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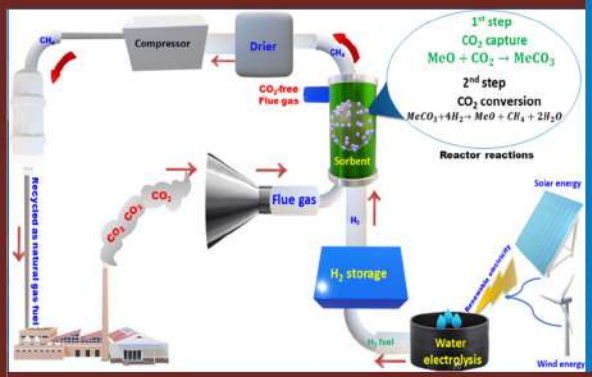
Tectonic Evolution of Greater Maldive Ridge

Mega tribal festival 'Medaram Jatara' celebrations

Saudi Arabia-Iran Relations

India and Canada to re-launch the Comprehensive Economic Partnership Agreement

Army tag for new gecko from Meghalaya



Carbon Capture and Utilisation Technologies

ISRO successfully carried out ground test of solid booster stage for SSLV

Kalpana Chawla: Tracing the incredible journey of a Karnal girl

A Monthly Magazine from

EXCEL CIVILS ACADEMY

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Director's Message

Dear Aspirants,

The Criminal Procedure (Identification) Bill, 2022 was introduced in the Lok Sabha on March 28, 2022 and passed in Rajya Sabha on 6th April, 2022 which replaces the Identification of Prisoners Act, 1920. This can be considered a path-breaking piece of legislation as it is the first amendment made to the Identification of Prisoners Act, in over a century which holds a great significance in the present-day criminal proceedings practice. The major differences between the two are the type of data that may be collected, persons from whom such data may be collected and the authority that may authorise such collection.

The Identification of Prisoner's Act 1920 limited the scope of data collection to recording finger impressions and foot impressions of limited category of convicts. Now with the introduction of this bill, the Government envisages to expand the scope of measurements to include iris, behavioural attributes like signature and hand writing and biological samples. Under the Identification of Prisoners Act 1920, data could be collected only for those convicted or arrested for offences punishable with rigorous imprisonment of one year or more. But with the new bill, the data can be collected from anyone who is arrested or convicted for any offence. Also it has a provision to collect vital details from "other persons" who do not fall under the ambit of convicts, detainees or arrested persons. Nonetheless, the biological samples can only be collected forcibly from persons arrested for offences against a woman or child or if the offence carries a minimum imprisonment of seven years.

The bill also mentions that if a person refuses to give the requisite information, the police can take it forcibly in a manner prescribed by the executive later on. This bill grants limited power to refuse the collection of information. Hitherto, for the data to be collected for the investigation, an order from a Magistrate was necessary. But now, any Police Officer of the rank of Head Constable and above or a Head Warder of a prison can collect the data. The data collected will be retained for 75 years and NCRB (National Crime Records Bureau) will be the authority to collect, store, process, share and destroy all such data collected.

With the introduction of this Bill, the government aims to consolidate evidence and increase the conviction rates in the country. But the opposition parties and the Civil Rights groups have expressed major concerns with respect to the bill. When the bill was introduced in the Lok Sabha, the opposition MPs claimed that it is in derogation of both Article 20(3) and Article 21 of the Constitution and

therefore it is beyond the legislative competence of the House. Article 20(3) clearly states that no person accused of an offence shall be compelled to be a witness against himself. The Right to Privacy as stated in Article 21 is also not guaranteed by this bill. The Bill also is in violation of Right to Equality under Article 14 of the Constitution. The Bill doesn't explicitly define the persons from whom such data may be collected which leads to arbitrariness. The Bill also provides excessive powers to the Executive by giving it wide rule-making powers without any guidance. It also empowers the functionaries such as police and prison officers to decide who they may compel to give the required data which means that wide discretionary powers have been bestowed upon them with negligible checks and restraints. The data collected might also be used for psychiatric evaluation methods like polygraph tests, brain-mapping and narco-analysis which were explicitly prohibited by the Supreme Court in Selvi Vs State of Karnataka (2010). The civil rights organizations claim that the data collected might also be used for communal profiling, mass surveillance and suppression of dissent. They also argue that a strong data protection law is necessary before collecting and storing the data of individuals is carried out as per the provisions of the Bill.

Though the objective behind the introduction of the bill is to increase the conviction rates, by using modern technology and scientific investigation in the light of fast changing crime scenario and modus operandi adopted by the violators of the law of the land, apprehensions are expressed by the civils rights groups about its possible misuse to settle political as well as personal scores by people in authority. It is the responsibility of the Executive to build in adequate safeguards to protect the the privacy of the law abiding citizens and allay all such apprehensions. A robust oversight mechanism needs to be put in place to prevent its misuse and at the same time ensure that the legitimate State interests are protected. While the right to dissent or freedom of speech is the bedrock of a vibrant democracy, there can always be reasonable restrictions to fundamental rights when the very existence of nationhood is threatened by inimical elements.

Best wishes,

Yours sincerely,

K. Rajendra Kumar IPS (Retd)

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1. NATIONAL

1.1 Ujjwala Yojana

- The first independent impact assessment of the Ujjwala programme has highlighted its benefits in terms of saving of lives and reduction in air pollution.

Key observations:

- Greater penetration and usage of LPG as a cooking fuel is estimated to have prevented at least 1.5 lakh pollution-related premature deaths in the year 2019 alone.
- It also avoided at least 8 million tonnes of PM2.5 emissions in 2019 (13% reduction in air pollution deaths)
- It had shown a vast improvement not just in prevalence of respiratory diseases but also in general health conditions in villages with high coverage of Ujjwala connections.
- The survey had found 50 per cent improvement in general health conditions in villages of Rajasthan, Uttar Pradesh and Bihar with high coverage of Ujjwala connections.
- Previously government report had said that three States have become kerosene free. These include- Haryana, Punjab and Andhra Pradesh.
- Union Territories that have become kerosene-free are the Union Territories of Delhi, Chandigarh, Daman & Diu, Dadar & Nagar Haveli, Andaman & Nicobar Island and Puducherry.

Pradhan Mantri Ujjwala Yojana:

- Launched in May 2016 with the aim of providing LPG (liquefied petroleum gas) connections to poor households and reduce health risk associated with burning biomass.
- A deposit-free LPG connection is given to eligible beneficiary with financial assistance of Rs 1,600 per connection by the Centre.
- Government data shows that by January 2022, 9 crore new LPG connections had been rolled out under this scheme, and that 99.8 per cent of the over 28 crore households in India now have access to LPG, up from 61.9 per cent in 2015.

Eligibility criteria:

- Applicant must a woman above the age of 18 and a citizen of India.
- Applicant should belong to a BPL (Below Poverty Line) household.
- No one in the applicant's household should own an LPG connection.
- The household income of the family, per month, must not exceed a certain limit as defined by the government of the Union Territories and State Government.
- Applicant must not be a recipient of other similar schemes provided by the government.

1.2 India's Arctic Policy

- The Centre released India's Arctic Policy, with the aim of enhancing the country's cooperation with the resource-rich and rapidly transforming region.

The six pillars of the Policy are as follows:

- Science and Research
- Economic and Human Development Cooperation
- Climate and Environmental Protection
- Transportation and Connectivity
- Governance and International Cooperation
- National Capacity Building.

The Objectives of the Policy

- Strengthening national capabilities and competencies in science and exploration, climate and environmental protection, maritime and economic cooperation with the Arctic region.
- Institutional and human resource capacities will be strengthened within Government and academic, research and business institutions.
- Inter-ministerial coordination in pursuit of India's interests in the Arctic.
- Enhancing understanding of the impact of climate change in the Arctic on India's climate, economic, and energy security.
- Contributing better analysis, prediction, and coordinated policymaking on the implications of ice melting in the Arctic on India's economic, military and strategic interests related to global shipping routes, energy security, and exploitation of mineral wealth.
- Studying linkages between Polar Regions and the Himalayas.
- Deepen cooperation between India and countries of the Arctic region under various Arctic forums, drawing expertise from scientific and traditional knowledge.
- Increase India's participation in the Arctic Council and improve understanding of the complex governance structures in the Arctic, relevant international laws, and geopolitics of the region.

1.3 Agri Stack

- The government is working on a digital 'stack' of agricultural datasets, with its core as land records. But, such a centralised stack will use old and inaccurate land records; farmers' personal and financial details will be used without a strong data protection law; and rural areas have a low level of digital literacy. Hence, experts say such an 'Agri Stack' is problematic.
- The Agri Stack is a collection of technologies and digital databases proposed by the Central Government focusing on India's farmers and the agricultural sector.

- The central government has claimed that these new databases are being built to primarily tackle issues such as poor access to credit and wastage in the agricultural supply chain.
- Under Agri Stack', the government aims to provide 'required data sets' of farmers' personal information to Microsoft to develop a farmer interface for 'smart and well-organized agriculture'.
- The digital repository will aid precise targeting of subsidies, services and policies, the officials added.
- Under the programme, each farmer of the country will get what is being called an FID, or a farmers' ID, linked to land records to uniquely identify them. India has 140 million operational farm-land holdings.

1.4 Ban On Mechanised Fishing Boats In The Mangalajodi Area Of The Chilika Lake

- The Odisha government has proposed to ban movement of mechanised fishing boats in the Mangalajodi area of the Chilika lake, an important haunt of migratory birds, to provide the winged guests an undisturbed ecosystem for six months every year.
- Mangalajodi is recognised as globally important for the conservation of birds. Migratory birds arrive there for roosting.
- Chilika is 64 kilometres long in the north-south direction and 13.5 km wide in the east-west direction.
- The sea connected with the lake near Satapada through a shallow and narrow channel.
- The connecting channel was obstructed by shoals, sand spits and sandbars, thus restricting the outflow of water and also checking the tidal flow into the lake.
- Chilika is Asia's largest and world's second largest lagoon.
- It is the largest wintering ground for migratory birds on the Indian sub-continent and is home to a number of threatened species of plants and animals.
- In 1981, Chilika Lake was designated the first Indian wetland of international importance under the Ramsar Convention.
- Major attraction at Chilika is Irrawaddy dolphins which are often spotted off Satpada Island.
- The large Nalabana Island (Forest of Reeds) covering about 16 sq km in the lagoon area was declared a bird sanctuary in 1987.
- Kalijai Temple is located on an island in the Chilika Lake

1.5 Report On Unified District Information System For Education Plus 2020-21

- The Ministry of Education has released a detailed report on Unified District Information System for Education Plus (UDISE+) 2020-21 on school education of India.
- The UDISE+ system of online data collection from the schools was developed by Department of School Education & Literacy in the year 2018-19.

- It was aimed to overcome the issues related to erstwhile practice of manual data filling in paper format and subsequent feeding on computer at the block or district level in the UDISE data collection system since 2012-13.
- In UDISE system, improvements have been made particularly in the areas related to data capture, data mapping and data verification.

Highlights of the report:

- In 2020-21 total students enrolled in school education from primary to higher secondary stood at 25.38 crore.
- There is an increase of 28.32 lakh enrolments as compared to the 25.10 crore enrolment in 2019-20.
- Gross Enrolment Ratio (GER) which measure the general level of participation has improved in 2020-21 at all levels of school education compared to 2019-20.
- Level wise GER in 2020-21 as compared to 2019-20 are: 92.2% from 89.7% in upper primary, 99.1 % from 97.8% in elementary, 79.8% from 77.9% in secondary and 53.8% from 51.4% in higher secondary respectively. 96.96 lakh teachers are engaged in school education during 2020-21.
- This is higher by about 8800 in comparison with number of teachers in school education in 2019-20.
- In 2020-21 the Pupil Teacher Ratio (PTR) stood at 26 for primary, 19 for upper primary, 18 for secondary and 26 for higher secondary, showing an improvement since 2018-19.
- The PTR for primary, upper primary, secondary and higher secondary was 28, 20, 21, and 30 respectively during 2018-19.
- In 2020-21 over 12.2 crore girls are enrolled in primary to higher secondary showing an increase of 11.8 lakh girls compared to the enrolment of girls in 2019-20.
- Schools with functional electricity have made impressive progress during 2020-21 with net addition of 57,799 schools provided electricity.
- Now 84% of the total schools have functional electricity facility in comparison with 73.85% in 2018-19 showing remarkable improvement of 10.15% during the period.
- Percentage of the schools with functional drinking water has increased to 95.2 % in 2020-21 from 93.7 % in 2019-20.
- Percentage of the school with functional girl's toilet facility has increased to 93.91 % in 2020-21 in comparison with 93.2 % in 2019-20 by adding the facility in additional 11,933 schools during the year.

- Number of schools having functional computers increased to 6 lakh in 2020-21 from 5.5 lakh in 2019-20 showing an increasing of 3 %. Now, 40% of the schools have functional computers.
- Number of schools having internet facility increased to 3.7 lakh in 2020-21 from 3.36 lakh in 2019-20 with an increase of 2.6%.
- During 2020-21, 39.7 lakh students of government aided, private school students shifted to Government schools.

1.6 Tapi-Par-Narmada Link Project

- Some tribals have intensified their protest against the Par-Tapi-Narmada river linking project after it was mentioned in the budget speech (2022-23) of the finance minister.
- These projects had been sanctioned in 2010, when a tripartite agreement was signed between the Union government, Gujarat and Maharashtra.
- The Finance Minister in her Budget Speech said that five river linking projects will be taken up after consensus among states.
- The projects are Damanganga-Pinjal, Par-Tapi-Narmada, Godavari-Krishna, Krishna-Pennar and Pennar-Cauveri.
- The Ken-Betwa is the first project under the government's National Perspective Plan for river inter-linking.
- The National River Linking Project (NRLP) formally known as the National Perspective Plan, envisages the transfer of water from water 'surplus' basins where there is flooding, to water 'deficit' basins where there is drought/scarcity, through inter-basin water transfer projects. Par-Tapi-Narmada River Linking Project
- Par Tapi Narmada Link proposes to transfer water from the water surplus regions of Western Ghats to the water deficit regions of Saurashtra and Kutch (Gujarat).
- The link project includes seven reservoirs proposed in north Maharashtra and south Gujarat.
- The water from the seven proposed reservoirs would be taken through a 395 km long canal to take over a part of the command of the on-going Sardar Sarovar Project (on Narmada), while irrigating small areas enroute.
- The seven dams proposed in the scheme are Jheri, Mohankavchali, Paikhed, Chasmandva, Chikkar, Dabdar and Kelwan.
- This would save Sardar Sarovar water which will be used to extend irrigation in Saurashtra and Kutch region.
- The link mainly envisages construction of seven dams, three diversion weirs, two tunnels, 395 km long canal, 6 power houses and a number of cross-drainage works.

1.7 Char Dham Highway Development Project

- The Supreme Court has urged its former Justice AK Sikri to take over as the Chairman of the high-powered committee constituted by it to "consider the cumulative and independent impact of the Char Dham Mahamarg Vikas Pariyojana (Char Dham Highway Development Project) on the entire Himalayan valley".
- In February 2022, Veteran environmentalist Ravi Chopra has resigned as chairman of the Supreme Court's High Powered Committee (HPC) on the Char Dham project, saying that his "belief that the HPC could protect this fragile (Himalayan) ecology has been shattered".
- In his resignation letter to the secretary general of the Supreme Court on January 27, Chopra referred to the apex court's December 2021 order that accepted the wider road configuration to meet defence needs, instead of what the HPC had recommended and the SC accepted in its earlier order in September 2020.
- In 2018, the project was challenged by an NGO for its potential impact on the Himalayan ecology due to felling trees, cutting hills and dumping excavated material.
- In 2019, the SC formed the HPC Chopra to examine the issues, and in September 2020, accepted his recommendation on road width etc.
- In November 2020, the ministry of Defence sought wider roads to meet the requirement of the Army.
- In December 2021, the SC modified its September 2020 order on the ground that the court could not "interrogate the policy choice of the establishment which is entrusted by law with the defence of the nation".

About Chardham project:

- The project involves developing and widening nearly 900-km of national highways connecting the holy Hindu pilgrimage sites of; Badrinath, Kedarnath, Gangotri, and Yamunotri at an estimated cost of Rs.12,000 crores.
- The highway will be called Char Dham Mahamarg(Char Dham Highway) and the highway construction project will be called Char Dham Mahamarg Vikas Pariyojana(Char Dham Highway Development Project).

Karewas

- In the name of development, Kashmir's highly fertile alluvial soil deposits called 'karewas' are being destroyed.
- Despite its agricultural and archaeological importance, karewas are now being excavated to be used in construction.

