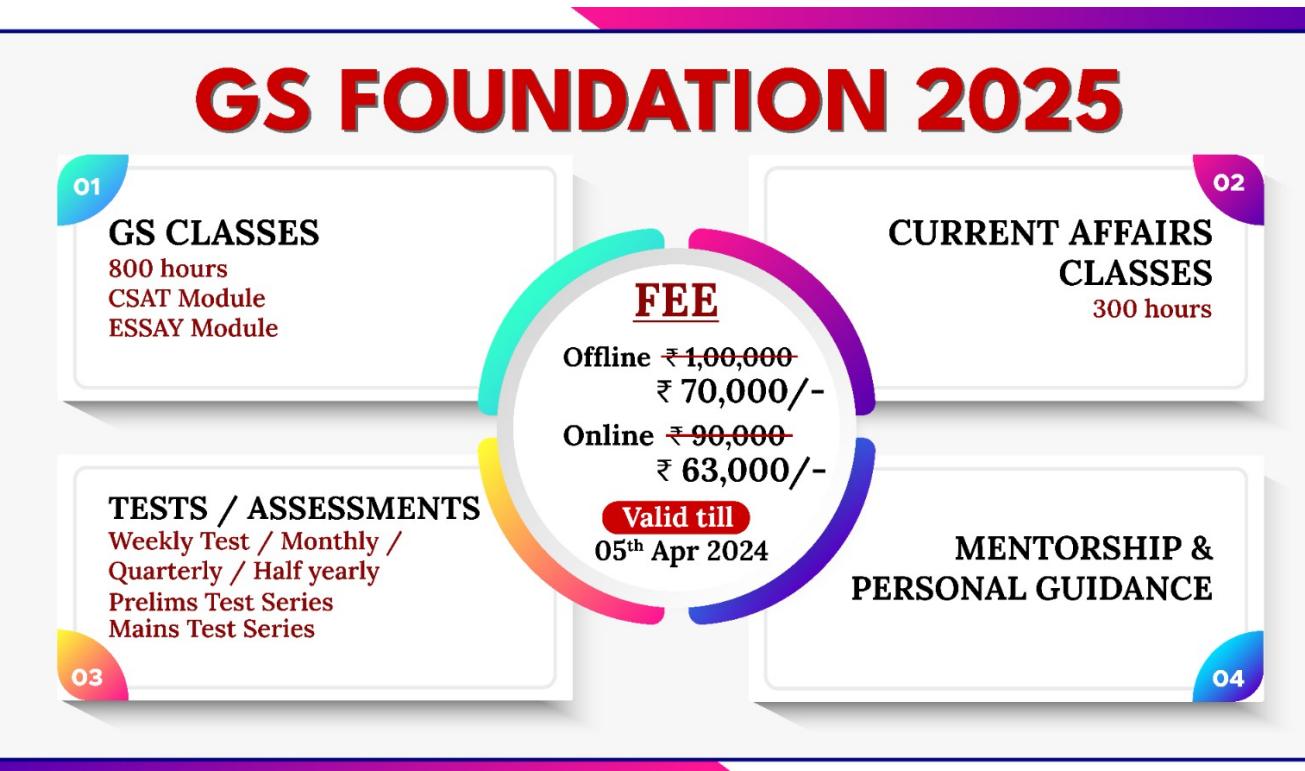
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INTERNATIONAL CONSERVATION EFFORTS

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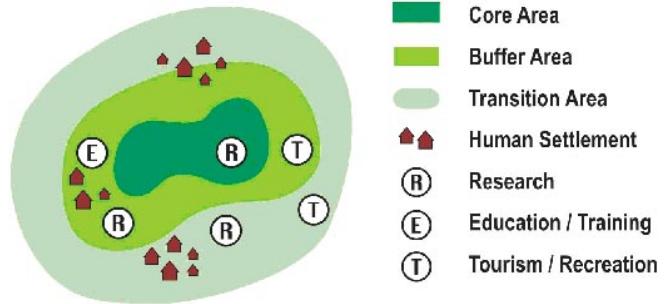
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2. UNESCO'S MAN AND BIOSPHERE PROGRAM (MAB)

- **Introduction**
 - » MAB Program is a **major effort in biodiversity conservation**, launched in 1971.
 - » It is an **inter-governmental scientific program** that aims to establish a scientific basis for improvement of relationships between people and their environments.
 - » MAB **combines natural and social sciences, economics and education** to improve human livelihood, and the equitable sharing of benefits.
- **Implementation of the MAB program**
 - » For implementation of its inter-disciplinary work on ground, MAB relies on the World Network of Biosphere Reserves (WNBR) and partnership for knowledge sharing, research and monitoring, education and training, and participatory decision making.
- **Characteristics of Biosphere Reserves**
 - » The characteristics feature of biosphere reserves are
 - **People are integral component**
 - **Remain under national jurisdiction** but share their experience and ideas nationally, regionally and internationally within the WNBR.
 - **Achieve three inter-connected functions:** Conservation, development and logistic support
 - **Zonation Scheme**
 - **Multi-stakeholder approach** with particular emphasis on the involvement of local communities in management.
 - **Integrating cultural and biological diversity**, especially the role of traditional knowledge in ecosystem management.
 - **Fostering dialogue** for conflict resolution in natural resource use.
- **Details about Zonation Scheme**
 - » While countries maintain flexibility at the national levels with regard to the definition of zones, **the zonation needs to ensure that biosphere reserves effectively combine conservation, sustainable use of resources, and knowledge generation through integrated zonation and collaborative management**.
 - » **Each biosphere reserve includes three zones: (Core, Buffer and Transition)**
 - i. **The Core Zone**

- Generally the strict nature reserves and wilderness portions are designated as core area in a BR.
- It should be kept absolutely undisturbed (or minimally disturbed).
- Non-destructive research and low impact uses (e.g. education) allowed.
- **Key functions of Core Area:**
 - **Conservation** function
 - **Range of ecosystem services:**
 - Employment opportunities can also complement conservation goals (e.g. environmental education, research, environmental rehabilitation and conservation measures, recreation and eco-tourism).

Structure of a model biosphere reserve.



ii. **The Buffer Zone** usually surrounds or adjoins the core area.

- It is used for cooperative activities compatible with sound ecological practices including, environmental education, recreation, ecotourism, and applied and basic research.
- They can also have important connectivity function in a larger spatial context as they connect biodiversity components within the core areas with those in transition areas.
- Human activities, if natural within BR, are likely to be permitted to continue if these don't affect the ecological diversity.

iii. **Transition Zone**

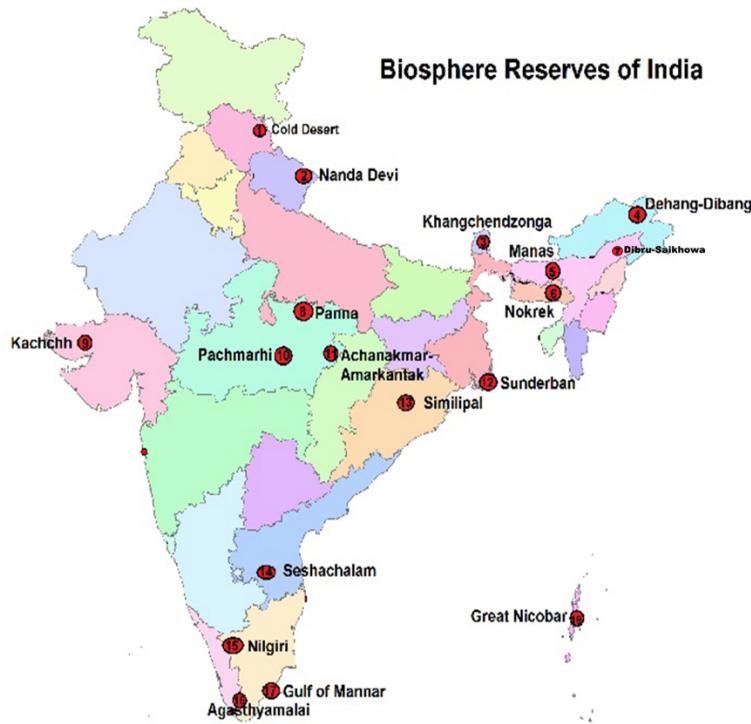
- Outermost part of biosphere reserve
- It has a central function in sustainable development which may contain a variety of agricultural activities, settlements, and other uses and in which local communities, management agencies, scientists and non-governmental organizations, cultural groups, economic interests, and other stakeholders work together to manage and sustainably develop the area's resource.
- Usually not delimited

- **Designation of Biosphere Reserves:** International Coordination Council (ICC) of the MAB program, UNESCO takes the final decision on the nomination for designation.
- **Relation between Biosphere Reserves and other protected areas (NP, WLS etc)**
 - BRs don't replace other PAs but it further strengthens the protected area network.
 - Existing PAs can become part of BR without any change in their legal status.
 - Inclusion of such PA in BR will enhance their national value
 - It doesn't mean the BR are to be established only around National Parks and WLS.
 - **Key differences**
 - » Conservation of overall biodiversity rather than a some specific flagship species.

- » **Increases broad-basing of stakeholders**, especially local people's participation and their training, compared to the features of scheme on WLS and NPs.
- » BRs are **internationally recognized** within the framework of UNESCO's MAB programme, after receiving consent from the participating countries.

- **Biosphere Reserves in India**

- The Indian government has established **18 biosphere reserves in India**, (categories roughly corresponding to IUCN Category 5 protected areas).
- A **scheme called Biosphere Reserve** is being implemented by GoI since 1986, in which financial assistance is given to states for maintenance, improvement and development of certain items. (60:40 general states, 90:10 - Northeastern and 3 Himalayan states)
- **The Indian National Man and Biosphere Committee** constituted by the Central govt identifies new sites, advises on policies and programmes, lays down guidelines, reviews progress and guidelines in the light of evaluation studies and feedback.
- **Management** of the biosphere reserves is the responsibility of concerned state/UT with necessary financing assistance, guidelines for management and technical expertise provided by the central government.
- **World Network of Biosphere reserves**
 - » **12** of the 18 biosphere reserves are a part of the World Network of Biosphere Reserves, based on the UNESCO Man and Biosphere (MAB) programme list.