- In the Kashmiri dialect, the term Karewa means "elevated table land". Firstly, this term was used by Godwin Austin in 1859 and later on by Lydekker in 1878 for unconsolidated to semi-consolidated sand clay conglomerate sequence.
- "Vudr" is the local name for Karewas in Kashmiri language.
- Karewas are the thick deposits of glacial clay and other materials embedded with moraines.
- These are unconsolidated lacustrine deposits. Lacustrine means "associated with lakes".
- Kashmir valley nestles between the Great Himalayas and the Pir Panjal ranges of the Kashmir Himalayas.
- In earlier times, when the upliftment of the Pir Panjal ranges happened, the flow of the river had stopped.
- As a result, the whole of Kashmir valley became a large lake.
- Slowly, the glacial deposits have accumulated here in this lake. Thus creating a large lacustrine plain. Later on, the water drained away and these unconsolidated deposits remained there.
- These unconsolidated gravel and mud deposits are known as Karewa formation.
- Karewa deposits have different soil and sediments such as sand, clay, silt, shale, mud, lignite and losses. Hence, these are very useful for agricultural and horticulture activities.
- Karewa formations are useful for the cultivation of Zafran is a local variety of Saffron in Kashmir valley.
- These are also important for the cultivation of almond, walnut, apple, and orchards.

1.8 National Waterways 2 Gets Connected With National Waterways 1

- The Union Minister of Ports, Shipping & Waterways received the maiden voyage of food-grains from Patna to Pandu port via Bangladesh in Guwahati (Assam).
- Inland Waterways Authority of India (IWAI) is planning to run a fixed schedule sailing between NW1 and NW2 heralding a new age of inland water transport for Assam & the Northeast India.
- The Inland Vessels Bill, 2021, was also approved to regulate safety, security and registration of inland vessels.
- The start of cargo movement through ships through Indo Bangladesh Protocol Route (IBRP) marks the beginning of a new age of economic prosperity for the whole region of Northeast.
- This will pave the way for growth & development of inland water transport.
- This will also provide the business community a viable, economic & ecological alternative and will also play a pivotal role in energising India's northeast as the engine of growth.
- The sustained effort to rejuvenate the historical trade routes via Bangladesh got a fillip under PM Gati Shakti.
- It has been envisioned that Northeast will slowly turn & convert into a connectivity hub.

- The integrated development plan, under PM Gati Shakti, has been envisioned in order to amp up swift movement of cargo over Brahmaputra.

Inland Waterways:

- India has about 14,500 km of navigable waterways which consist of rivers, canals, backwaters, creeks, etc.
- As per the National Waterways Act 2016, 111 waterways have been declared as National Waterways (NWs).
- NW-1: Ganga-Bhagirathi-Hooghly River System (Prayagraj-Haldia) with length 1620 km is the longest National Waterway in India.
- The Inland Waterways Authority of India (IWAI) is implementing the Jal Marg Vikas Project (JMVP) for capacity augmentation of navigation on the Haldia-Varanasi stretch of Ganga (part of NW-1) with the technical and financial assistance of the World Bank.

1.9 Artificial Intelligence In e Court Projects

- During the 2022 Budget session of Parliament, Law Minister Kiren Rijiju said that while implementing Phase 2 of the e Court projects, under operation since 2015, a need was felt to adopt new, cutting-edge technologies of Machine Learning (ML) and Artificial Intelligence (AI) to increase the efficiency of the justice delivery system.
- To explore the use of AI in judicial domain, the Supreme Court of India has constituted the Artificial Intelligence Committee which has mainly identified application of AI technology in translation of judicial documents, legal research assistance and process automation.
- Several law firms are now keen on trying out new technologies for a quick reference on judicial precedents and pronouncements on cases with similar legal issues at stake.
- The Mumbai-based Riverus, a “legal tech” firm, has developed ML applications that peruse troves of cases, “understand” them, and parse cases that are similar in content — very much like a human expert would do — in a fraction of the time.

Present status in India

- Over the course of the COVID-19 pandemic, the use of technology for e-filing, and virtual hearings has seen a dramatic rise.
- From the beginning of the lockdown in 2020 until January 8 this year, the Supreme Court of India emerged as a global leader by conducting 1,81,909 virtual hearings.
- But the use of ML in India’s legal sphere has so far been restricted to automating back-end work, and is still a very long way from being used as a decision-making tool for the judiciary.

- SUVAS is a language-learning application being used to translate judgments, and SUPACE, which can draft a legal brief, comprise the initiatives being undertaken in the Indian judiciary as a part of incorporating ML-based applications.

1.10 Data Protection Bill

- The government has said that it is studying the inputs received on the draft data protection bill, and will carefully ensure that any legislation in the digital ecosystem will act as an enabler, fuelling the growth momentum.
- On December 16, 2021, the Joint Committee on Personal Data Protection Bill had tabled its report in both the Houses of Parliament, giving its views on various provisions.
- Nearly two years after it was constituted on 11 December 2019, the Joint Committee on the Personal Data Protection Bill, 2019, headed by BJP MP P.P. Chaudhary, presented its final report on the upcoming bill in both Houses of Parliament on 16 December.

Key recommendations:

- Remove the word 'personal' from the existing title of 'Personal Data Protection Bill'. This is intended to reflect that the bill, in order to better ensure privacy, will also be dealing with non-personal data, such as personal data that has been anonymised.
- Amend the section restricting the transfer of personal data outside India to say "sensitive personal data shall not be shared with any foreign government or agency unless such sharing is approved by the central government.
- No social media platform be allowed to operate in India unless its parent company, which controls the technology powering its services, sets up an office in the country.
- It proposes a separate regulatory body to be set up to regulate the media.
- Jail term of up to 3 years, fine of Rs 2 lakh or both if de-identified data is re-identified by any person.
- The word 'personal' ought to be dropped from the name of the Bill.
- Central government may exempt any government agency from the legislation only under exceptional circumstances.

1.11 Kavach: Automatic Train Protection System

- The Indian Railways tested 'Kavach'-Automatic Train Protection System by making two trains move towards each other at full speed.
- The Kavach system was announced in the 2022 Union Budget as a part of the Atmanirbhar Bharat initiative.
- Around 2,000 km of rail network is planned to be brought under the indigenous system to enable safety and capacity augmentation in 2022-23.

Kavach:

- It is India's own automatic protection system, which is in development since 2012, under the name Train Collision Avoidance System (TCAS), which got rechristened Kavach or "armour".
- It is a set of electronic devices and Radio Frequency Identification (RFID) devices installed in locomotives, in the signalling system as well as the tracks.
- They connect to each other using ultra high radio frequencies to control the brakes of trains and also alert drivers, all based on the logic programmed into them.
- TCAS or Kavach includes the key elements from already existing, and tried and tested systems like the European Train Protection and Warning System, and the indigenous Anti Collision Device. It will also carry features of the high-tech European Train Control System Level-2 in future.
- The current form of Kavach adheres to the highest level of safety and reliability standard called Safety Integrity Level (SIL)4.
- SIL comes from two voluntary standards used by plant owners/operators to quantify safety performance requirements for hazardous operations.
- There are four SIL Levels (1-4). A higher SIL Level means a greater process hazard and a higher level of protection required.
- In the new avatar, India wants to position Kavach as an exportable system, a cheaper alternative to the European systems in vogue across the world.
- While now Kavach uses Ultra High -Frequency, work is on to make it compatible with 4G Long Term Evolution (LTE) technology and make the product for global markets.
- Work is on to make the system such that it can be compatible with other already installed systems globally.

1.12 Exercise MILAN 2022

- The Indian Navy's multilateral Exercise MILAN 2022 is scheduled to commence from 25th Feb 2022 in the 'City of Destiny', Visakhapatnam.
- 2020 edition of MILAN was postponed to 2022 due to Covid-19.
- MILAN 22 will witness its largest ever participation, with more than 40 countries sending their warships/ high level delegations.
- This edition of MILAN will be larger in 'scope and complexity' with focus on exercises at sea including exercises in surface, sub-surface and air domains and weapon firings.
- Theme 2022: 'Camaraderie – Cohesion – Collaboration'.

MILAN:

- MILAN is a biennial multilateral naval exercise incepted by Indian Navy in 1995 at Andaman and Nicobar Command.
- Starting with the participation of only four countries, viz Indonesia, Singapore, Sri Lanka and Thailand, in the 1995 edition, the exercise has since transitioned leaps and bounds in terms of number of participants and complexity of exercises.
- Originally conceived in consonance with India's 'Look East Policy', MILAN expanded in ensuing years with India's 'Act East policy' and Security And Growth for All in the Region (SAGAR) initiative, to include participation from island nations in the Western IOR (Indian Ocean Region) as also IOR littorals.

1.13 Devayatanam: Conference On Temple Architecture

- The Union Culture Minister inaugurated Devayatanam, a one-of-a-kind conference on temple architecture of India, at Hampi, Karnataka.
- It is a part of the celebration under Azadi Ka Amrit Mahotsav and is being organized on 25th-26th February by the Archaeological Survey of India (ASI) of the Ministry of Culture.
- The temples of Hampi are already featured in the World Heritage List of UNESCO for their Sheer brilliance, Scale of imagination, and Scintillating architecture.
- Approximately 10 of India's 40 UNESCO World Heritage Inscriptions are Hindu Temples in different architectural styles, patterns and symmetry.
- In 2021, Rudreswara Temple, (also known as the Ramappa Temple) at Mulugu district, Telangana has been inscribed on UNESCO's World Heritage list.
- The conference provides a platform to discuss, deliberate and disseminate to the world the grandeur of Indian temples, art and architecture.
- This was in line with the overall vision of the Prime Minister which is based on 5 V's, i. e. Vikas (development), Virasat (heritage), Vishwas (trust), Vignan (knowledge), which lead us to becoming a vishwaguru so that India shows the world the way.
- Devayatnam, the house of god is not only a place to worship and perform rituals but also a centre for education, fine arts, music, science & technology, rituals & traditions or activities shaping the society.

1.14 Bhasha Certificate Selfie

- The Ministry of Education launched a campaign 'Bhasha Certificate Selfie under Ek Bharat Shreshtha Bharat (EBSB).
- In 2021, the Ministry of Education launched the Bhasha Sangam initiative under EBSB.

- It was launched to encourage cultural diversity and promote multilingualism and to foster the spirit EBSB.
- It aims to promote the Bhasha Sangam mobile app, developed by the Ministry of Education and MyGov India.
- Bhasha Sangam mobile app was launched on Rashtriya Ekta Diwas 2021 (31st October).
- It aims to ensure that people acquire basic conversational skills in Indian languages. To achieve this, a target of 75 lakh people acquiring basic conversational skills has been set.
- The 'Bhasha Certificate Selfie' initiative is encouraging people to upload their selfie with the certificate from their social media accounts.

Bhasha Sangam Initiative:

- It is an initiative to teach basic sentences of everyday usage in 22 Indian languages (Eighth Schedule languages).
- It is developed by the National Council of Educational Research and Training (NCERT).
- The idea is that people should acquire basic conversational skills in an Indian language other than their mother tongue.
- It is available on DIKSHA, ePathshala and through 22 booklets.

Ek Bharat Shreshtha Bharat Initiative:

- It was launched in 2015 to promote engagement amongst the people of different States/UTs so as to enhance mutual understanding and bonding between people of diverse cultures, thereby securing stronger unity and integrity of India.
- It is an initiative of the Ministry of Education.
- Every State and UT in the country would be paired with another State/UT for a time period, during which they would carry out a structured engagement with one another in the spheres of language, literature, cuisine, festivals, cultural events, tourism etc.

1.15 Sustainable Cities India Program

- The World Economic Forum and the National Institute of Urban Affairs (NIUA) signed a Memorandum of Understanding (MoU) to collaborate on a jointly designed 'Sustainable Cities India program'.
- The 'Sustainable Cities India program' intends to enable cities to decarbonize in a systematic and sustainable way that will reduce emissions and deliver resilient and equitable urban ecosystems.
- The Forum and NIUA will adapt the Forum's City Sprint process and Toolbox of Solutions for decarbonization in the context of five to seven Indian cities across two years.

- The City Sprint process is a series of multi-sectoral, multi-stakeholder workshops involving business, government, and civil society leaders to enable decarbonization, especially through clean electrification and circularity.
- As per the World Economic Forum's Global Risks Report 2022, densely populated countries that are highly dependent on agriculture, such as India, are especially vulnerable to climate insecurity. Decarbonization in cities is a real opportunity to keep global warming well below 2°C and cities in India can make an enormous contribution in reaching this goal.
- The World Economic Forum's Net Zero Carbon Cities' mission is to create an enabling environment for clean electrification and circularity, resulting in urban decarbonization and resilience.
- Established in 1976, the National Institute of Urban Affairs (NIUA) is India's leading national think tank on urban planning and development.

1.16 The Angadia System

- An FIR has been registered against three Mumbai Police officials for allegedly threatening Angadias and extorting money from them in south Mumbai. Earlier this month, an Angadias shop in Mulund was looted by a gang of robbers.
- The Angadia system is a century-old parallel banking system in the country where traders send cash generally from one state to another through a person called Angadia that stands for courier.
- It is by and large used in the jewellery business with Mumbai – Surat being the most popular route as they are two ends of the diamond trade.
- The cash involved is huge and it is the responsibility of the Angadia to transfer cash from one state to another for which they charge a nominal fee. Generally, it is the Gujarati, Marwari and Malbari community that are involved in the business.
- The Angadia system works completely on trust as large sums, at times in crores, are involved.
- While the Angadia system per se is legal, there hangs a cloud over the activity as it is suspected that a lot of times it is used to transfer unaccounted money.
- There have been suspicions that it is also used for transfer of black money like the hawala transaction which is generally used across countries.

1.17 Permanent Indus Commission

- A 10-member Indian delegation will visit Pakistan for the annual meeting of the Permanent Indus Commission from March 1-3.
- Under the Indus Water Treaty, it is mandatory to hold a meeting at least once every year ending March 31 In a first since the signing of the Indus -Water Treaty between the two countries, three

female officers will also be part of the Indian delegation, which will be advising the Indian Commissioner on various issues during the meeting.

- Pakistan's objections on Indian hydroelectric projects namely Pakal Dul (1,000 MW), Lower Kalnai (48 MW) and Kiru (624 MW) in Chenab basin in Jammu and Kashmir and few small hydroelectric projects in Ladakh are likely to be on the agenda for discussion.

Indus Water Treaty:

- It is a Water-Distribution Treaty, signed in Karachi on 1960, between India (Pm Jawaharlal Nehru) and Pakistan (President Ayub Khan), brokered by the World Bank. Under the provisions of the Indus Waters Treaty, signed between India and Pakistan in 1960, all the waters of the eastern rivers — the Sutlej, Beas, and Ravi — amounting to around 33 MAF (million acre-feet) annually is allocated to India for unrestricted use.
- The waters of western rivers — Indus, Jhelum, and Chenab — amounting to around 135 MAF annually are largely for Pakistan.
- Under the Treaty, India has been given the right to generate hydroelectricity through a run of the river projects on the western rivers subject to specific criteria for design and operation.
- It also gives the right to Pakistan to raise concerns on the design of Indian hydroelectric projects on western rivers.

Permanent Indus Commission:

- The Permanent Indus Commission is a bilateral commission of officials from India and Pakistan, created to implement and manage goals of the Indus Waters Treaty, 1960.
- The Commission according to the treaty must meet regularly at least once a year, alternately in India and Pakistan

2. INTERNATIONAL RELATIONS

2.1 The Disclosure from A Missile Misfiring

- Unintended escalation of tensions between the two nuclear-armed countries, calls for serious introspection by the two about the perils of living under the shadow of nuclear weapons.
- The incident casts a shadow on the standards of the storage, maintenance, the handling and even the engineering of high-technology weapon systems in India. But, more pertinently, the incident highlights the sorry state of bilateral mechanisms for crisis management between the two nuclear adversaries where there is a missile flight time of barely a few minutes.

What was the incident and its response?

- Recently, the Government of India acknowledged that "technical malfunction led to the accidental firing of a missile" which landed 124 km inside Pakistan's territory. The incident happened in the course of routine maintenance.
  - It was speculated that it was a test of one of India's top missiles, BrahMos, jointly developed with Russia.
  - In this regard, India has ordered a high-level Court of Inquiry.
- Pakistan has alleged that the incident "indicates many loopholes and technical lapses of a serious nature in Indian handling of strategic weapons".
  - The Chargé affaires of the Indian High Commission in Islamabad was summoned twice by Pakistan to convey its concerns.
  - Islamabad termed the inquiry as ordered by India as insufficient and demanded a joint probe.
  - It has also sought the involvement of the international community to promote "strategic stability in the region".
- The Indian and Pakistani responses to the missile (mis)firing were the best possible outcome under the circumstances given that there is little bilateral mechanism for crisis management.

What are the Causes of the Strategic Unstability in the Region?

- The strategic stability regime in South Asia (particularly the region comprising India-Pakistan) is hardly prepared for dealing with such accidents or for enhancing effective crisis management and deterrence stability. The causes are;
- Non-Inclusion of Cruise Missiles in Agreement: Although India and Pakistan signed a 'Pre-Notification of Flight Testing of Ballistic Missiles' agreement in October 2005, it does not include cruise missiles.
  - Notably, the missile that was misfired, suspected to be the BrahMos, was a cruise missile.
- Lack of Structure Bilateral Dialogues: It has been quite long since the two sides have held their structured meetings on nuclear confidence building measures (CBMs) and conventional CBMs.

- India and Pakistan have not held either the 'Expert Level Talks on Nuclear Confidence Building Measures' or 'Expert Level Talks on Conventional Confidence Building Measures' for several years now.
- Also, neither of the countries have any high commissioners on the other side; there is no structured bilateral dialogue.

- Chinese Interventions: What makes the regional strategic stability regime more unstable is the fact that the third state with nuclear weapons in the region, China, has so far refused to engage in strategic stability discussions with India.
  - However, China has not deterred from getting involved in the India-Pakistan conflict, apart from being in a military standoff with India.
- These elements, now with the possibility of accidental firing of missiles, make the region particularly weak from a strategic stability point of view.

What is the Pre-Notification of Flight Testing of Ballistic Missiles Agreement, 2005?

- Under this agreement, each country must provide the other an advance notification on the flight test it intends to take for any land or sea launched, surface-to-surface ballistic missile.
  - Before the test, the country must issue Notice to Air Missions (NOTAM) or Navigational Warning (NAVAREA) to alert aviation pilots and seafarers, respectively.
- Also, the testing country must ensure that the launch site is not within 40 km, and the planned impact area is not within 75 km of either the International Boundary (IB) or the Line of Control (LoC).
  - The planned trajectory should not cross the IB or the LoC and must maintain a horizontal distance of at least 40 km from the border.
- The testing country must notify the other nation "no less than three days in advance of the commencement of a five day launch window within which it intends to undertake flight tests of any land or sea launched, surface-to-surface ballistic missile".
- The pre-notification has to be "conveyed through the respective Foreign Offices and the High Commissions".

What Steps Can Be Taken?

- Revival of Bilateral Dialogue Mechanisms: Provided the nature of the India-Pakistan relationship — adversarial, nuclear-armed, crisis prone, and suffering from trust deficit — there is an urgent need, especially in the wake of the recent incident, to revive the two dialogue mechanisms - Expert Level Talks on Nuclear and Conventional CBMs.
- Updating Existing Mechanisms and Agreements: India and Pakistan urgently require faster mechanisms for communicating sensitive information during crisis periods and peacetime given how quickly the two sides are capable of transitioning from peacetime to a crisis.

- Also, it is important to include cruise missiles in the pre-notification regime as they are now a part of each side's arsenal.

- Establishment of Mechanism like NRRCs: India and Pakistan should consider setting up mechanisms such as Nuclear Risk Reduction Centres (NRRCs), as established between the U.S. and the Soviet Union during the Cold War.
  - The primary objective of NRRCs is risk reduction by providing a structured mechanism for timely communication of messages and proper implementation of already agreed upon CBMs.
  - Such a mechanism could act like the 'Permanent Indus Commission' which has resolved several disputes arising out of the Indus Water Treaty.
- Centres for Information Clarification: Some of the misperceptions and ambiguities in the strategic domain could be taken up by the risk reduction centres for resolution or clarification.
  - Such a body could routinely exchange messages, provide timely clarifications, and review compliance to agreements, among others.
  - In an age of social media and 24-hour news, honest mistakes or unforeseen accidents could spiral into a military standoff especially in the absence of timely clarifications.
- Maintaining its Position of a Responsible Nuclear Power: India's global image of being a responsible nuclear power has been built over decades of restrained words and thoughtful action. The recent incident frays this reputation.
  - India became a member of the Missile Technology Control Regime in 2016, an acceptance by major powers of India's status as a reliable defence partner that is capable of handling its strengths and contributing to global security.
  - India is developing more missile systems, including a hypersonic variant. The handling and the launch of any such missiles are highly regulated with checks and balances to avoid accidents.
- India must leave no scope for any doubts about its capacity to handle nuclear and other military assets. Strict measures must be taken to restore the confidence of the international community in India.

2.2 Saudi Arabia-Iran Relations

- Recently, Saudi Arabia has mass executed 81 people, including seven Yemenis and one Syrian national for crimes related to terrorism and other capital crimes. This has prompted the Iranian government to suspend talks with the country.
  - Both countries have had tense diplomatic relations since a long time ago.
  - Regional rivals Iran and Saudi Arabia, which severed diplomatic ties in 2016, launched direct talks hosted by Iraq in 2021 as UN (United Nations)-led efforts to end a war in Yemen stall. They have held four rounds of talks in Iraq.

What is Background of Saudi Arabia-Iran Conflict?

- Religious Factionalism: Relations between Saudi Arabia and Iran have been sour in part because of religious differences, which go back centuries. They each follow one of the two main branches of Islam.
  - Iran is largely Shia Muslim, while Saudi Arabia sees itself as the leading Sunni Muslim power.
- Leader of Islamic World: Historically, Saudi Arabia, a monarchy and home to the birthplace of Islam, saw itself as the leader of the Muslim world.
  - However this was challenged in 1979 by the Islamic revolution in Iran which created a new type of state in the region - a kind of revolutionary theocracy - that had an explicit goal of exporting this model beyond its own borders.
- Regional Cold War: Saudi Arabia and Iran - two powerful neighbors - are locked in a fierce struggle for regional dominance.

- Uprisings across the Arab world (after the Arab Spring in 2011) caused political instability throughout the region.
- Iran and Saudi Arabia exploited these upheavals to expand their influence, notably in Syria, Bahrain and Yemen, further heightening mutual suspicions.
- Moreover, external powers like the US and Israel have a major role in exacerbating conflict between Saudi Arabia and Iran.

- Proxy Wars: Iran and Saudi Arabia are not directly fighting but they are engaged in a variety of proxy wars (conflicts where they support rival sides and militias) around the region.
  - For Example, Houthi rebels in Yemen. These groups can acquire greater capabilities which can cause further instability in the region. Saudi Arabia accuses Iran of supporting them.
- 2016 Flash Point: Many Iranian protesters attacked Saudi diplomatic missions in the Iran following Saudi Arabia's execution of the Shiite Muslim cleric Sheikh Nimr al-Nimr.

What can be the Possible Impact of Normalization of Relations?

- Resolution of Israel-Palestine Conflict: Warming of relations between Iran and Saudi Arabia may have a positive impact in dealing with Israel and the Palestinian issue.
- Stabilization of Oil Market: Iran and Saudi Arabia share a common interest for stable oil prices given the importance of the market to their economies.
  - Normalization of relations would ensure steady oil revenues for all producing countries and more predictability to economic planners in both Saudi Arabia and Iran.

Way Forward

- Role of India: Historically, India has good diplomatic relations with both the countries. Stabilization of relations between the two countries may impact India in a mixed way.
  - On the negative side, higher oil prices will affect the balance of trade in India.
  - On the positive side, this could provide easing of investments, connectivity projects across the region.
- Reciprocity by Iran: Iran still needs to make a mark in its diplomatic efforts by publicly supporting a cease-fire in Yemen.
- Easing of US Sanctions: Clarity on US sanctions over Iran is of prime importance, if Iran-Saudi Arabia relations are to get normalized.

2.3 Permanent Normal Trade Relations

- US and other members of the Group of Seven (G7) will revoke Russia's "Permanent Normal Trade Relations (Pntr)" status to punish Russia for war over Ukraine.
- The move would pave the way for the US to impose tariffs on a wide range of Russian goods, heightening pressure on an economy on the brink of deep recession.
  - A recession is a period of declining economic performance across an entire economy
  - That lasts for several months.
- The G7 is the group of developed western countries (UK, Canada, France, Germany, Italy, Japan and the US) established in 1975.

What is PNTR?

- The status of Permanent Normal Trade Relations (PNTR) is a legal designation in the United States for free trade with a foreign nation.
- In the United States, the name was changed from Most Favored Nation (MFN) to PNTR in 1998.

What is MFN Status?

- World Trade Organization (WTO) members commit to treating other members equally so
- they can all benefit from each other's lowest tariffs, highest import quotas and fewest trade barriers for goods and services.
  - This principle of non-discrimination is known as Most Favoured Nation (MFN) treatment.
  - This is one of the measures which ensures trade without discrimination. Another one is 'National Treatment '.
- Article 1 of the General Agreement on Tariffs and Trade (GATT), 1994, requires every WTO member country to accord MFN status to all other member countries.
- There are some exceptions, such as when members strike bilateral trade agreements or when members offer developing countries special access to their markets.
- For countries outside the WTO, such as Iran, North Korea, Syria or Belarus, WTO members can impose whatever trade measures they wish without flouting global trading rules. In international trade, MFN status (or treatment) is awarded by one nation to another.
  - For example, India accorded MFN status to all WTO member countries, including Pakistan, from the date of entry into force of the so called Marrakesh Agreement, establishing the WTO.
  - A nation with MFN status will not be discriminated against and will not be treated worse than any other nation with MFN status.
  - Grant someone a special favour (such as a lower customs duty rate for one of their products) and you have to do the same for all other WTO members.

- There is no formal procedure for suspending MFN treatment and it is not clear whether members are obliged to inform the WTO if they do so.
  - India suspended Pakistan's MFN status in 2019 after a suicide attack by a Pakistan- based Islamist group killed 40 police.
  - Pakistan never applied MFN status to India.

What is National treatment?

- It means 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, and to foreign and local trademarks, copyrights and patents.
- This principle of "national treatment" is also found in all the three main WTO agreements (Article 3 of GATT, Article 17 of GATS and Article 3 of TRIPS).
- National treatment only applies once a product, service or item of intellectual property has entered the market.
  - Therefore, charging customs duty on an import is not a violation of national treatment even if locally-produced products are not charged an equivalent tax.

What does losing MFN status mean?

- Revoking Russia's MFN status sends a strong signal that the United States and its Western allies do not consider Russia a economic partner in any way, but it does not in itself change conditions for trade.
- It does formally allow the Western allies to increase import tariffs or impose quotas on Russian goods, or even ban them, and to restrict services out of the country.
  - They could also overlook Russian intellectual property rights.
- Ahead of MFN status removal, the United States had already announced a ban on imports of Russian oil and gas.
- Further, the European Union has already banned about 70% of all imports, such as tobacco, potash and products made of wood or steel, from non-WTO member Belarus (Russia's ally in war with Ukraine).

2.4 India and Canada to re-launch the Comprehensive Economic Partnership Agreement

- Recently, India and Canada held the fifth Ministerial Dialogue on Trade & Investment (MDTI), where Ministers agreed to formally re-launch the negotiations for India-Canada Comprehensive Economic Partnership Agreement (CEPA) and also consider an Interim Agreement or Early Progress Trade Agreement (EPTA) that could bring early commercial gains to both the countries.

- Earlier, India and Australia announced that they are set to conclude an Interim Trade Agreement in March 2022 and a Comprehensive Economic Cooperation Agreement (CECA) 12-18 months thereafter.

What are the Key Points?

- The Interim Agreement would include high level commitments in goods, services, rules of origin, sanitary and phytosanitary measures, technical barriers to trade, and dispute settlement, and may also cover any other areas mutually agreed upon.
- The two sides emphasized cooperation in sectors such as pharmaceuticals and critical and rare earth minerals as well as in areas like tourism, urban infrastructure, renewable energy, and mining.
- Both countries agreed to undertake intensified work with respect to the recognition of Canada's systems approach to pest risk management in pulses and market access for Indian agriculture goods such as sweet corn, baby corn and banana etc.
- Canada also agreed to examine expeditiously the request for Conformity Verification Body (CVB) status to APEDA (Agricultural and Processed Food Products Export Development Authority) for facilitating Indian organic export products.
  - A CVB is an organization that has an agreement with the Canadian Food Inspection Agency under subsection 14(1) of the Canadian Food Inspection Agency Act to assess, recommend for accreditation and monitor certification bodies.
- The Ministers acknowledged the significance of establishing resilient supply chains in critical sectors and exchanged views on collaboration in this area.

What is an Interim Trade Agreement?

- An interim or early harvest trade agreement is used to liberalize tariffs on the trade of certain goods between two countries or trading blocs before a comprehensive FTA (Free Trade Agreement) is concluded.
- Government's emphasis on interim agreements may be tactical so that a deal may be achieved with minimum commitments and would allow for contentious issues to be resolved later.
- The problem, though, is that these early harvest schemes potentially target the low- hanging fruits, leaving the tougher goods and services for later.
- Early harvest agreements that do not graduate into full-scale FTAs are exposed to legal challenges from other countries that are members of the World Trade Organization (WTO).
- It is often beneficial to negotiate the entire deal together, as an early harvest deal may reduce the incentive for one side to work towards a full FTA.

What is CEPA?

- It is a kind of free trade pact which covers negotiation on the trade in services and investment, and other areas of economic partnership.
- It may even consider negotiation on areas such as trade facilitation and customs cooperation, competition, and Intellectual Property Rights.
- Partnership agreements or cooperation agreements are more comprehensive than Free Trade Agreements.
- CEPA also looks into the regulatory aspect of trade and encompasses an agreement covering the regulatory issues.
- India has signed CEPAs with South Korea and Japan.

What is India's Current Trade Relation with Canada?

- India is Canada's 11th largest export market, and 12th largest trading partner overall.
- India's exports to Canada stood at USD 2.9 billion in 2020-21 as against USD 2.85 billion in 2019-20. Imports in 2020-21 were USD 2.68 billion as against USD 3.9 billion in 2019-20.
- Canada's commercial priorities in India are targeted at India's policy objectives and sectors where Canada has a comparative advantage. These priorities include:
- Supporting India's energy security ambitions through increased exports of conventional and nuclear energy as well as clean and renewable energy technology, Helping India meet its substantial urban and transportation infrastructure needs through provision of financing, equipment, technology and engineering services,
- Enhanced education and skills training through greater collaboration between Canadian and Indian educational and technical skills institutions,

- Commercial research and development to drive innovation in such sectors as information and communications technologies,
- Increased exports of food products and fertilizers to support India's food security needs.

2.5 1954 Hague Convention

- Recently, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has pitched for protective measures to preserve Ukraine's endangered cultural heritage in light of Russia's invasion over Ukraine.
  - To avoid deliberate or accidental damages, the agency is marking cultural sites and monuments in Ukraine with the distinctive "Blue Shield" emblem of the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict.

What is the Hague Convention 1954?

- Background: Through history, armed conflicts always wrought havoc on the lives of people. In addition to its humanitarian toll, conflicts also led to the large-scale destruction of cultural heritage, weakening the foundations of communities, lasting peace and prospects of reconciliation.
- Origin: Considering that the preservation of cultural heritage is of great importance for all peoples of the world and thus needs universal protection, the Convention for the Protection of Cultural Property in the Event of Armed Conflict was adopted in 1954 under the auspices of UNESCO.
  - This convention is referred to as the 1954 Hague Convention.
  - It is the first and the most comprehensive multilateral treaty dedicated exclusively to the protection of cultural heritage in times of peace as well as during an armed conflict.
- Aim: The convention aims to protect cultural property, such as monuments of architecture, art or history, archaeological sites, works of art, manuscripts, books and other objects of artistic, historical or archaeological interest, as well as scientific collections of any kind regardless of their origin or ownership.
- India is party to Hague Convention 1954.

What is the Blue Shield Emblem?

- Need: Article 6 of the 1954 Hague Convention states that cultural property may bear a distinctive emblem so as to facilitate its recognition.
- Origin: In pursuance of this, the Blue Shield, formerly the International Committee of the Blue Shield was founded in 1996.
- About: It is a non-governmental, non-profit, international organisation committed to the protection of heritage across the world.
- The Blue Shield network, often referred to as the cultural equivalent of the Red Cross.

Logo of Blue Shield Emblem

- Function: The Blue Shield is a network of committees of dedicated individuals across the world that is committed to protect the world's cultural heritage from threats such as armed conflict and natural disasters.
- This includes museums, monuments, archaeological sites, archives, libraries and audio- visual material, and significant natural areas, as well as intangible heritage.
- Associated Issue: Some States have refrained from marking their cultural property, arguing that it would make that property more vulnerable to attack by an enemy determined to destroy its symbols of national identity.
- Unfortunately, this proved to be the case during the war in the former Yugoslavia where cultural property marked with the Blue Shield was intentionally targeted.