Name	States	Key Fauna	Type	Year
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Great Nicobar Biosphere Reserves	Andaman and Nicobar Islands	Saltwater Crocodile	Islands	2013
Gulf of Mannar Biosphere Reserve	Tamil Nadu	Dugong or Sea cow	Coastal	2001
Agasthyamalai Biosphere Reserve	Kerala, Tamil Nadu	Nilgiri Tahr, Elephants	Western Ghats	2016
Nilgiri Biosphere Reserve	Tamil Nadu, Kerala, Karnataka	Nilgiri Tahr, Lion-tailed macaque	Western Ghats	2000
Simlipal Biosphere Reserve	Odisha	Gaur, Royal Bengal Tiger, Wild Elephant	Deccan Peninsula	2009
Achanakmar-Amarkantak Biosphere Reserve	Chhattisgarh, Madhya Pradesh	-	Maikala Hills	2012
Panna	Madhya Pradesh	Tiger, Chital, Chinkara, Sāmbhar, Sloth Bear	Ken River	2020
Panchmarhi Biosphere Reserve	Madhya Pradesh	Giant Squirrel, Flying Squirrel	Semi-Arid	2009
Sunderbans Biosphere Reserve	West Bengal	Royal Bengal Tiger	Gangetic Delta	2001
Nokrek Biosphere Reserve	Meghalaya	Red Panda	Tura Range, Meghalaya Plateau	2009
Khangchendzonga National Park	Sikkim		Himalayas	2018
Nanda Devi Biosphere Reserve	Uttarakhand	-	Western Himalayas	2004

- Other Biosphere reserves, not part of MAB include the following:

Name	States	Key Fauna	Type	Year
Seshachalam Hills	Andhra Pradesh (Eastern Ghats)		Eastern Ghats	2010
Little Rann of Kutch	Gujarat	Indian Wild Ass	Desert	2008
Manas	Assam	Golden Langur, Red Panda	Eastern Himalayas	1989
Dibru Saikhowa	Assam	Golden Langur	East Himalayas	1997
Dihang-Dibang	Arunachal Pradesh		Eastern Himalayas	1998

Cold Desert	Himachal Pradesh	Snow Leopard	Western Himalayas	2009
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1) PANNA BIOSPHERE RESERVE

- In 2020, UNESCO included Panna National Park/ TR in the list of UNESCO's World Network of Biosphere Reserves. Thus, Panna becomes the third biosphere reserve in MP after Panchmarhi and Amarkantak. MoEF&CC had declared Panna a Biosphere reserve in 2011 itself.
- **Details of Panna**
 - » It is a "Critical Tiger Habitat" in the state of Madhya Pradesh. It is also home to World Heritage Site of Khajuraho.
 - » It is characterized by forest and marshy vegetation, with an abundance of rare medicinal plants.
 - » **Ken river** flows through the reserve and the Ken-Betwa project will also be located in it.

CRITICAL TIGER HABITATS:

- Critical Tiger Habitat (CTH) refers to the areas within the tiger reserve that are considered to be the most important for the conservation of tigers.
- These areas are critical for:
 - i. Maintaining the breeding population and their prey species, as well as
 - ii. Providing connectivity to other habitats for long term survival of the tiger population.
- Certain areas under the Tiger Reserves are designated Critical Tiger Reserves under the Wildlife Protection Act, 1972. These areas are given highest level of protection under the law, and any development or human activity within these areas is strictly regulated to prevent any disturbance to the tiger population.
- The designation of Critical Tiger Habitats has played a significant role in conservation of tigers in India. As of March 2023, there are 54 tiger reserves in India, and each reserve has its own Critical Tiger Habitat area.