What is UNESCO?

About:

- It is a specialized agency of the United Nations (UN). It seeks to build peace through international cooperation in Education, the Sciences and Culture.
- It was founded in 1945 and is located in Paris, France.
- It has 193 Members and 11 Associate Members. India joined UNESCO in 1946.
- In 2019, the USA and Israel formally quit UNESCO.

Major Initiatives of UNESCO:

- Man and Biosphere
- Programme World Heritage
- Programme Global Geopark Network
- Network of Creative Cities
- Atlas of World Languages in Danger Reports:

Report

- UNESCO Science
- Global Education Monitoring Report

- State of the Education Report for India

2.6 Humanitarian Corridors

- Recently, Russia declared a temporary ceasefire in the Russia-Ukraine War to provide "humanitarian corridors" for civilians.
  - As the war enters a likely deadlier phase, numerous civilians attempt to leave the country for safety and refuge, there must be humanitarian measures taken to reduce civilian casualties.

What are Humanitarian Corridors?

- **About**: They are demilitarised zones, in a specific area and for a specific time — and both sides of an armed conflict agree to them.
  - The United Nations (UN) considers humanitarian corridors to be one of several possible forms of a temporary pause of armed conflict.
  - For example through large-scale bombing of civilian targets — humanitarian corridors can provide crucial relief.
- Need: The corridors are necessary when cities are under siege and the population is cut off from basic food supplies, electricity and water.
- Function: Through these corridors, either food or medical aid can be brought to areas of conflict, or civilians can be evacuated.
- Accessibility: Access to humanitarian corridors is determined by the parties to the conflict. It's usually limited to neutral actors, the UN or aid organisations such as the Red Cross.
  - They can also be used by UN observers, Non-governmental Organisations (NGOs) and journalists to gain access to contested areas where war crimes are being committed.

What are International conventions related to the Humanitarian Corridor?

- Even before international organizations recognized humanitarian corridors, such zones were defined in armed conflicts including in World War II when Jewish children were evacuated from areas under Nazi control to the United Kingdom.
- Humanitarian corridors were defined in resolution 45/100 of the UNs' general assembly in 1990.
  - It said that "relief corridors" are seen by the international community as an important instrument to back up the right of civilians to receive assistance during armed conflicts. It is also recognized in the Geneva Conventions of 1949 and their Additional Protocols of 1977.
- In 1992, the International Institute of Humanitarian Law from Sanremo in Italy defined the concept more specifically.
- "Humanitarian assistance can transit, in this case, through the so-called humanitarian corridors, which must be respected and protected by the relevant authorities and, if necessary, under the authority of the UN".

- Humanitarian corridors have been frequently used in the Syrian civil war, Libyan civil war, and Gaza war among other such conflict zones.

What are Associated Issues?

- Difficult to Enforce: Since all sides need to agree to set up the corridors, Humanitarian corridors are difficult to enforce.
  - There are many wars and conflicts where calls for civilian corridors or a pause in fighting have been made in vain.
  - In the ongoing war in Yemen, for instance, the UN has so far failed in its negotiations.
- Possible Misuse: There is a risk of military or political abuse.
  - For example, the corridors can be used to smuggle weapons and fuel into besieged cities.

Way Forward

- Need for Humanitarian Pause: In addition to the humanitarian corridor, the global community should encourage a humanitarian pause as the corridors are constructed.
  - A humanitarian pause would involve a temporary cessation of fighting to protect civilians.
  - This will enable civilians to reach the corridors and move through safely.

2.7 Expansionism of NATO

- When Russia launched a military invasion of Ukraine, the purported reason behind this act of territorial aggression was the eastward expansion of the North Atlantic Treaty Organization (NATO).
  - The expansionism of NATO threatened at some undefined point in the future to allow Ukraine to join the grouping as a treaty ally and thus bring this transatlantic security coalition within striking distance of Russia's western borders.
  - Earlier, an emergency special session was convened by the United Nations General Assembly (UNGA) for discussing a resolution that called for Russia to unconditionally withdraw its troops.

What is NATO?

- It is a military alliance established by the North Atlantic Treaty (also called the Washington Treaty) of April, 1949, by the United States, Canada, and several Western European nations to provide collective security against the Soviet Union.
- There are currently 30 member states, with North Macedonia becoming the latest member to join the alliance in 2020.

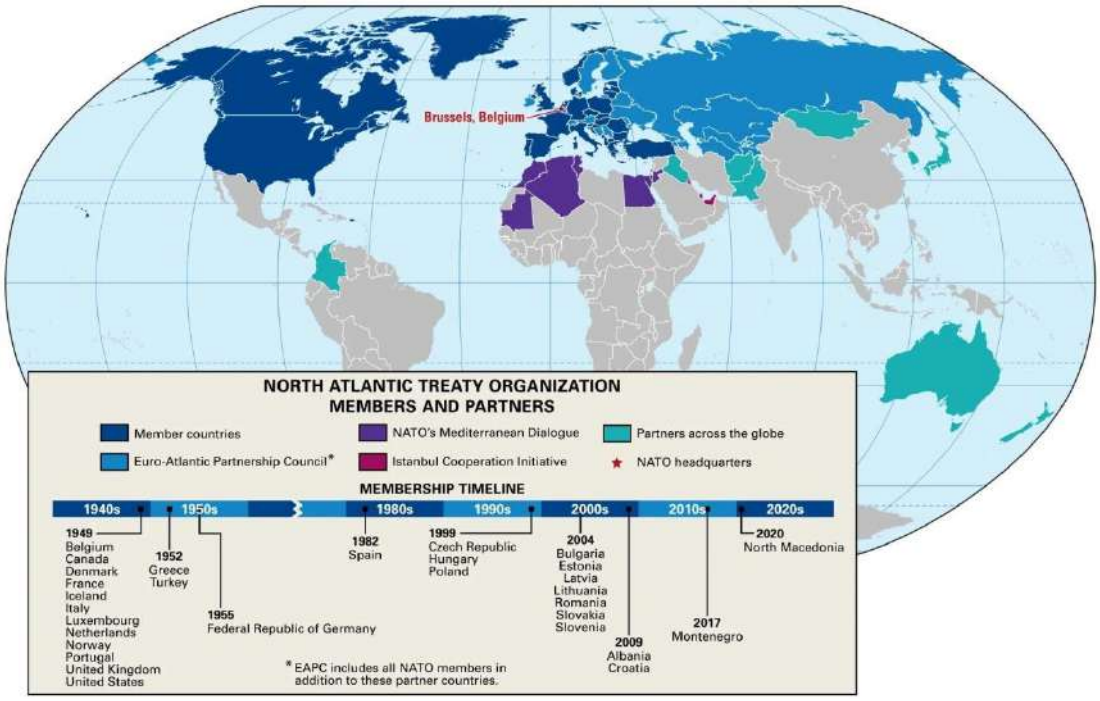
What are the Origins of NATO?

- The self-declared mission of NATO when it emerged in 1949, had three points:
  - Deterring Soviet expansionism.

  - Forbidding the revival of nationalist militarism in Europe through a strong North American presence on the continent.
  - Encouraging European political integration.
- Clearly the legacy of the Nazi (Hitler) affliction and World War II weighed heavily on the minds of the founding members of NATO.
- Although NATO claims that it is only "partially true" that its very creative was to counter the threat from the erstwhile Soviet Union, there was a strong emphasis on military cooperation and collective defence in its clauses.
  - For example, Article 5 of the treaty proclaims that an armed attack against one or more of them (NATO members) shall be considered an attack against them all" and that following such an attack, each ally would take "such action as it deems necessary, including the use of armed force in response.
- The broader context at the time was that in 1955, a time when the Cold War was gaining momentum, the Soviet Union signed up socialist republics of Central and Eastern Europe to the Warsaw Pact (1955), including Albania (which withdrew in 1968), Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania.
  - The Pact, essentially a political-military alliance, was viewed as a direct strategic counterweight to NATO.
  - Its focus at the time was the fact that while East Germany was still part of the Soviet occupied-territory of Germany, the Federal Republic of Germany had joined NATO by May 1955, and Russia began to worry about the consequences of a strengthened and rearmed West Germany at its border.
- As a unified, multilateral, political and military alliance, the Warsaw Pact was aimed at tying Eastern European capitals more closely to Russia, which it effectively did for several decades through the worst hostilities of the Cold War.
- Indeed, the Pact even gave the Soviet Union the option to contain civil uprisings and dissent across the European satellite states, including in Hungary in 1956, Czechoslovakia in 1968, and Poland in 1980-1981.
- All that began to unravel by the late 1980s, when the sheer downward pressure of inevitable economic slowdown in most Eastern European Pact (Warsaw Pact) allies reduced the potential for military cooperation to make any real difference strategically across the region.
- Thus, it hardly came as a surprise in September 1990 that East Germany quit the Pact to be reunified with West Germany,and soon Czechoslovakia, Hungary, and Poland withdrew from all Warsaw Pact military exercises.
- The Pact was officially disbanded in early 1991 after the dissolution of the Soviet Union itself.

What Were the Rounds of Expansions Carried out by NATO?

- Even as the Soviet Union was dissolved into Russia and former Soviet republics, NATO, emboldened by circumstances and optimism that the global balance of power was tipping in its favour, embarked on a path of expansion.
  - During the term in office of the US, NATO began, in successive rounds of negotiation and expansion, to pull former Warsaw Pacts states into its membership.
  - After reunification, while Germany retained membership of NATO, the Czech Republic, Hungary, and Poland joined the alliance in 1999. But it did not end there — in 2004, Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovakia, Slovenia joined the treaty organisation.
  - In 2009 Albania and Croatia signed on, in 2017 Montenegro entered the bloc and in 2020 it was North Macedonia's turn.



Why is Russia Sensitive to NATO expansion?

- In 2008, in the week leading up to NATO's Bucharest Conference, NATO Allies welcomed Ukraine's and Georgia's Euro-Atlantic aspirations for membership and agreed that these countries will become members of NATO.
- They went on to announce a period of intensive engagement with both countries at a high political level to address the questions still outstanding regarding their Membership Action Plan applications.
- This set off alarm bells in Russia, because even the very concept of Ukraine, a nation considered to hold strong historic ties first to the Soviet Union, was against Russia's belief.

- This development prompted Russia to warn the US that no Russian leader could stand idly by in the face of steps toward NATO membership for Ukraine.
- That would be a hostile act toward Russia.
  - This was only among the more recent of a long list of actions by NATO leaders that Russia considers a political betrayal.

Did NATO Violate a Promise to Avoid Expansion?

- In 1990 the US informed Russia that there would be no extension of NATO's jurisdiction for forces of NATO one inch to the east.
  - While Russia seized upon this comment to fuel its ostensive outrage at NATO expansion into the Baltic States region.
  - It is a fact that in early 1990, the focus of the diplomacy for the Two plus Four – including East and West Germany plus the United States, France, the Soviet Union, and the United Kingdom – agreement was whether a unified Germany would be part of NATO.
- The US wanted to reassure Russia that NATO command structures and troops would not be transferred to the territory of the former German Democratic Republic.
- It was a difficult time in Russia, domestically, because in the aftermath of the Soviet Union's dissolution, there was a failure to institutionalise democratic practices, a stable market economy, and a robust law and order system.
- Facing all manner of chaos at home, erstwhile Russia began to interpret the Two plus Four Treaty (Treaty on the final settlement with respect to Germany, 1990) as a ban on NATO exp ansion east of Germany.
- Russia informed the US that it ruled out "the option of expanding NATO territory eastward." Through the 2000s, Russia carried on in this vein, speaking with increasing alarm and anger at NATO's steady expansion into Eastern Europe, and saying in Munich, Germany in 2007 that it is obvious that NATO expansion does not have any relation with the modernisation of the alliance itself or with ensuring security in Europe.
- On the contrary, it represents a serious provocation that reduces the level of mutual trust.
- In 2008, following NATO announcement of its intent to admit Georgia and Ukraine into its alliance, Russia invaded Georgia and took control of several of its territorial regions, and in 2014, with Ukraine drifting closer towards an economic alliance with the European Union, Russia marched into Ukraine and seized Crimea.

2.8 Safety Net for Students Abroad

- Indian students going abroad to study is not a new phenomenon. For decades now, lack of quality education institutes in India and demand-supply gap has been forcing many families to send their

children abroad. The spotlight, however, has turned on these students with two recent events — the Covid-19 pandemic and Russia's war on Ukraine.

- Unless the education system in India is tailored to the needs of students, they will continue to fly abroad. Indian institutes need to start providing students with more options for professional courses including technical, medical and others.

What is the Current Scenario?

- Currently, 7,70,000 Indian students are studying abroad from 4,40,000 in 2016 which is a 20% growth. On the other hand, the growth in the domestic region has been merely 3% when compared to the demand for education abroad,
- India is the second largest source of international students after China. Before the onset of the pandemic, the Indian students studying abroad were spending $24 billion in foreign economies, which is around 1% of India's GDP.
  - The number is expected to rise to around 1.8 million by 2024 when the Indian students will be spending nearly $80 billion outside India.
- To pursue a medical degree, Indian students have been heading out to Russia, China, Ukraine, Kyrgyzstan, Kazakhstan and the Philippines for about three decades now.
- Sushma Swaraj, former External Affairs Minister of India, referred to Indians abroad as "brand ambassadors". The Prime Minister of India and U.K. have called Indians in the U.K. the "living bridge" between both countries.
  - The larger benefits of this Indian Diaspora come in terms of soft power, knowledge transfer and remittances that come back to India.

What are the Causes of Studying Abroad?

- With more than half the Indian population under the age of 25, and no Indian university in the world's top 100, it is natural that aspirational students would look to study abroad.
- In terms of medical degree, the amount spent on living and the tuition fees are far more affordable than paying for an MBBS seat in private medical colleges within India.
- There are far more MBBS aspirants than there are MBBS seats in India. As per data from the National Medical Commission (NMC), in 2021-22, there were 596 medical colleges in the country with a total of 88,120 MBBS seats.

What are the recent crises faced by these Students?

- Amid the recent Russia-Ukraine Conflict, there have been cases of the unfortunate deaths of two Indian students (one died in shelling, the other suffered a stroke) in Ukraine.
  - Although there is chaos amid an external armed aggression, the situation warrants serious interventions.
  - It is estimated that around 20,000 Indian students were stranded in Ukraine.

- More recently, about 2,000 international students, mainly from India, have been affected after three Canadian colleges shut down abruptly.
  - As per the allegations, the colleges, which are now bankrupt, collected lakhs of rupees in fees, thereby jeopardizing the students' futures.
- A similar incident happened during the pandemic when Australia shut its borders to the thousands of Indian students enrolled to study on its campuses.

What Steps Can Be Taken?

- Role of Host Countries: The Indian students are the consumers of higher education abroad, and guests of the nations they reside in. It is only natural then for India to mandate protection of Indians abroad by ensuring that host countries take on this responsibility.
- Safety Net through International Treaties: The Indian government should proactively create a safety net for the international students. International agreements that oblige host countries to ensure the welfare of Indian students during times of crises and contingencies should be given paramount importance.
  - The trade agreements India is currently negotiating with the U.K. and Australia make for a great opportunity to do so.
- Student Insurance Schemes: Contrary to popular opinion, a considerable chunk of students who study abroad is not from wealthy families; they take expensive loans to finance their education.
  - The aspiration to secure a better exposure and future can render them prone to difficulties. A mandatory student insurance scheme as well as responsibility for the welfare of students in the foreign country should be incorporated into agreements to secure the interests of students who also spend considerably in the host country.
- More Public Sector Medical Colleges: Creating more medical colleges will be beneficial for the country, if access and availability can be ensured.
  - However, this will not be possible by resorting to private enterprise only - the State and Central governments can start more medical colleges, as recommended by NITI Aayog, by utilising district headquarters hospitals, and expanding the infrastructure.
  - This way, students from the lower and middle socio-economic rung, who are otherwise not able to access medical seats, will also benefit.
- More Investments in Higher Education: Enhancing investment in higher education, especially in research and development, is urgently required to raise the standard of higher education in India.
  - HEFA (Higher Education Finance Agency) is a welcome step in providing finance to premier educational institutions for creation of high quality infrastructure and innovation ecosystems.

- Taking measures to allow foreign universities to set up campuses in India will increase the inflow of foreign funding in India's Higher Education system and reduce "Brain Drain" from India.

3. INDIAN ECONOMY

3.1 Implementation of Agriculture Export Policy

- In view of considerable overlap between schemes, it has been decided to merge the 'Scheme on Implementation of Agriculture Export Policy' with other district level schemes being planned by the Department of Commerce. The institutional framework created under the District Export Hubs initiative, at State and District levels, is being utilized to achieve the objectives of Agriculture Export Policy.