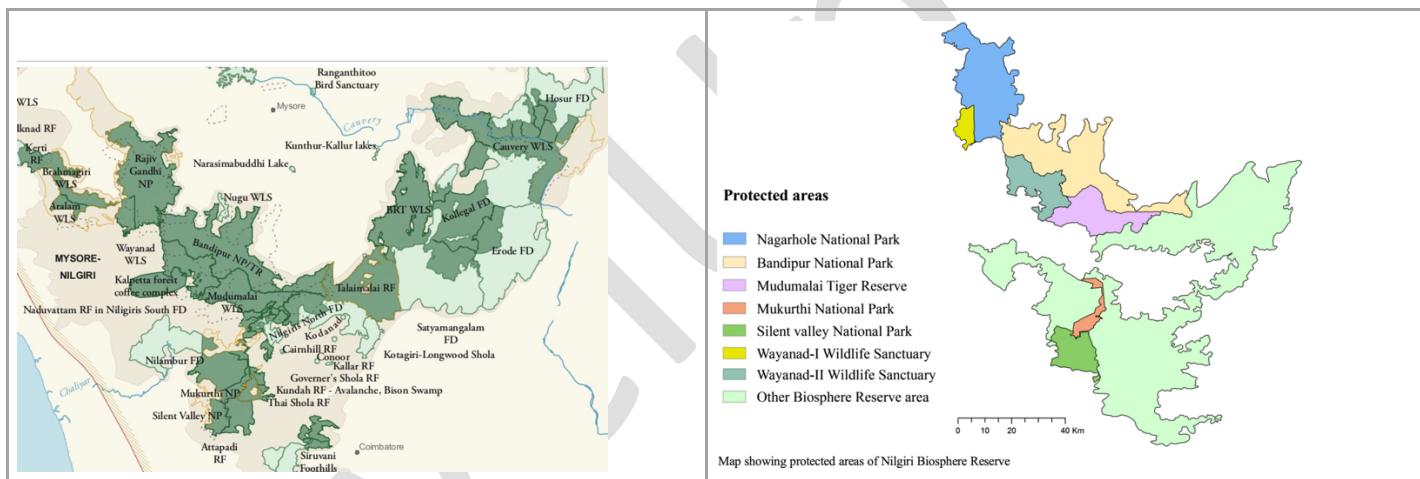
2) KANCHENJUNGA BIOSPHERE RESERVE

- **About Kanchenjunga Biosphere Reserve -**
 - » It is one of the highest ecosystems in the world. It falls within the Himalayan global biodiversity hotspots.
 - » **The core zone** alone has over 150 glaciers and 73 glacial lakes. **Zemu glacier** is one of the famous ones.
 - » 86% of the core lies in Alpine zone and the remaining portions are in the Himalayan Wet temperate and sub-tropical moist deciduous forest.
 - » It is also home to many threatened species including **musk deer, snow leopard, red panda, and Himalayan Tahr**.
 - » It is also home to many ethnic communities including **Lepcha, Nepalese, and Bhutia**.
- **Significance**
 - » The inclusion in the list will **boost the unique ecosystem of Sikkim** on two counts: Collaborative research and tourism.
 - It will boost the international research collaboration relating to flora and fauna and ecosystem of KBR.

- Further, this will help Sikkim get **more tourists**.

3) NILGIRI BIOSPHERE RESERVE

- The Nilgiri Biosphere Reserve was the first BR in India established in the year 1986. It is located in the Western Ghats and includes 2 of the 10 biogeographical provinces of India.
- Location and Area:** The reserve encompasses 5,520 km², in the state of Tamil Nadu (2537.6 Km²), Karnataka (1527.4 Km²) and Kerala (1455 km²). It forms an almost complete ring around the Nilgiri Plateau.
- Protected Area in Nilgiri BR include:**
 - Nagarhole NP**
 - Bandipur National Park**
 - Wayanad WLS**
 - Mudumalai WLS**
 - Sathyamangalam WLS**
 - Mukurthi NP**
 - Silent Valley NP**



- Vegetation type of Nilgiri BR**

Vegetational Types of the Nilgiri Biosphere Reserve

S.No	Forest type	Nature of Vegetation	Area of occurrence
1	Moist evergreen	Dense, moist and multi storeyed forest with gigantic trees	In the narrow valleys of Silent Valley
2	Semi evergreen	Moist, deciduous	Nilambur and Palghat division
3	Thorn	Dense	North east part of the Nilgiri district
4	Savannah woodland	Trees scattered amid woodland	Mudumalai and Bandipur
5	Sholas & grasslands	High elevated evergreen with grasslands	South and western catchment area, Mukurthi national park

- **The People:**

- » A variety of human cultural diversity can be found in the Nilgiri Biosphere Reserve.
- » Tribal groups like the Todas, Kotas, Irullas, Kurumbas, Paniyas, Adiyans, Edanadan Chettis, Cholanaickens, Allar, Malayan, etc., are native to the reserve. Except for Cholanaickens who live exclusively on food gathering, hunting and fishing, all the other tribal groups are involved in their traditional occupation of agriculture.

4) 3RD NOV: INTERNATIONAL DAY FOR BIOSPHERE RESERVE

- In the year 2022, at the 41st session of UNESCO's general conference, it was decided that Nov 3 would be celebrated worldwide as the International Day of Biosphere Reserve.
- This international day by UNESCO aims to:
 - i. Conserve nature, protecting biodiversity and cultural diversity.
 - ii. Promote scientific research, underpinning development through research monitoring, education and training.
 - iii. Promote socio-culturally and environmentally sustainable economic development.
 - iv. To foster the growth of local economies.

5) GLOBAL SITUATION OF BIOSPHERE RESERVES UNDER MAB NETWORK

- As of Nov 2023, there are 738 properties in 134 countries, including 12 in India, four in Sri Lanka and three in Maldives

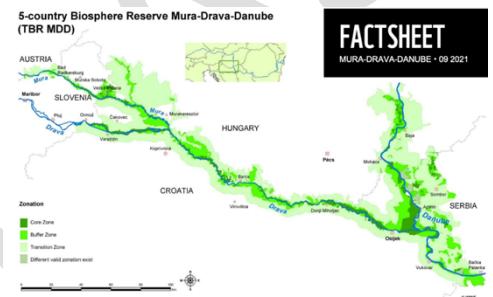
6) TRANSBOUNDARY BIOSPHERE RESERVES

- A TBR is first and foremost a cooperation between established Biosphere reserves. UNESCO formally designates it as a TBR if certain conditions are met:

- » A political agreement between the states concerned.
 - » A Common zoning that promotes the spatialization of conservation and development issues
 - » Identification of local and national partners and the establishment.
- TBR is an international recognition of a political will to cooperate in the conservation and sustainable use, through common management, of a shared ecosystem.

7) IN 2021 UNESCO DECLARED WORLD'S FIRST 5 COUNTRY BIOSPHERE RESERVE IN AMAZON OF EUROPE

- In Sep 2021, UNESCO designated **Mura-Drava-Danube** (MDD) as the world's first 'five country biosphere reserve'.
- **Unique Features:**
 - » It is Central Europe's largest near natural free-flowing river system without any dams across five countries.
 - » It is the first biosphere reserve in the world which is commonly shared and managed by five countries.
 - » With, 930,000 ha along 700 km of Mura, Drava and Danube Rivers Europe's largest river protected area.
 - » Flagship project for international understanding and regional cooperation.
- The reserve covers 700 kms of the Mura, Drava and Danube rivers and stretches across **Austria, Slovenia, Croatia, Hungary, and Serbia**.
- It is home to floodplain forests, gravel, and sand banks, river islands, oxbows, and meadows.
- It is home to continental Europe's highest density of breeding white-tailed eagle (more than 150 pairs), as well as endangered species such as the little tern, black stork, otters, beavers, and sturgeons.
- It is also an important annual resting and feeding place for more than 250,000 migratory birds, according to WWF. Almost, 900,000 people live in the biosphere reserve.
- The total area of the reserve - a million hectares - in the so called 'Amazon of Europe', makes it the largest riverine protected area on the continent.
- The new reserve represented an important contribution to the European Green Deal and contributes to the implementation of the EU Biodiversity Strategy in the Mura-Drava-Danube region.
 - » The strategy aims to revitalize 25,000 km of rivers and protect 30% of the EU's land area by 2030.



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3. UNESCO WORLD HERITAGE CONVENTION

- In 1972, UNESCO adopted the Convention Concerning the Protection of the World Cultural and Natural Heritage.
 - » This convention seeks to encourage the identification, protection, and preservation of cultural and natural heritage around the world, considered to be of outstanding value to humanity.
- **Strategic Objectives** (the "Five Cs")
 - » Credibility
 - » Conservation
 - » Capacity Building
 - » Communication
 - » Communities
- **What does the convention contain?**
 - » The Convention sets out the duties of state parties in identifying potential sites and their role in protecting and preserving them.
 - By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage.
 - » It explains how the World Heritage Fund is to be used and managed and under what conditions international financial assistance may be provided.
 - » The Convention obligates States Parties to report regularly to the World Heritage Committee on the state of conservation of their World Heritage properties.
 - » It also encourages States Parties to strengthen the appreciation of the public for World Heritage properties and to enhance their protection through educational and information programmes.
- **World Heritage Site**
 - » A world heritage site is a landmark which has been officially recognized by the UN, specifically by UNESCO.
 - » Sites are selected on the basis of cultural, historical, scientific or some other form of significance and they are legally protected by international treaties. UNESCO regards these sites as being important to the collective interests of humanity.
 - » The list is maintained by the International World Heritage Program administered by the UNESCO World Heritage Committee, composed of 21 UNESCO member states which are elected by General Assembly.
 - » While each World Heritage site remains part of legal territory of state wherein the site is located, UNESCO considers it in the interest of the International Community to preserve each site.
- **How UNESCO grants World Heritage Site tag?**
 - » Step 1: Inclusion in tentative list

- A tentative list is an "inventory" of properties a country believes deserves to be a World Heritage Site.

» **Step 2: Nomination File**

- After UNESCO includes a property in the Tentative List, the country has to prepare a nomination document.
- The Nomination file is evaluated by the International Council for Monuments and Sites and the World Conservation Union. These bodies then make recommendations to the World Heritage Committee.

» **Step 3: Consideration by UNESCO World Heritage Committee**

- The country meets once a year to determine whether or not to inscribe each nominated property on the World Heritage List and sometimes defer the decision to request more information from the country which nominated the sites.
- There are 10 selection criteria - a site must meet at least one.

- **10 Criteria**

- » Up to 2004 there were six criteria for cultural heritage site and four criteria for the natural heritage site.
- » In 2005 this was modified so that, now only one set of ten criteria.
- » Nominated sites must be of "outstanding universal value" and meet atleast one of the ten criteria.

1) WORLD HERITAGE SITES IN INDIA

As of Jan 2024, India has 42 World Heritage sites (34 Cultural, 7 Natural and 1 Mixed)

Cultural Heritage Sites in India	Year of Entry	State
#1 Agra Fort	1983	Uttar Pradesh
#2 Ajanta Caves	1983	Maharashtra
#3 Ellora Caves	1983	Maharashtra
#4 Taj Mahal	1983	Uttar Pradesh
#5 Group of Monuments at Mahabalipuram	1984	Tamil Nadu
#6 Sun Temple, Konark	1984	Odisha
#7 Churches and Convents of Goa	1984	Goa
#8 Fatehpur Sikri	1986	Uttar Pradesh
#9 Group of Monuments at Hampi	1986	Karnataka
#10 Khajuraho Group of Monuments	1986	Madhya Pradesh
#11 Elephanta Caves	1987	Maharashtra
#12 Great Living Chola Temples	1987	Tamil Nadu