3.2 Export of Organic Food grains

- The National Centre for Organic Farming (NCOF), under the Ministry of Agriculture & Farmers Welfare, is the nodal organization for organic farming in the country. NCOF implements the National Project on Organic Farming (NPOF) to promote production, certification and marketing of organic products. The National Programme for Organic Production (NPOP), introduced by the Department of Commerce, is aimed at regulation and promotion of organic production for exports.
- The promotion of exports of organic products is a continuous process. The Agricultural & Processed Food Products Export Development Authority (APEDA), an autonomous organisation under the administrative control of Department of Commerce, has been mandated with implementation of NPOP and export promotion of organic products. APEDA provides assistance to the exporters of organic products under various components of its export promotion scheme. APEDA also undertakes various activities to promote exports of organic products viz. addition of new products under NPOP, making efforts to get NPOP standards recognized by the importing countries, promoting 'India Organic' brand through participation in international trade fairs and exhibitions, organising Buyer-Seller Meets (BSMs), organising capacity building and outreach programmes etc.
- India's exports of organic products amounted to USD 1.04 billion during 2020-21. Organic food grains are being exported from the country mainly under the category Cereal & Millets. During 2020-21, 59908 MT of organic products under the category 'Cereal & Millets', worth 76 million USD, have been exported from India under the National Programme for Organic Production (NPOP).
- The Government of India has been promoting Organic farming in the country, including in Bundelkhand and Uttarakhand, through dedicated schemes namely Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) since 2015-16 to cater to the needs of domestic and export markets respectively. Marketing and branding have been integral part of organic farming schemes. Assistance of Rs 6800/ ha under PKVY and Rs 5000/ ha under MOVCDNER is provided for marketing, branding

and trade. Brand 'Organic Uttarakhand' has been developed under PKVY for the State of Uttarakhand.

3.3 Micro Entrepreneurs in Rural Areas

- Under Startup India Initiative, entities including Micro enterprises are recognized by Department for Promotion of Industry and Internal Trade (DPIIT) as Startups as per eligibility conditions prescribed under G.S.R. notification 127 (E) dated 19th February, 2019. All initiatives under the Startup India are inclusive and are implemented across States, cities, towns and rural areas. The recognised startups can avail benefits under the Startup India Initiative as given below:

I. **Startup India Seed Fund Scheme (SISFS):** Easy availability of capital is essential for entrepreneurs at the early stages of growth of an enterprise. The capital required at this stage often presents a make or break situation for startups with good business ideas. The Scheme aims to provide financial assistance to startups for proof of concept, prototype development, product trials, market entry and commercialization. Rs. 945 crore has been sanctioned under the SISFS Scheme for period of 4 years starting from 2021-22. It will support an estimated 3,600 entrepreneurs through 300 incubators in the next 4 years.

II. **Fund of Funds for Startups (FFS) Scheme:** The Government has established FFS with corpus of Rs. 10,000 crore, to meet the funding needs of startups. DPIIT is the monitoring agency and Small Industries Development Bank of India (SIDBI) is the operating agency for FFS. The total corpus of Rs. 10,000 crore is envisaged to be provided over the 14th and 15th Finance Commission cycles based on progress of the scheme and availability of funds. It has not only made capital available for startups at early stage, seed stage and growth stage but also played a catalytic role in terms of facilitating raising of domestic capital, reducing dependence on foreign capital and encouraging home grown and new venture capital funds.

III. **Ease of Procurement:** To enable ease of procurement, Central Ministries/ Departments are directed to relax conditions of prior turnover and prior experience in public procurement for all Startups subject to meeting quality and technical specifications. Further, Government e-Marketplace (GeM) Startup Runway; a dedicated corner for startups to sell products & services directly to the Government has been started.

IV. **Self-Certification under Labour and Environmental laws:** Startups are allowed to self-certify their compliance under 6 Labour and 3 Environment laws for a period of 3 to 5 years from the date of incorporation.

V. **Income Tax Exemption for 3 years:** Startups incorporated on or after 1st April 2016 can apply for income tax exemption. The recognised startups that are granted an Inter-Ministerial Board Certificate are exempted from income-tax for a period of 3 consecutive years out of 10 years since incorporation.

VI. **Exemption for the Purpose Of Clause (VII)(b) of Sub-section (2) of Section 56 of the Act:** A DPIIT recognized startup is eligible for exemption from the provisions of section 56(2)(viib) of the Income Tax Act.

VII. **Faster Exit for Startups:** Ministry of Corporate A¬ffairs has notified Startups as 'fast track firms' enabling them to wind up operations within 90 days vis-a-vis 180 days for other companies.

VIII. **Support for Intellectual Property Protection**: Startups are eligible for fast-tracked patent application examination and disposal. The Government launched Start-ups Intellectual Property Protection (SIPP) which facilitates the startups to file applications for patents, designs and trademarks through registered facilitators in appropriate IP offices by paying only the statutory fees. Facilitators under this Scheme are responsible for providing general advisory on diff¬erent IPRs, and information on protecting and promoting IPRs in other countries. The Government bears the entire fees of the facilitators for any number of patents, trademark or designs, and startups only bear the cost of the statutory fees payable. Startups are provided with an 80% rebate in filing of patents and 50% rebate in filling of trademark vis-a-vis other companies.

IX. **Startup India Hub:** The Government launched a Startup India Online Hub on 19th June 2017 which is one of its kind online platform for all stakeholders of the entrepreneurial ecosystem in India to discover, connect and engage with each other. The Online Hub hosts Startups, Investors, Funds, Mentors, Academic Institutions, Incubators, Accelerators, Corporates, Government Bodies and more.

X. **International Access to Indian Startups:** One of the key objectives under the Startup India initiative is to help connect Indian startup ecosystem to global startup ecosystems through various engagement models. This has been done though international Government to Government partnerships, participation in international forums and hosting of global events. Startup India has launched bridges with over 13 countries (Brazil, Sweden, Russia, Portugal, UK, Finland, Netherlands, Singapore, Israel, Japan and South Korea, Canada, Croatia) that provides a soft-landing platform for startups from the partner nations and aid in promoting cross collaboration.

XI. **National Startup Awards:** National Startup Awards is an initiative to recognize and reward outstanding startups and ecosystem enablers that are building innovative products or solutions and scalable enterprises, with high potential of employment generation or wealth creation, demonstrating measurable social impact.

- Prime Minister's Employment Generation Programme (PMEGP), a credit-linked subsidy programme aimed at generating self-employment opportunities through establishment of micro-enterprises in the non-farm sector by helping traditional artisans and unemployed youth, is operational. The Scheme was launched during FY 2008-09. Under the Scheme, general category beneficiaries can avail of margin money subsidy of 25 % of the project cost in rural areas and 15%

in urban areas. For beneficiaries belonging to special categories such as scheduled caste/scheduled tribe/OBC /minorities/women, ex-serviceman, physically handicapped, North-east region, Hill and Border areas etc. the margin money subsidy is 35% in rural areas and 25% in urban areas.

- Further, the Fund of Funds for Startups Scheme and the Startup India Seed Fund Scheme are operational to provide capital at various stages of business cycle of a startup.
- Under the Fund of Funds for Startups Scheme (FFS), a corpus of Rs. 10,000 crore has been sanctioned, spread over 14th and 15th Finance Commission cycles. The Scheme is operated and managed by Small Industries Development Bank of India (SIDBI). The Scheme does not directly provide financial assistance to startups, instead supports SEBI- registered Alternative Investment Funds (AIFs), who in turn invest money in growing Indian startups through equity and equity-linked instruments.
- Under the Startup India Seed Fund Scheme (SISFS), Rs. 945 crore has been sanctioned for period of 4 years starting from 2021-22. The funds are released to Startups through approved Incubators.

3.4 Success Story: Swachh Bharat Mission

MRF in Udupi Providing safe Solid Waste Management Services to 41 Gram Panchayats

- The Material Recovery Facility (MRF) Centre of Nitte Gram Panchayat (Karkala Taluk, Udupi district of Karnataka) has provided effective waste management services to 41 Gram Panchayats (GPs) in the Blocks of Karkala, Udupi, Kaup and Hebri that come under the purview of this project.
- The project is supervised by the Zilla Panchayat of Udupi. While Saahas Zero Waste Private Limited provides technical guidance for project implementation, the operation of the facility is handled by Mangala Resource Management Private Limited, Mangalore.

Objectives of the project:

- To provide centralised waste management services with limited human resource utilization

- To derive maximum resources from the waste and prevent unscientific waste management while protecting the environment
- To increase the efficiency of human resources by using simple machines
- To dispose non-recyclable waste such as multi-layer plastics to cement factories
- To dispose waste to authorized recycling centres
- To provide efficient facilities, social security, and promote health and safety of workers
- To maintain records on waste management
- **Process:** Dry waste collected door to door within the project area is brought to the solid waste management (SWM) centres where it is weighed and packed before loading onto the MRF station's waste collection vehicle every week. The waste thus collected is again weighed in the MRF centre and stored in the storage compartments.
- It is then divided into about 25 to 30 sections with the help of a conveyer belt. The sorted waste is then bailed using a bailing machine. Recycled waste is sold to authorized recycling companies. Non-recyclable waste is transported to cement factories for the purpose of co-processing.
- **Unit capacity:** The MRF unit has a 1000 sq. ft building and is capable of handling 10 tonnes of waste per day. It has separate sections for waste storage, sorting and bailing units, in addition to an office, a security room, a rest room and toilet facility. Other amenities include a conveyor belt, a baling machine, a stacker, a fire safety facility, a generator, a CCTV, a 70-ton capacity weigh bridge and 7-ton capacity truck.
- **Service charges:** A separate bank account for the MRF is being maintained by the Nitte GP into which GPs are required to deposit monthly service charge; the Chairman or Member Secretary are signatories to the account. An invoice is submitted to the Joint Committee and Multiple Gram Panchayats by the MRF Operator with supportive documents before the 5th of every month. The GPs are required to deposit service fees into the bank account of this Joint Committee within 7 days of receipt of the invoice.

Role of the GPs:

- To inform households, commercial establishments, and other waste producers about the procedure for waste segregation and collection, at their own cost
- Wet waste and hazardous waste from households should be done at GP level
- Segregate waste collected within their jurisdiction, store in dry units, ensure dry waste is odourless and deliver it to the MRF vehicle
- Waste collected at GP level should be packed in bags
- A vehicle should be available to transport waste to prevent waste dumping

- If a GP wishes the MRF to collect bulk waste, the MRF operator should be notified two days in advance
- Timely payment of service fee to MRF operator. If waste collected is less than expected, 50 per cent of service fee needs to be paid.
- **Funding:** A sum of Rs 250 lakhs has been utilized for the project under Swachh Bharat Mission (Grameen); Rs. 8.32 lakhs under the Rural Employment Guarantee Scheme; Rs.28.35 lakhs under the 15th Finance Commission Scheme, Rs. 10 lakhs under the Gram Vikas fund; Rs.23 lakhs from Nitte Panchayat's own fund.




Outcome and Impact:

- Quantity of waste collected has increased from 1-2 tons to 4-5 tons after MRF was setup
- Waste dumping and public littering has reduced enormously
- The project changed to a revenue neutral model after MRF operations began
- Awareness on scientific handling and disposal of different categories of waste has increased among the public
- MRF centre sells waste to authorized recyclers at higher rates
- The bailing system allows for bailing and selling of bulk quantities
- **Non**-recyclable waste is shipped to the cement companies
- Plan for scale-up: Plans are in the pipeline to build 4 Plastic Waste Management Units (PWMU) at Badagabettu, Kedur, Thrasi and Hebri to support the remaining 144 Gram Panchayats.

3.5 Khadi Prakritik Paint

- Khadi Prakratik Paint has been developed from cow dung by Kumarappa National Handmade Paper Institute (KNHPI), Jaipur, a unit of Khadi and Village Industries Commission (KVIC), under the administrative control of the Ministry of MSME. Khadi Prakratik paint is eco-friendly and cost effective. The Khadi Prakratik Paint developed by KNHPI has been tested at National

Test House, Ghaziabad (Govt. of India), National Test House, Mumbai (Govt. of India) and Shri Ram Institute of Industrial Research, Delhi (An ISO certified test lab) and satisfies the parameters required for paint.

- It is envisaged that manufacture of Khadi Prakratik Paint will promote local manufacturing, create sustainable employment and generate additional revenue for farmers and cow shelter homes and will also generate employment in the rural areas, which will improve the rural economy and help in controlling the migration from rural to urban areas, in the country.
- Cow dung is a major constituent used in the manufacture of Prakritik Paint. 100 kgs. of cow dung is utilized for making 500 liters of paint. Therefore, setting up of paint units would be helpful in utilization of cow dung and thereby help in cleaning the environment.
- KNHPI imparts training in manufacture of Khadi Prakritik Paint. Prakritik Paint manufacturing units are being set up under Prime Minister's Employment Generation Programme (PMEGP) scheme of Ministry of MSME. The technology for the manufacture of Khadi Prakritik Paint has been provided to many units in villages in the country.

3.6 MSP for different crops

- Government of India announces Minimum Support Prices (MSP) for 22 major agricultural commodities of Fair Average Quality (FAQ) each year in both the Crop seasons after taking into account the recommendations of the Commission for Agricultural Costs and Prices (CACP). In addition, MSP for toria and de-husked coconut is also fixed on the basis of MSPs of rapeseed & mustard and copra respectively. Government also extends remunerative price to farmers through its various interventions schemes. Besides, the overall market also responds to declaration of MSP and Government's procurement operations which results in private procurement on or above the MSP for various notified crops.
- Government extends price support for paddy and wheat through the Food Corporation of India (FCI) and State Agencies. Under this policy, whatever food grains are offered by farmers within the stipulated period & conforming to the specifications prescribed by Government are purchased at Minimum Support Price (MSP) by the State Government agencies including FCI for Central Pool. It aims to service the National Food Security Act (NFSA) and other welfare schemes of the Government so that subsidized food grains are supplied to the poor and needy, and to build up buffer stocks of food grains to ensure food grain security.
- Further, different types of nutri-cereals and maize are procured by State Governments itself in consultation with FCI to the extent that the concerned State Government may utilise the same for distribution under Targeted Public Distribution System (TPDS) as well as Other Welfare Schemes (OWS).

- Oilseeds, pulses and copra of Fair Average Quality (FAQ) are procured from registered farmers under Price Support Scheme under Umbrella Scheme of Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA), as per its prescribed guidelines. Under PM-AASHA, States / UTs are offered to choose either Price Support Scheme (PSS) or Price Deficiency Payment Scheme (PDPS) in a given procurement season with respect to particular oilseeds crop for the entire State. Further, States have the option to roll out Private Procurement and Stockist Scheme (PPSS) on pilot basis in district / selected APMC(s) of district involving the participation of private stockist for oilseeds. Cotton and Jute are also procured by Government at MSP through Cotton Corporation of India (CCI) and Jute Corporation of India (JCI).
- For making effective procurement by government agencies, procurement centers are opened by respective State Government Agencies and Central Nodal Agencies like NAFED, FCI etc after taking into account the production, marketable surplus, convenience of farmers and availability of other logistics/ infrastructure such as storage and transportation etc. large number of the purchase centers in addition to the existing mandis and depots/godowns are also established at key points for the convenience of farmers.

3.7 Contribution Of Women In Agriculture

- 173 women start-ups / entrepreneurs have been supported under the "Innovation and Agri-Entrepreneurship Development" programme
- As per the Census 2011 conducted by the Registrar General of India, the total number of women farmers as cultivators are 3.60 crore and agricultural labour are 6.15 crore in the country.

➢ The Ministry of Agriculture and Farmers Welfare has launched a component called "Innovation and Agri-Entrepreneurship Development" under Rashtriya Krishi Vikas Yojana (RKVY-RAFTAAR) in 2018-19 with an objective to promote innovation and agri-entrepreneurship by providing financial support and nurturing the incubation ecosystem. This Ministry has appointed five Knowledge Partners (KPs) as Centres of Excellence and twenty four RKVY-RAFTAAR Agribusiness Incubators (R-ABIs) from across the country for implementation this programme. So far, 173 women startups/ entrepreneurs have been supported under the "Innovation and Agri-Entrepreneurship Development" programme. Besides, the Indian Council of Agriculture Research (ICAR) has been supporting Agri-based startups under the project called National Agriculture Innovation Fund (NAIF) initiated in year 2016-2017. So far, 50 Agri-Business Incubation Centers (ABICs) have been established and are operational in ICAR network under NAIF scheme. Potential women start-ups / entrepreneurs can avail benefit from these programmes.