#13 Group of Monuments at Pattadakal	1987	Karnataka
#14 Buddhist Monuments at Sanchi	1989	Madhya Pradesh
#15 Mountain Railways of India	1999	West Bengal, Tamil Nadu, Himachal Pradesh
#16 Humayun's Tomb, Delhi	1993	Delhi
#17 Qutub Minar and Monuments, Delhi	1993	Delhi
#18 Mahabodhi Temple Complex at Bodh Gaya	2002	Bihar
#19 Rock Shelters of Bhimbetka	2003	Madhya Pradesh
#20 Champaner-Pavagadh Archaeological Park	2004	Gujarat
#21 Chhatrapati Shivaji Terminus (formerly Victoria Terminus)	2004	Maharashtra
#22 Red Fort Complex	2007	Delhi
#23 Jantar Mantar	2010	Jaipur
#24 Hill Forts of Rajasthan	2013	Rajasthan
#25 Rani Ki Vav (The Queen's Stepwell)	2014	Gujarat
#26 Archaeological Site of Nalanda Mahavira at Nalanda	2016	Bihar
#27 The Architectural Work of Le Corbusier, an Outstanding Contribution to the Modern Movement	2016	Chandigarh
#28 Historic City of Ahmedabad	2017	Gujarat
#29 Victorian Gothic and Art Deco Ensembles of Mumbai	2018	Maharashtra
#30 Jaipur City	2019	Rajasthan
#31 Kakatiya Rudreshwara (Ramappa) Temple	2021	Telangana
#32 Dholavira, a Harappan City	2021	Gujarat
#33 Santiniketan	2023	West Bengal
#34 Sacred Ensembles of the Hoysala	2023	Karnataka

Natural Heritage Site in India	Year of Entry	State
#1 Sundarbans National Park	1987	West Bengal

#2 Western Ghats	2012	Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra, and Gujarat
#3 Nanda Devi and Valley of Flowers National Parks	1988	Uttarakhand
#4 Manas Wildlife Sanctuary	1985	Assam
#5 Great Himalayan National Park	2014	Himachal Pradesh
#6 Keoladeo National Park	1985	Rajasthan
#7 Kaziranga National Park	1985	Assam

Mixed Heritage Site in India	Year of Entry	State
#1 Khangchendzonga National Park	2016	Sikkim

2) ADVANTAGE OF GETTING WORLD HERITAGE TAG

- **Identity:** the recognized site gets a new identity world over. The status itself confirms that the outstanding and exceptional features of the listed site.
- **Funding:** the site gets fund from World Heritage Fund for its protection
- **Tourism:** International recognition attracts attention of both domestic and global tourists.
- **Protection during Wartime:** The site becomes protected under Geneva convention against destruction or misuse during war.
- **National governments also become more responsible** in the protection of the site.
- **Access to global project management resources**, as they are now more willing to participate with the project.

“MARATHA MILITARY LANDSCAPES OF INDIA” WILL BE INDIA’S NOMINATION FOR RECOGNITION AS UNESCO WORLD HERITAGE LIST FOR THE YEAR 2024-25 (JAN 2024)

- It was developed between 17th and 19th centuries, and represent an extraordinary fortification and military system envisioned by the Maratha rulers
- The **twelve component parts of this nomination** are, Salher Fort, Shivneri Fort, Lohgad, Khanderi fort, Raigad, Rajgad, Pratapgad, Suvarnadurg, Panhala fort, Vijay durg, Sindhudurg in Maharashtra and Gingee Fort in Tamil Nadu.
- The Maratha Military Landscapes of India is nominated under **criterion (iii): To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization that in living or which has disappeared**, **criterion (iv): to be an outstanding example of a type of building, architectural or technological ensemble, or landscape that illustrates significant stage(s) in human history** and **Criterion**

(vi): To be directly or tangibly associated with events or living traditions, with ideas or with beliefs, with artistic and literary works of outstanding universal significance.

UNESCO INSCRIBES KARNATAKA'S SACRED ENSEMBLE OF HOYSALAS IN WORLD HERITAGE LIST (SEP 2023)

- The ancient site was part of UNESCO's tentative list since 2014 and now the global body has decided to inscribe **Sacred Ensembles of the Hoysalas in the World Heritage List**.
 - » The serial property encompasses the **three most representative examples of Hoysalas-style temple complexes in Southern India** dating from 12th to 13th century.
 - » The Hoysala style was created through a careful selection of **contemporary temple features** and those from the past to create a different identity from neighbouring kingdoms.
 - The shrines are characterized by hyper real sculptures and stone carving that cover the entire architectural surface, a circumambulatory platform, a large-scale sculpture gallery, a multi-tiered frieze, and Sculpture of the Sala legend.
 - » Chennakesava Temple was constructed by King Vishnuvardhana of the Hoysala dynasty in the 12th century to commemorate his victory over Cholas.
 - Other temples which are part of the Sacred Ensemble of Hoysala at Belur are Kappe Chennigaraya temple, Veeranarayan Temple, and Ranganayaki Temple which are relatively smaller in size than Chennakesava Temple but are famous for their architectural marvel.
 - » **Sacred Ensembles of Hoysala at Halebid:**
 - Intricate carving, finely detailed sculptures, and star shaped architectural plans are the prime features of sacred ensembles of Hoysala at Halebid.
 - The main Hoysaleswara temple was built in the 12th century during the reign of the King Vishnuvardhana and is dedicated to Lord Shiva.
 - Kedareshwara temple showcases remarkable Hoysala architecture and stone carvings.

SANTINIKETAN: NEW INDIAN SITE IN THE UNESCO'S WORLD HERITAGE LIST (SEP 2023)

- Santiniketan, West Bengal has been inscribed on the UNESCO's list of World Heritage sites during the ongoing 45th session of the UNESCO World Heritage Committee in Riyadh, Kingdom of Saudi Arabia.
 - » It is **India's 41st UNESCO World Heritage site**.
 - Established in Rural West Bengal in 1901, Santiniketan was founded by Rabindranath Tagore, a renowned poet and philosopher.
 - It is an ensemble of historic buildings, landscapes, and gardens, pavilions, artworks, and continuing educational and cultural traditions that together express its outstanding Universal value.
 - The built and open spaces of Santiniketan constitute an exceptional global testimony to ideas of environmental art and educational reform where progressive education and visual art intertwined with architecture and landscape, with the Ashram, Uttarayan, and Kala Bhavan areas forming the prime sites of these practices.

4. CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

- **Introduction :**
 - The CBD is a multilateral treaty which was approved in 1992 at the Earth Summit in Rio and came into force on 29 Dec, 1993.
 - » NOTE: Other two convention finalized at Rio summit included UNFCCC and UNCCD.
 - It has **3 main objectives:**
 - » The conservation of Biodiversity.
 - » The sustainable use of the component of biodiversity.
 - » The fair and equitable sharing of benefits arising out of the utilization of genetic resources.
 - **Membership**
 - » As of Feb **2022**, 196 countries were parties to convention.
 - India ratified CBD in 1994.
 - USA - signed the convention in 1993, but has not ratified it.
- **Key provisions**
 - » The Convention requires governments to undertake to conserve and sustainably use biodiversity. They are required to **develop national biodiversity strategies and action plans** and to integrate these into broader national laws for environment and development
 - » **Key treaty commitments include**
 1. Identifying and monitoring important components of biological diversity.
 2. Establishing protected areas to conserve biodiversity while promoting environmentally sound development around the area.
 3. **Rehabilitating degraded ecosystems** and promoting recovery of threatened species in collaboration with local residents
 4. Respecting, preserving and maintaining traditional knowledge of the sustainable use of biodiversity with the involvement of indigenous people and local communities.
 5. **Preventing** introduction of, controlling and eradicating alien species that could threaten ecosystems, habitats or species.
 6. Controlling the risks posed by GM Organisms.
 7. Promoting **public participation**, educating people and raising awareness regarding the significance of biodiversity.
 8. **Reporting** on how countries are meeting biodiversity goals.



1) CARTAGENA PROTOCOL ON BIOSAFETY TO THE CONVENTION ON BIOLOGICAL DIVERSITY

- **Introduction**

- It is an international agreement which aims to ensure the **safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology** that may have adverse effects on biological diversity, taking also into account risks to human health.
- The protocol makes it clear that **products from new technologies** must be based on the **precautionary principle** and allow developing nations to balance public health against economic benefits.
- It was the **first international regulatory framework** on safer transfer, handling and use of LMOs.
- It was adopted in 2000 and entered into force on 11th Sep 2003.
- The protocol **promotes biosafety by establishing rules and procedures** for the safe transfer, handling, and use of LMOs.

- **Advanced Information Agreement**

- The Cartagena Protocol provides for **Advanced information agreement (AIA)** procedure for ensuring that countries are provided with the information necessary to make decisions before agreeing to the import of such organisms into their territory.
- **Biosafety Clearing House** is established by the protocol to facilitate the exchange of information on LMOs and to assist countries in the implementation of the Protocol.

2) NAGOYA-KUALA LUMPUR SUPPLEMENTARY PROTOCOL ON LIABILITY AND REDRESS TO THE CARTAGENA PROTOCOL ON BIOSAFETY

- Liability and redress in the context of Cartagena Protocol concerns the question of what would happen if the trans-boundary movement of LMO has caused damage.
- It provides international rules and procedures on liability and redress for damage to biodiversity resulting from LMOs.
- India ratified in 2014

3) NAGOYA PROTOCOL TO CBD

- **What is Nagoya Protocol and what is its objective?**

- The Nagoya Protocol on **Access to Genetic Resources and the Fair and Equitable Sharing of Benefits** Arising from their utilization (ABS) to the CBD is a supplementary agreement to the CBD.
- It provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources.
- The Nagoya Protocol on ABS was adopted on 29 October 2010 in Nagoya, Japan and entered into force on 12 October 2014

- **Significance of Nagoya Protocol**

- Creates greater legal certainty and transparency for both providers and users of genetic resources by:
 - » Establishing more predictable conditions for access to genetic resources