- Government has taken several initiatives to enhance collaboration between small business and e-commerce platforms.
- Central Board of Indirect Taxes and Customs (CBIC), Department of Revenue has exempted sellers of specified handicraft goods made by craftsmen from obtaining compulsory registration under GST Act, thus enabling collaboration between small businesses and e-commerce platforms.
- Department for Promotion of Industry & Internal Trade (DPIIT) has actively engaged with various large e-commerce platforms to onboard artisans and handicraftsmen, including those engaged in manufacture of Geographical Indication (GI) goods and toys. Further, under the One District – One Product (ODOP) initiative, drives have been conducted across various States, facilitating on-boarding of sellers of identified products on e-Commerce platforms to provide greater visibility for small businesses from rural sector.
- Ministry of Micro, Small & Medium Enterprises (MSME) has taken multiple initiatives for enhancing participation of small business in e-commerce which include:

➢ Procurement and Marketing Support (PMS) Scheme: Under this Scheme, the sub-component of "Adoption of e-Commerce by Micro Enterprises" has been introduced. This new component includes providing financial assistance for selling products or services by Micro Enterprises (up to 10 new products) through e-commerce portals.

➢ Portals of National Small Industries Corporation (NSIC): NSIC is operating MSME Global Mart portal. This is a non-transactional B2B Portal which facilitates e-Marketing support to MSME's. The portal provides information of business, technology and finance and also exhibits the core competence of Indian SMEs.

➢ E-commerce portal of Khadi and Village Industries Commission (KVIC): KVIC has developed an online portal https://www.kviconline.gov.in for selling Khadi products added by Khadi Gramodyog Bhavan, New Delhi.

➢ Ministry of Tribal Affairs has launched an e-market place www.tribesindia.com portal through Tribal Cooperative Marketing Development Federation of India Limited (TRIFED). It has forged tie ups with various leading e-Commerce platforms and is on-boarding tribal artisans with their products for online sales.

- Thirty-Nine (39) Towns have been recognized as Towns of Export Excellence (TEE) under the Foreign Trade Policy 2015-20 (extended up to 31.03.2022).
- Towns of Export Excellence (TEE) can avail benefits under Para 1.35 (b) of Foreign Trade Policy i.e.,

i. Recognized associations of units in Towns of Export Excellence can avail financial assistance under Market Access Initiative (MAI) scheme, on priority basis, for export promotion projects for marketing, capacity building and technological services.

ii. Common Service Providers in the Towns of Export Excellence are entitled for Authorisation under Export Promotion Capital Goods (EPCG) Scheme.

- Towns producing goods of Rs. 750 Crore or more can be recognised as Towns of Export Excellence (TEE) based on potential for growth in exports. However, for Town of Export Excellence (TEE) in Handloom, Handicraft, Agriculture and Fisheries sector, the threshold limit is Rs.150 Crore.

3.8 Aatma Nirbhar Bharat Package for Micro Enterprises

- As part of the Aatmanirbhar Bharat Initiative, Ministry of Food Processing Industries is implementing a Centrally Sponsored PM Formalisation of Micro food processing Enterprises (PMFME) Scheme for providing financial, technical and business support for setting up/ up gradation of 2 lakh micro food processing enterprises through credit linked grant during five years from 2020-21 to 2024-25 with an outlay of Rs. 10,000 crores.
- The scheme envisages supporting micro enterprises through increased access to credit, integration with organized supply chain by strengthening branding and marketing, increased access to common services, strengthening of institutions, research & training in the food processing sector.
- The details of support to Micro Food Processing Units under the scheme are mentioned below:

i. Support to Individual Micro Enterprises: Credit-linked capital grant @35% of the eligible project cost, maximum ceiling Rs.10 lakh per unit;

ii. Support to FPOs/ SHGs/ Producer Cooperatives: Credit linked Grant @35% to support clusters and groups such as FPOs/ SHGs/ Producer Cooperatives along their entire value chain for sorting, grading, storage, common processing, packaging, marketing, testing etc.

iii. Support to SHGs for seed capital: Seed capital @ Rs. 40,000/- per member of SHG engaged in food processing for working capital and purchase of small tools.

iv. Support for Common Infrastructure: Credit linked grant @ 35% to support FPOs, SHGs, and Cooperatives, any Government agency or private enterprises for Common infrastructure. The common infrastructure will also be available for other units and public to utilize on hiring basis for substantial part of the capacity.

v. Branding and Marketing Support: Grant upto 50% for Branding and Marketing to groups of FPOs/ SHGs/ Cooperatives or an SPV of micro food processing enterprises.

vi. Capacity Building: Training for Entrepreneurship Development Program to meet the requirement of food processing industry and product specific skilling.

- Under Marketing and Branding component of the scheme, the following support to micro enterprises has been envisaged:

i. Developing a common brand and packaging including product standardization (ii) Marketing tie up with national and regional retail chains and state level institutions (iii) Quality control to ensure product quality meets required standards (iv) Training relating to marketing

- The major eligible components for support under the scheme are Market study, Product standardization (including quality assurance), Packaging material, Graphic designing, warehousing/ storage rentals, Promotional activities, Training related to Sales & Marketing and Trademark registration.

3.9 Capacity Of Indian Shipping Industry

- The Government is committed to increase the tonnage under Indian flag. The major steps taken by the Government in this regard are as below:

(i) Revision of the criteria for Right of First refusal (ROFR):

- The criteria for granting the Right of First Refusal in chartering of vessels through tender process has been revised through Directorate General of Shipping, Mumbai, DGS Circular No. 02 of 2021, for promoting tonnage under Indian flag and ship-building in India, so as to make India an Atma-nirbhar/selfreliant Bharat, in terms of tonnage and ship-building in India. DGS Circular No. 02 of 2021 is at Annexure. The following is the revised hierarchy of RoFR with highest priority to India built, Indian flag (Indian owned) vessels;

1. Indian built, Indian flagged (Indian owned);
2. Foreign built, Indian flagged (Indian owned);
3. Indian built, foreign flagged (foreign owned).

- This will promote demand of Indian built and Indian flag vessels as the Indian built and Indian flag vessels will have the priority in chartering and will also provide additional market access and business support to ships built in India.

(ii) Ship Building Financial Assistance Policy (2016-2026):

- Government of India has approved the Financial Assistance Policy for Indian Shipyards on 9th December 2015, for grant of financial assistance to Indian Shipyards. Only those vessels shall be eligible for grant of financial assistance, for which the construction commences subsequent to the signing of valid contracts. Vessels which are constructed and delivered within a period of three years from the date of contract are eligible for availing financial assistance under the policy. For specialized vessels, the delivery period can be extended till six years. Financial assistance shall be

@ 20% of the contract price, actual receipts, fair price (whichever is least) to Indian shipyards. Under the policy, the financial assistance extended would be reduced by 3% every three years.

(iii) Subsidy support to Indian shipping companies:

- A scheme for the promotion of flagging of merchant ships in India by providing Rs.1624 crore over a period of five years as subsidy support to Indian shipping companies in global tenders footed by Ministries and Central Public Sector Enterprises (CPSEs) has been approved by the Cabinet. The rate of subsidy support will be based on age of the vessel.

(iv) Protection to Indian Flag vessels during engagement of foreign ships:

- Indian and Foreign entities intending to engage foreign flag vessels for coastal trade of India need to have a license under section 406 of Merchant Shipping Act, 1958 from DG Shipping, GoI. The DGS issues license to such foreign flag vessel only after ensuring that no Indian vessel is available for such trade/function to be performed by foreign flag vessel. Accordingly, Indian ships are given priority above foreign ships for such transportation. Because of this facility, these entities and even shipping companies make an effort to own or register vessels under Indian flag. This helps in increasing the Indian shipping tonnage.

3.10 Auto Fuel Vision and Policy-2025

- Government has taken a series of measures to enhance energy security and improve efficiency in use of energy for sustainability

➢ The Minister of State for Petroleum and Natural Gas, Shri Rameswar Teli in a written reply to a question in the Rajya Sabha today informed that the Government has taken a series of measures to enhance energy security and improve efficiency in use of energy for sustainability. These inter alia include diversification in sources of imports, promotion of alternate fuels, increasing production of oil and gas, substitution of energy demand, improving refinery processes, notification of fuel efficiency norms, etc. Government has been promoting the use of biofuels with multiple objectives of reducing import dependency, generating employment, providing better remuneration to farmers, reduction in environment pollution, etc. in line with the National Policy on Biofuels 2018.

➢ Various long term and short term policy initiatives have been taken to increase production of domestic oil and gas which inter alia include Discovered Small Field Policy, Hydrocarbon Exploration and Licensing Policy, Policy framework for coal bed methane, etc. Further, Government has also provided functional freedom to National Oil Companies and facilitated wider private sector participation by streamlining approval processes including electronic single window mechanism.

- Auto Fuel Vision and Policy-2025 had recommended the implementation of BS-IV emission norms from 01.04.2017, BS-V emission norms in respect of new vehicles from 01.04.2020 and existing models from 01.04.2021 and BS-VI emission norms from 2024. However, Government had leapfrogged to BS-VI emission norms (directly from BS-IV) in April 2020.
- The improvement in the fuel quality from BS-IV to BS-VI was achieved by reducing the sulphur content from 50 Parts Per Million (ppm) in BS-IV to maximum 10 ppm in BS-VI compliant fuel. This has facilitated the development of upgraded / improved engine technologies such as introduction of advanced emission control system, installation of catalytic convertor or diesel particulate filters to reduce particulate matter and selective catalyst reduction systems for reduction in Nitrogen Oxides emissions in BS-VI compatible vehicles.

3.11 Powerthon-2022 under RDSS Aims to Build a Robust Power Sector

- Union Minister for Power and MNRE Shri R K Singh virtually launched today Powerthon-2022, a hackathon competition under RDSS to find technology driven solutions to solve the complex problems in power distribution and to ensure quality and reliable power supply
- In his keynote address Shri R K Singh, said that this program is much needed in the power sector. We will have a standing body and this innovation will be open and an ongoing scheme. He encouraged technologists to come forward not only with solutions to existing problems but also with other problem statements and ideas for reliable power supply. He said that ideas and concepts will be rewarded with licence and development of prototypes will also be fostered.
- Secretary Power Shri Alok Kumar, CMD REC along with other senior officials from Ministry of Power, REC, SINE IIT Bombay were present at the virtual event. DISCOMs and technologists also participated in huge numbers.
- REC Limited in collaboration with SINE, IIT Bombay, India's premier technological institute today announced the launch of the Powerthon-2022, a hackathon competition wherein Technology Solution Providers (TSPs), start-ups, educational institutions, research institute, equipment manufacturers, state power utilities and other state and central power sector entities, shall be briefed on the current challenges/problem statements faced across the power distribution sector and invited to participate and showcase their technology driven solutions to solve the complex problems.
- The hackathon will task participants to find innovative solutions based on advanced emerging technologies like AI/ML, Blockchain, IoT, VR/AR etc on nine (09) themes that have been identified after various discussions & consultations with 14 DISCOMs across 9 states and have been categorized across 9 broad aspects for pilot testing:
  - Demand/Load Forecasting
  - AT&C (Aggregate Technical & Commercial) Loss Reduction

- Energy Theft Detection
- Prediction of DT (Distribution Transformer) Failure
- Asset Inspection
- Vegetation Management
- Consumer Experience Enhancement
- RE (Renewable Energy) Integration
- Power Purchase Optimization

- The competition will bring together qualified mentors with TSPs, innovators, and other participants from across the nation to create teams that hack for the future and develop solutions which contribute to creating a much more vibrant and efficient electricity network.
- Under the competition, an Expert Group and a Technical Committee is being constituted for overall evaluation of the Proof of concept (POC) and selection of TSP. The TSPs will then be actively mentored and a pilot run shall be conducted by the selected TSP for the thematic area. On the success of the pilot run, scale-up avenues will be pursued under the RDSS scheme.
- For each Problem statement, 4-5 TSPS will be shortlisted based on their Proof of Concept (POC) and asked for pilot at Discom test-bed. If the pilot run is successful, scale-up avenues will be pursued under the RDSS scheme
- Powerthon-2022 is being launched in line with the aim of Revamped Distribution Sector Scheme (RDSS) introduced by the Ministry of Power, Government of India. RDSS is a Reform-based and Result-linked Scheme introduced by the Ministry of Power and the key objectives of RDSS are Reducing AT&C losses to 12-15%, eliminating the ACOS-ARR gap by 2024-25 and improving the quality & reliability of the power supply to build a robust power sector which can amplify the development opportunities in the nation's quest for a thriving economy. RDSS has 2 major components, of which Part A is Strengthening & Upgradation of Distribution infrastructure under which Smart prepaid metering, Communicable feeders for DTs & Unified software is of focus. This Scheme also lays special emphasis on using Advanced tech to analyze data generated through IT/OT devices to Increase operational efficiency & financial sustainability of DISCOMs.
- It is pertinent to mention that a framework for promoting advanced technologies across power distribution sector has already been approved under the RDSS Scheme. Under this, a two-pronged strategy i.e. leveraging the existing network of Technology Solution Providers (TSPs) to test and scale up use cases at DISCOM(s); and creating power distribution focused incubators for continuous innovation in the sector has been adopted wherein REC has been entrusted as Designated Agency (DA) to search for Advanced Technologies in the Power Sector. In this regard, REC has signed an MoU with Society for Innovation and Entrepreneurship (SINE) under IIT Bombay as 'Incubator cum Technology Partner' for organizing POWERTHON-2022 as well

identifying the TSP. Startup India, the flagship initiative of the Government of India, intended to catalyse startup culture and build a strong and inclusive ecosystem for innovation and entrepreneurship in India is also supporting in wide publicity of Powerthon-2022.

4. ENVIRONMENT

4.1 Medaram Jathara Festival

- Recently, the Ministry of Tribal Affairs has sanctioned Rs 2.26 Crores for various activities pertaining to Medaram Jathara 2022.
- Medaram Jatara is the second-largest fair of India, after the Kumbh Mela, celebrated by the second-largest Tribal Community of Telangana- the Koya tribe for four days.
- Medaram Jatara is also known as Sammakka Saralamma Jatara.
- It is a tribal festival honoring the fight of a mother and daughter, Sammakka and Saralamma, with the reigning rulers against an unjust law.
- It is celebrated in the state of Telangana. The Jatra begins at Medaram in Tadvai Mandal in Warangal district.
- Medaram is a remote place in the Eturnagaram Wildlife Sanctuary, a part of Dandakaranya, the largest surviving forest belt in the region.
- It is celebrated once in two years in the month of "Magha" (February) on the full moon day.
- People offer bangaram/gold (jaggery) of a quantity equal to their weight to the goddesses and take holy bath in Jampanna Vagu, a tributary to River Godavari.
- It was declared a State Festival in 1996.

What are the important things about the Koya Tribe?

- Koya tribe is the largest adivasi tribe of Telangana and listed as Scheduled Tribe in Telangana.
- The community is spread across Telugu speaking states of Telangana and Andhra Pradesh.
- Koyas popularly call themselves as Dorala Sattam (Lords group) and Putta Dora (original lords). Koyas call themselves "Koitur" in their dialect, like Gonds.

4.2 River Devika Project: Jammu and Kashmir

- River Devika project, built at the cost of over Rs 190 crore, will be complete by June, 2022.

What is the River Devika project?

- The work on the project was started in March 2019 under the National River Conservation Plan (NRCP).

- Under the project, bathing "ghats" (places) on the banks of the Devika River will be developed, encroachments will be removed, natural water bodies will be restored and catchment areas will be developed along with cremation ground.
- The project also includes the construction of three sewage treatment plants, sewerage network of 129.27 km, development of two cremation ghats, protection fencing and landscaping, small hydropower plants and three solar power plants.
- On completion of the project, the rivers will see reduction in pollution and improvement in water quality.

What is the importance of the Devika River?

- Devika River originates from the hilly Suddha Mahadev temple in Udhampur district of Jammu and Kashmir and flows down towards western Punjab (now in Pakistan) where it merges with the Ravi River.
- The river holds religious significance as it is revered by Hindus as the sister of river Ganga.
- In June 2020, Devika Bridge was inaugurated in Udhampur. Apart from taking care of traffic congestion, the Devika Bridge was also meant to help smooth passage of Army convoys and vehicles.

4.3 World Sustainable Development Summit 2022

- Recently, the Prime Minister addressed the The Energy and Resources Institute's (TERI) World Sustainable Development Summit.
- **What is the World Sustainable Development Summit?**
- The World Sustainable Development Summit (WSDS) is the annual flagship event of TERI. It was earlier known as Delhi Sustainable Development Summit. Instituted in 200.
- It is the only Summit on global issues, taking place in the developing world.
- Objective:
- It has been conceptualized as a single platform to accelerate action towards sustainable development and climate change.
- It aims to bring together global leaders and thinkers in the fields of sustainable development, energy and environment sectors on a common platform.

What is TERI?

- TERI is a non-profit research institute.
- It conducts research work in the fields of energy, environment and sustainable development for India and the Global South.
- It was established in 1974 as Tata Energy Research Institute and renamed to The Energy Resources Institute in 2003.

4.4 Tectonic Evolution of Greater Maldive Ridge

- In a recent study, an Indian researcher traced the tectonic evolution and the nature of the Greater Maldive Ridge (GMR).
- It is a very crucial geodynamic feature in the western Indian Ocean whose origin has been the centre of many a scientific debate.
- The study was conducted by the Indian Institute of Geomagnetism, Mumbai, an autonomous institute of the Department of Science & Technology, Govt. of India.

What is a Tectonic Plate?

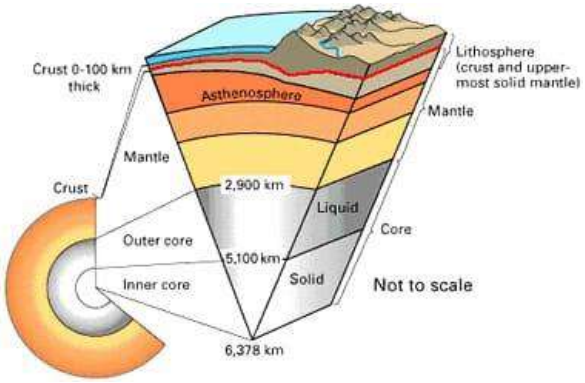
- A tectonic plate (also called lithospheric plate) is a massive, irregularly-shaped slab of solid rock, generally composed of both continental and oceanic lithosphere.
- The lithosphere includes the crust and top mantle with its thickness range varying between 5-100 km in oceanic parts and about 200 km in the continental areas.
- The concept of Tectonic Plates was first introduced in 1967.
- A tectonic plate may be a continental plate or an oceanic plate, depending on which of the two occupies the larger portion of the plate.
- The Pacific plate is largely an oceanic plate whereas the Eurasian plate is a continental plate.
- The tectonic plates are not fixed but constantly move horizontally over the Asthenosphere as rigid units.
- Sometimes these plates collide, move apart, or slide next to each other which leads to Earthquakes or Volcanic Eruptions.

What is a Mid-Ocean Ridge?

- A mid-ocean ridge or mid-oceanic ridge is an underwater mountain range, formed by plate tectonics.

What is the Mohorovicic discontinuity?

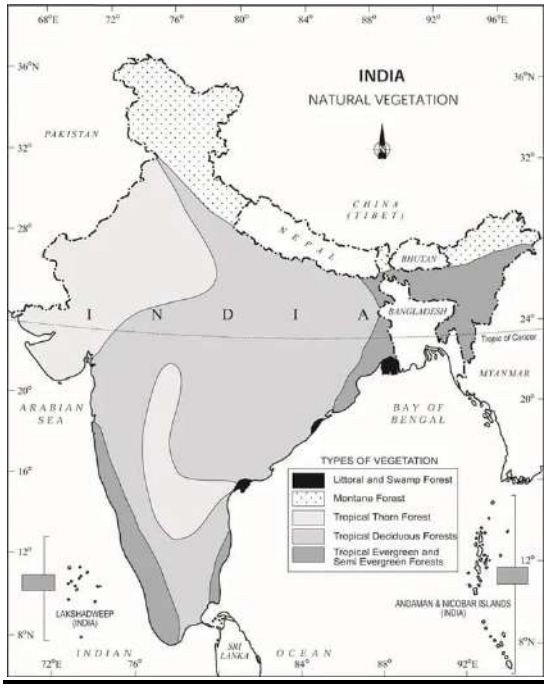
- The Mohorovicic discontinuity, or "Moho," is the boundary between the crust and the mantle. The red line in the diagram shows its location.
- In geology the word "discontinuity" is used for a surface at which seismic waves change velocity.
- One of these surfaces exists at an average depth of 8 kilometres beneath the ocean basin and at an average depth of about 32 kilometres beneath the continents.
- At this discontinuity, seismic waves accelerate. This surface is known as the Mohorovicic Discontinuity or often simply referred to as the "Moho."
- The Mohorovicic Discontinuity was discovered in 1909 by Andrija Mohorovicic, a Croatian seismologist



What is the Greater Maldive Ridge?

- The Maldive Ridge is an aseismic ridge that is not associated with earthquake activities. This ridge, located in the western Indian Ocean, southwest of India, is not well investigated.
- It is of paramount importance to gain knowledge on the structure and geodynamics of aseismic ridges (as it provides valuable inputs towards understanding the evolution of ocean basins

4.5 Reserved Forest



- Recently, the Delhi government has notified forest land in two villages in South Delhi as ‘reserved forest’, which will give them legal status.
- It was notified under Section 20 (declaration of reserved forest) of Indian Forest Act, 1927.

What are the Different Types of Forests?

- Reserved Forests: Reserve forests are the most restricted forests and are constituted by the State Government on any forest land or wasteland which is the property of the Government.
- In reserved forests, local people are prohibited, unless specifically allowed by a Forest Officer in the course of the settlement.

- Protected Forests: The State Government is empowered to constitute any land other than reserved forests as protected forests over which the Government has proprietary rights and the power to issue rules regarding the use of such forests.
- This power has been used to establish State control over trees, whose timber, fruit or other non-wood products have revenue-raising potential.
- Village forest: Village forests are the one in which the State Government may assign to 'any village community the rights of Government to or over any land which has been constituted a reserved forest'.

What is the Status of Forest Cover in India?

- According to the India State of Forest Report-2021, the forest and tree cover in the country continues to increase with an additional cover of 1,540 square kilometres over the past two years.
- Madhya Pradesh has the largest forest cover in the country followed by Arunachal Pradesh, Chhattisgarh, Odisha and Maharashtra.
- In terms of forest cover as percentage of total geographical area, the top five States are Mizoram, Arunachal Pradesh, Meghalaya, Manipur and Nagaland.
- The states that have shown the highest increase in forest cover are Telangana (3.07%), Andhra Pradesh (2.22%) and Odisha (1.04%).
- Five states in the Northeast – Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland have all shown loss in forest cover.

4.6 Greater One-Horned Rhino

- Recently, a case of poaching of the world-famous one-horned rhino has been suspected inside the Kaziranga National Park in Assam.

What are the Key Points related to One-Horned Rhino?

- There are five species of rhino – white and black rhinos in Africa, and the greater one-horned, Javan and Sumatran rhino species in Asia.
- IUCN Red List Status:
- Black Rhino: Critically endangered. Smaller of the two African species.

- White Rhino: Near Threatened. Researchers have created an embryo of the northern white rhino by using In Vitro Fertilization (IVF) process.
- One-Horned Rhino: Vulnerable
- Javan: Critically Endangered
- Sumatran Rhino: Critically Endangered. It has gone extinct in Malaysia.
- Only the Great One-Horned Rhino is found in India.
- Also known as Indian rhino, it is the largest of the rhino species.
- It is identified by a single black horn and a grey-brown hide with skin folds.
- They primarily graze, with a diet consisting almost entirely of grasses as well as leaves, branches of shrubs and trees, fruit, and aquatic plants.

Threats:

- Poaching for the horns
- Habitat loss
- Population density
- Decreasing Genetic diversity.

What are the Conservation Efforts?

- The five rhino range nations (India, Bhutan, Nepal, Indonesia and Malaysia) have signed a declaration 'The New Delhi Declaration on Asian Rhinos 2019' for the conservation and protection of the species.
- Recently, the Ministry of Environment Forest and Climate Change (MoEFCC) has begun a project to create DNA profiles of all rhinos in the country.
- National Rhino Conservation Strategy: It was launched in 2019 to conserve the greater one-horned rhinoceros.
- Indian Rhino Vision 2020: Launched in 2005, it was an ambitious effort to attain a wild population of at least 3,000 greater one-horned rhinos spread over seven protected areas in the Indian state of Assam by the year 2020.

4.7 Army Tag for New Gecko

- Recently, a team of herpetologists have recorded a new species of bent-toed gecko from a wooded part of the Umroi Military Station in Meghalaya.
- Its scientific name is Crytodactylus exercitus and its English name is Indian Army's bent-toed gecko.
- Further, another new bent-toed gecko, the Cyrtodactylus siahaensis named after Mizoram's Siaha district where it was found.
- A herpetologist is someone who specializes in the study of reptiles and amphibians.

What are Geckos?

- Geckos are reptiles and are found on all the continents except Antarctica.
- These colorful lizards have adapted to habitats from rainforests, to deserts, to cold mountain slopes.
- Over a long period of time, geckos have developed special physical features to help them survive and avoid predators.
- Gecko tails serve many purposes. They help balance their weight as they climb branches, they act as fuel tanks to store fat, and as camouflage to help them disappear into their environment.
- Geckos are also able to shed their tails if a predator grabs them.
- Most geckos are nocturnal, which means they are active at night, but day geckos are active during the day and nibble on insects, fruits, and flower nectar.
- Most geckos make noises such as chirping, barking, and clicking when they are defending their territory or attracting a mate.
- There are many species of geckos. Depending on the species, their endangered status can range from least concern to critically endangered.

4.8 Plastic Waste Management (Amendment) Rules, 2022

- Recently, the Ministry of Environment, Forest, and Climate Change announced the Plastic Waste Management (Amendment) Rules, 2022, which notified the instructions on Extended Producer Responsibility (EPR) for plastic packaging.
- Plastic Waste Management Rules 2016 has been amended to fast-track the elimination of single-use plastics and promote alternatives.
- The term Extended Procedure Responsibility means the responsibility of a producer for the environmentally sound management of the product until the end of its life.

What are the Provisions under the New Rules?

Classification of Plastics:

- Category 1: Rigid plastic packaging will be included under this category.

- Category 2: Flexible plastic packaging of single layer or multilayer (more than one layer with different types of plastic), plastic sheets and covers made of plastic sheet, carry bags, plastic sachet or pouches will be included under this category.
- Category 3: Multi-layered plastic packaging (at least one layer of plastic and at least one layer of material other than plastic) will be included under this category.
- Category 4: Plastic sheet or like used for packaging as well as carry bags made of compostable plastics fall under this category.

Plastic Packaging:

- Reuse of rigid plastic packaging material has been mandated in the guidelines to reduce the use of fresh plastic material for packaging.
- The enforceable prescription of minimum level of recycling of plastic packaging waste collected under EPR along with use of recycled plastic content will further reduce plastic consumption and support recycling of plastic packaging waste.
- Extended Producer Responsibility

Certificates:

- In a significant first, the guidelines allow for sale and purchase of surplus extended producer responsibility certificates.
- This wills set-up a market mechanism for plastic waste management.

4.9 Lavender Cultivation

- Lavender Cultivation' under CSIR-IIIM's Aroma Mission will be started in Ramban district (Jammu Kashmir) as a part of Purple Revolution.
- Aromatic Plants include lavender, damask rose, mushk bala, etc.
- Council of Scientific & Industrial Research (CSIR) is a contemporary R&D organization under the Ministry of Science and Technology.

What is the Purple Revolution?

- The Purple or Lavender Revolution was launched in 2016 by the Union Ministry of Science & Technology through the Council of Scientific & Industrial Research's (CSIR) Aroma Mission.
- Lavender cultivation is practiced in almost all the 20 districts of Jammu & Kashmir.
- Under the mission, first-time farmers were given free lavender saplings, while those who had cultivated lavender before were charged Rs. 5-6 per sapling.

Significance:

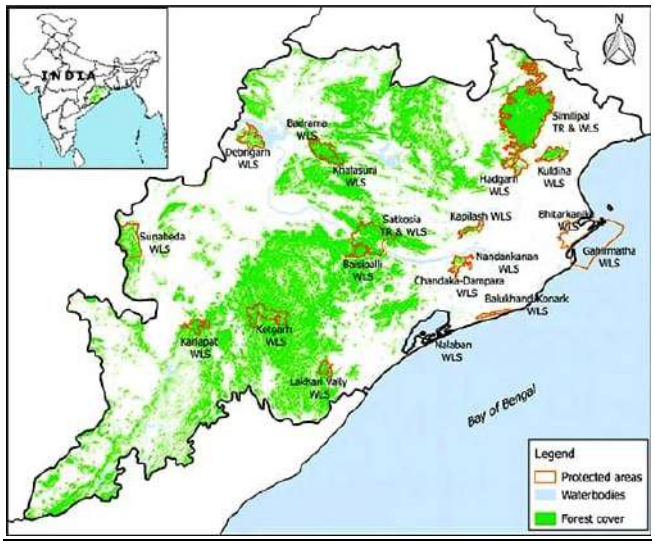
- It is in sync with the government policy of doubling farm incomes by 2022.
- It will help in providing means of livelihood to budding farmers and agri-entrepreneurs and give a boost to Start-Up India campaign and promote a spirit of entrepreneurship in the region.

- Over 500 youth had taken benefit from the purple revolution and augmented their income many-fold.

What is an Aroma Mission?

- About: The CSIR Aroma Mission is envisaged to bring transformative change in the aroma sector through desired interventions in the areas of agriculture, processing and product development for fuelling the growth of aroma industry and rural employment.
- The mission will promote the cultivation of aromatic crops for essential oils that are in great demand by the aroma industry.
- It is expected to enable Indian farmers and the aroma industry to become global leaders in the production and export of some other essential oils in the pattern of menthol mint.
- It aims to provide substantial benefits to the farmers in achieving higher profits, utilization of waste lands and protection of their crops from wild and grazing animals.

4.10 Similipal Biosphere Reserve: Odisha



- Recently the Forest Administration and SHGs (Self Help Groups) have started an awareness Campaign to manage fires in Similipal Biosphere Reserve this year.
- Earlier, scientists unravelled the mystery behind Odisha's 'Black Tigers' in Similipal Tiger Reserve (STR).
- Similipal derives its name from 'Simul' (silk cotton) tree.
- It was formally designated a tiger reserve in 1956 and brought under Project Tiger in the year 1973.
- It was declared a biosphere reserve by the Government of India in June, 1994.
- It has been part of the UNESCO World Network of Biosphere Reserve since 2009.
- It is part of the Similipal-Kuldiha-Hadgarh Elephant Reserve popularly known as Mayurbhanj Elephant Reserve.

- It is prone to forest fires. In 2021, the Simlipal saw a major fire between February-end and early March.

Location:

- It is situated in the northern part of Odisha's Mayurbhanj district. Geographically, it lies in the eastern end of the eastern ghat.

What causes Fires and Mitigation?

- **Forest Fires:**
- Natural: Natural causes such as lighting or even soaring temperatures can sometimes result in forest fires here.
- Man Made Factors: Instances of poaching and hunting wherein the poachers set a small patch of forest on fire to divert the wild animals.
- **Mitigation Strategies:**
- Forecasting fire-prone days and including community members to mitigate incidents of fire, creating fire lines, clearing sites of dried biomass, and crackdown on poachers.

4.11 Saltwater Crocodile

- Saltwater Crocodiles (Crocodylus porosus), used to be found in Vietnam and southern China, became extinct in these areas due to human activity.

What do we know about the Saltwater Crocodile?

About:

- It is the largest of the 23 species of 'extant' or living crocodilians. This includes 'true crocodiles', alligators and caimans.
- The saltie is also called the 'estuarine crocodile' and as the name suggests, is typically found in the brackish water of estuaries.
- It can also tolerate saltwater in the oceans and can travel long distances over the open ocean, making use of tidal currents.

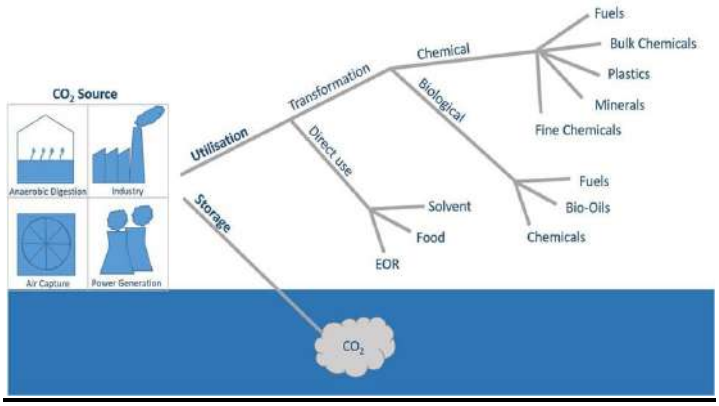
Habitat:

- The 'saltie' is today found in three locations in India — the Sundarbans, Bhitarkanika National Park and the Andaman and Nicobar Islands.
- It is one of the three crocodiles native to the Indian Subcontinent, along with the mugger crocodile (Crocodylus palustris) and the gharial (Gavialis gangeticus).
- It is also found in Bangladesh, Malaysia, Indonesia, Brunei, the Philippines, Papua New Guinea, Australia and the Solomon Islands.
- During antiquity the species' range extended from the Seychelles and Kerala, India in the west through to southeastern China, Palau and Vanuatu in the east.