- » Helping to ensure benefit sharing when genetic resource leave the country providing the genetic resources.
- **What is covered by NP?**
 - Genetic resources that are covered by CBD and benefits arising from their utilization.
 - » It also covers traditional knowledge (TK) associated with genetic resources that are covered by CBD and the benefits arising from its utilization.
- **Core Obligations of Nagoya Protocol wrt Genetic Resources**
 - **Access Obligation**
 - » Parties have to take domestic level access measures
 - **Benefit Sharing Obligation**
 - » Domestic level benefit sharing measures are to provide for the fair and equitable sharing of benefits arising from the utilization of genetic resources with the contracting party providing genetic resources
 - **Compliance Obligation**
 - » Specific obligations to support compliance with the domestic legislation or regulatory requirements of contracting party providing genetic resources , compliance with mutually agreed terms
- **What is the Access and Benefit-sharing Clearing House?**
 - The ABS clearing house is a platform for exchanging information on access and benefit sharing established by Article 14 of the Protocol, as part of the clearing house of the Convention.
 - It is one of the key tool in facilitating implementation of the Nagoya Protocol, by enhancing legal certainty and transparency on procedures for access and benefit-sharing and for monitoring the utilization of genetic resources along the value chain, including through internationally recognized certificates of compliance

4) CBD-COP15: KUNMING-MONTREAL BIODIVERSITY FRAMEWORK (DEC 2022)

- After multiple delays due to COVID-19, nearly 200 countries at the UN Biodiversity Conference (COP15) in Montreal sealed a landmark deal - ***The Kunming-Montreal Global Biodiversity Framework (GBF)***, with four goals and 23 action oriented targets.
- **Some Facts about COP15:**
 - COP15 was held in Montreal, Canada. It was chaired by China and hosted by Canada.
 - It resulted in the adoption of ***The Kunming-Montreal Global Biodiversity Framework (GBF)*** which replaces the Aichi Biodiversity targets set in 2010.
- **Key Features:**
 - **Four Goals and 23 action-oriented targets** were adopted.
 - **Four Goals:**

GOAL A

- The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;
- Human induced extinction of known threatened species is halted, and, by 2050, extinction rate and risk of all species are reduced tenfold, and the abundance of native wild species is increased to healthy and resilient levels;
- The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.

GOAL B

- **Biodiversity is sustainably used and managed** and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development, for the benefit of present and future generations by 2050.

GOAL C

- **The monetary and non-monetary benefits from the utilization of genetic resources**, and digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources, as applicable, are shared fairly and equitably, including, as appropriate with indigenous peoples and local communities, and substantially increased by 2050, while ensuring traditional knowledge associated with genetic resources is appropriately protected, thereby contributing to the conservation and sustainable use of biodiversity, in accordance with internationally agreed access and benefit-sharing instruments.

GOAL D

- Adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal global biodiversity framework are secured and equitably accessible to all Parties, especially developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, progressively closing the biodiversity finance gap of \$700 billion per year, and aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for Biodiversity.

▪ **23 Targets:**

- **TARGET 1:** Bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.
- **TARGET 2:** Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration,
- **TARGET 3** (commonly called **30X30**): Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures.
 - **Note:** Currently, 17% of terrestrial and 10% of marine areas are protected.

- **Note:** Countries are not individually required to attain the 30X30 target.
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- **TARGET 4:** Ensure urgent management actions, to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species,
- **TARGET 5:** Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal,
- **TARGET 6:** Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services; reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 percent, by 2030, eradicating or controlling invasive alien species especially in priority sites, such as islands.
- **TARGET 7:** Reduce pollution risks and the negative impact of pollution from all sources, by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects.
- **TARGET 8:** Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions,
- **TARGET 9:** Ensure that the management and use of wild species are sustainable, thereby providing social, economic and environmental benefits for people, especially those in vulnerable situations and those most dependent on biodiversity,
- **TARGET 10:** Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably,
- **TARGET 11:** Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services,
- **TARGET 12:** Significantly increase the area and quality and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably
- **TARGET 13:** Take effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030 facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments.
- **TARGET 14:** Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.
- **TARGET 15:** Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions:
 - (a) Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains and portfolios;

- (b) Provide information needed to consumers to promote sustainable consumption patterns;
- (c) Report on compliance with access and benefit-sharing regulations and measures, as applicable;
- in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production.
- **TARGET 16:** Ensure that people are encouraged and enabled to make sustainable consumption choices including by establishing supportive policy, legislative or regulatory frameworks, improving education and access to relevant and accurate information and alternatives, and **by 2030, reduce the global footprint of consumption in an equitable manner, halve global food waste.**
 - **TARGET 17:** Establish, strengthen capacity for, and implement in all countries in biosafety measures as set out in Article 8(g) of the Convention on Biological Diversity and measures for the handling of biotechnology and distribution of its benefits as set out in Article 19 of the Convention.
 - **TARGET 18:** Identify by 2025, and eliminate, phase out or reform incentives, including subsidies harmful for biodiversity, in a proportionate, just, fair, effective, and equitable way, while substantially and progressively reducing them by at least 500 billion US\$ per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity.
 - **TARGET 19:** Substantially and progressively increase the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, by 2030 mobilizing at least 200 billion United States dollars per year.
 - **Financial Package to poor countries:** The agreement asks for increasing to at least \$20 billion annually by 2025 the money that goes to poor countries. That number would be increased to \$30 billion each year by 2030.
 - **TARGET 20:** Strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through South-South, North-South and triangular cooperation,
 - **TARGET 21:** Ensure that the best available data, information and knowledge, are accessible to decision makers, practitioners and the public
 - **TARGET 22:** Ensure the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.
 - **TARGET 23:** Ensure gender equality in the implementation of the framework