Threats:

- Habitat destruction, fragmentation, and transformation, fishing activities and use of crocodile parts for medicinal purposes.

4.12 Carbon Capture and Utilisation Technologies



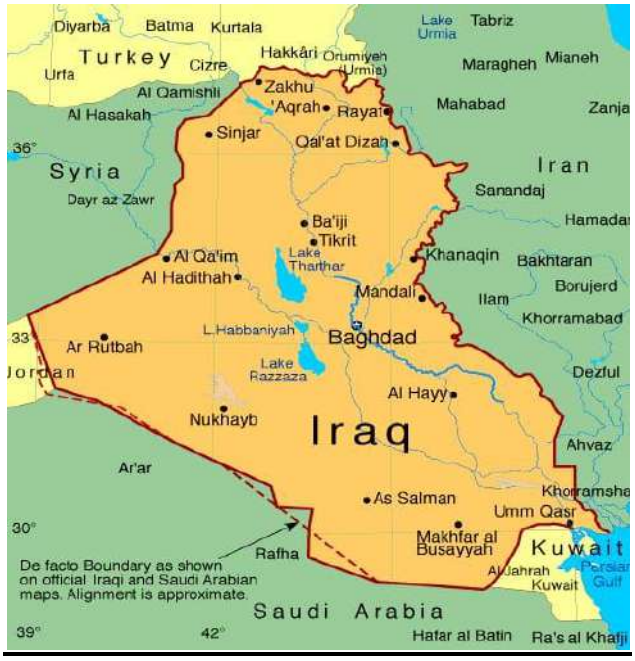
- According to a study conducted by Radboud University, most Carbon Capture and Utilisation and Storage (CCUS) technologies, which suck carbon dioxide (CO2) from the atmosphere and convert it into fuel or other valuable products, might fail to help the world reach Net Zero emissions by 2050.
- The study noted that a majority of these systems are energy intensive and the resultant product can also release CO2 into the atmosphere.
- 'Net zero emissions' refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere.

What are CCUS?

- Carbon Capture, Utilization, and Storage (CCUS) encompasses methods and technologies to remove CO2 from the flue gas and from the atmosphere, followed by recycling the CO2 for utilization and determining safe and permanent storage options.
- CO2 captured using CCUS technologies is converted into fuel (methane and methanol), refrigerants and building materials.

- The captured gas is used directly in fire extinguishers, pharma, food and beverage industries as well as the agricultural sector.
- CCUS technologies can play an important role in meeting net zero targets, including as one of few solutions to tackle emissions from heavy industry and to remove carbon from the atmosphere.
- CCUS is considered an important tool to help countries halve their emissions by 2030 and reach net-zero by 2050.
- These goals are crucial to meet the Paris Agreement targets for restricting global warming to 2 degrees Celsius (°C), and preferable to 1.5°C, over pre-industrial levels.

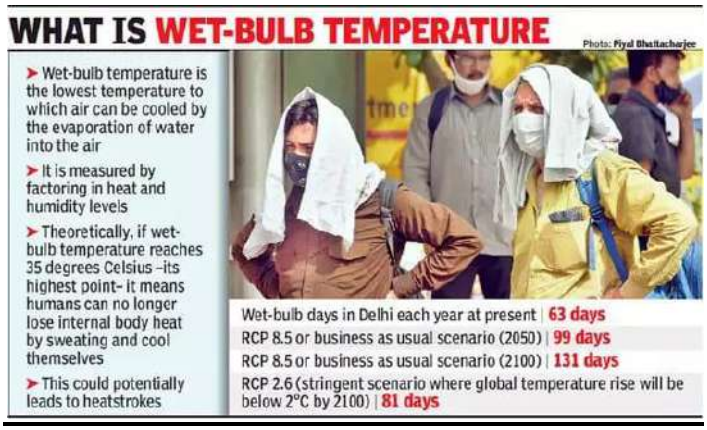
4.13 Razzaza Lake: Iraq



- Iraq's Razzaza Lake was once a tourist attraction known for its beautiful scenery and an abundance of fish that locals depended on. Now, dead fish litter its shores and the once-fertile lands around it have turned into a barren desert.
- Razzaza Lake, also known as Lake Milh, Arabic for Salt Lake, is located between Iraq's governorates of Anbar and Karbala.
- It's the second largest lake in Iraq and is part of a wide valley that includes the lakes of Habbaniyah, Tharthar and Bahr al-Najaf.
- Lake Tharthar is the largest.
- The lake was constructed as a measure to control floods in the Euphrates and to be used as a huge reservoir for irrigation purposes.
- Euphrates River is the longest river in southwest Asia. It is one of the two main constituents of the Tigris-Euphrates river system. The river rises in Turkey and flows southeast across Syria and through Iraq.

- Iraqis and tourists frequented the lake as a recreational spot to cool down during Iraq's hot summers.
- In recent years, it has been affected not only by the water shortage but by drought, neglect and increased evaporation during Iraq's hot summers. It has also been hit by pollution due to the diversion of sewage water into the lake and the theft of water quotas allocated to it.

4.14 Wet Bulb Temperature



- Recently, part 2 of the sixth assessment report of Intergovernmental Panel on Climate Change (IPCC), emphasised on the trend in the 'Wet Bulb' Temperature in South Asia.
- The trend will provide an index of the impact of heat and humidity combined — and its effect on health.

What is the Wet Bulb Temperature?

- Wet bulb temperature is the lowest temperature to which air can be cooled by the evaporation of water into the air at a constant pressure.
- WBT is a limit that considers heat and humidity beyond which humans can not tolerate high temperatures.
- The Wet Bulb temperature is the temperature of adiabatic saturation. This is the temperature indicated by a moistened thermometer bulb exposed to the air flow.
- An adiabatic process is one in which no heat is gained or lost by the system.
- Wet Bulb temperature can be measured by using a thermometer with the bulb wrapped in wet muslin.
- The adiabatic evaporation of water from the thermometer and the cooling effect is indicated by a "wet bulb temperature" lower than the "dry bulb temperature" in the air.
- The rate of evaporation from the wet bandage on the bulb, and the temperature difference between the dry bulb and wet bulb, depends on the humidity of the air.
- The evaporation is reduced when the air contains more water vapour.

- The wet bulb temperature is always lower than the dry bulb temperature but will be identical with 100% relative humidity (the air is at the saturation line).
- A wet-bulb temperature of 31°C is exceedingly harmful to humans, while a temperature of 35°C is unsurvivable for more than 6 hours.

How will this Trend Impact India?

- Lucknow and Patna, were among the cities predicted to reach wet-bulb temperatures of 35°C if emissions continued to rise, while Bhubaneswar, Chennai, Mumbai, Indore, and Ahmedabad are 'at risk' of reaching wet-bulb temperatures of 32°C-34°C with continued emissions.
- With continuing emissions, parts of central India including Vidarbha are at risk of exceeding wet bulb temperatures of 32-34°C.
- This will have consequences such as a rise in heat-wave linked deaths or reduced productivity.
- Relying on artificial cooling to cope with the growing heat would supercharge energy demand and leave many people dangerously exposed to power failures.
- It would also abandon the most vulnerable members of society and doesn't help those who have to venture outside.

4.15 Dugong Conservation Reserve in Palk Bay

- Recently, the Tamil Nadu government has decided to go ahead with the establishment of India's first conservation reserve for the Dugong in Gulf of Mannar, Palk Bay
- It facilitates India to act as the leading nation in the South Asia Sub-region with respect to dugong conservation.

What are Dugongs?

- Dugong (Dugong dugon) also called 'Sea Cow' is one of the four surviving species in the Order Sirenia and it is the only existing species of herbivorous mammal that lives exclusively in the sea including in India.
- Dugongs are an important part of the marine ecosystem and their depletion will have effects all the way up the food chain.
- Distribution and Habitat: They are found in over 30 countries and in India are seen in the Gulf of Mannar, Gulf of Kutch, Palk Bay, and the Andaman and Nicobar Islands.

Conservation Status:

- IUCN Red List status: Vulnerable
- Wild (Life) Protection Act, 1972: Schedule I
- CITES: Appendix I

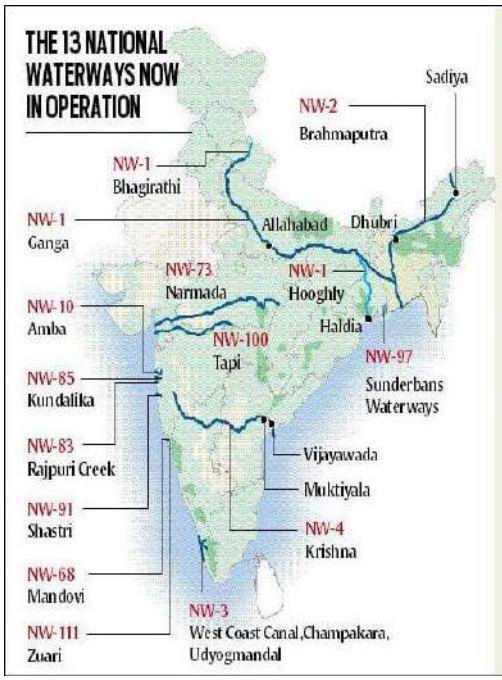
Steps Taken for Conservation:

- In February 2020, India hosted the 13th Conference of Parties (CoP) of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), an environmental treaty under the aegis of the United Nations Environment Programme (UNEP).
- The Government of India has been a signatory to the CMS since 1983.
- India has signed non-legally binding Memorandums of Understanding (MoU) with CMS on the conservation and management of Siberian Cranes (1998), Marine Turtles (2007), Dugongs (2008) and Raptors (2016).
- *The Ministry of Environment, Forests and Climate Change constituted a 'Task Force for Conservation of Dugongs' to look into issues related to conservation of dugongs and implementation of the 'UNEP/CMS Dugong MoU' in India.
- It also facilitates India to act as the leading nation in the South Asia Sub-region with respect to dugong conservation.

4.16 World Wildlife Day

- World Wildlife Day has been celebrated every year on the 3rd of March since 2013.
- The date chosen coincides with the day of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which was signed in 1973.
- The UNGA (General Assembly) resolution also designated the CITES Secretariat as the facilitator for the global observance of this special day for wildlife on the UN (United Nations) calendar.
- Theme: Recovering key species for ecosystem restoration.

4.17 Brahmaputra (NW2) gets connected with Ganga (NW1)



THE LINKS AND THE LENGTHS

NW-1	Ganga–Bhagirathi–Hooghly (Haldia-Allahabad)	1,620 km
NW-2	Brahmaputra river	891 km
NW-3	West Coast Canal–Champakara Canal–Udyogmandal Canal	205 km
NW-4	Krishna (Muktiyala–Vijayawada)	82 km
NW-10	Amba river	45 km
NW-83	Rajpuri Creek	31 km
NW-85	Revadanda Creek–Kundalika river	31 km
NW-91	Shastri river-Jaigad Creek System	52 km
NW-68	Mandovi river (Usgaon Bridge–Arabian Sea)	41 km
NW-111	Zuari river (Sanvordem Bridge–Marmugao Port)	50 km
NW-73	Narmada river	226 km
NW-100	Tapi river	436 km
NW-97	Sunderbans Waterways	172 km

- Recently, the Union Minister of Ports, Shipping & Waterways received the maiden voyage of food-grains from Patna to Pandu port via Bangladesh in Guwahati (Assam).
- Inland Waterways Authority of India (IWAI) is planning to run a fixed schedule sailing between NW1 and NW2 heralding a new age of inland water transport for Assam & the Northeast India.
- The Inland Vessels Bill, 2021, was also approved to regulate safety, security and registration of inland vessels.

What are Inland Waterways?

- India has about 14,500 km of navigable waterways which consist of rivers, canals, backwaters, creeks, etc.
- As per the National Waterways Act 2016, 111 waterways have been declared as National Waterways (NWs).
- NW-1: Ganga-Bhagirathi-Hooghly River System (Prayagraj-Haldia) with length 1620 km is the longest National Waterway in India.

- The Inland Waterways Authority of India (IWAI) is implementing the Jal Marg Vikas Project (JMVP) for capacity augmentation of navigation on the Haldia-Varanasi stretch of Ganga (part of NW-1) with the technical and financial assistance of the World Bank.

4.18 Glycosmis Albicarpa

- A team of scientists from the Botanical Survey of India (BSI) has discovered a new gin berry species named Glycosmis albicarpa from the Kanyakumari Wildlife Sanctuary in Tamil Nadu.
- BSI, established in 1890, is the apex research organisation under the Ministry of Environment and Forests (MoEFCC) for carrying out taxonomic and floristic studies on wild plant resources of the country.
- It has the objective to explore plant resources of the country and to identify plant species with economic virtues.

What Is Glycosmis Albicarpa?

- The species is endemic to the southern Western Ghats.
- The species belongs to the Orange family, Rutaceae.
- Many of the related plants of these taxonomic groups are being utilised for their medicinal values and food.
- Most commonly related species of these plants are collected from the wild, mainly for local use as food and medicine.
- Berries of Glycosmis species have the unique characteristic of ‘gin aroma’ and have gained in popularity as an edible fruit.
- The species is also a larval host plant for butterflies like other species of Glycosmis.

4.19 Amazon Rainforest Nearing Tipping Point

- A study published recently says that a significant part of the Amazon rainforest has been heading towards a tipping point since the early 2000s. It may be losing its ability to bounce back from extreme events such as drought or fire, threatening to become a dry savanna-like ecosystem.

- In this study, researchers analyzed 30 years of satellite data to understand the resilience of the rainforest and how it has changed over the years.

- The latest findings are consistent with the accumulating evidence that the twin pressures of climate change and human exploitation of tropical forests are endangering the world's largest rainforest, which is home to one out of every 10 species known to science.

What are the Key Points Related to Amazon Rainforests?

- These are large tropical rainforests occupying the drainage basin of the Amazon River and its tributaries in northern South America and covering an area of 6,000,000 square km.
- Tropical forests are closed-canopy forests growing within 28 degrees north or south of the equator.
- They are very wet places, receiving more than 200 cm rainfall per year, either seasonally or throughout the year.
- Temperatures are uniformly high - between 20°C and 35°C.
- Such forests are found in Asia, Australia, Africa, South America, Central America, Mexico and on many of the Pacific Islands.
- Comprising about 40% of Brazil’s total area, it is bounded by the Guiana Highlands to the north, the Andes Mountains to the west, the Brazilian central plateau to the south, and the Atlantic Ocean to the east.

4.20 State of India's Solar Capacity

- India added a record 10 Gigawatt (GW) of solar energy to its cumulative installed capacity in 2021.
- This has been the highest 12-month capacity addition, recording nearly a 200% year-on-year growth.
- India has now surpassed 50 GW of cumulative installed solar capacity, as on 28th February 2022.
- Of the 50 GW installed solar capacity, an overwhelming 42 GW comes from ground-mounted Solar Photovoltaic (PV) systems, and only 6.48 GW comes from Roof Top Solar (RTS); and 1.48 GW from off-grid solar PV.
- This is a milestone in India's journey towards generating 500 GW from renewable energy by 2030, of which 300 GW is expected to come from solar power.
- India's capacity additions rank the country fifth in solar power deployment, contributing nearly 6.5% to the global cumulative capacity of 709.68 GW.

5. SCIENCE & TECHNOLOGY

5.1 National Science day

- Nation celebrates National Science day on February 28 to honor the great contribution of Sir Chandrasekhara Venkata Raman for his work on the scattering of light and for the discovery of the effect named after him – 'The Raman Effect'.
- The Indian physicist won the Nobel Prize in physics in 1930 for his work on the scattering of light and for the discovery of 'The Raman Effect'. Sir CV Raman is the only Nobel Laureate in the science of Indian origin who studied, worked, and continued to live in the country his entire life. Let us dig deep into the discoveries of Sir CV Raman that revolutionized the science of optics.

What is the Raman Effect?

- The change in the wavelength of light when a light beam is deflected by molecules is known as Raman Effect. It is also known as Raman scattering and Raman spectrum.

Why seas are Blue?

- A glass of water has no color. But a deep sea with the same water is a brilliant blue. Ever thought of that? Sir CV Raman did, back in 1921 when he was on his way back from his first visit to England on the SS Narkunda, the curiosity was such that Sir CV Raman began small experiments on the ship with his limited types of equipment. On November 17, 1921, CV Raman sent a letter concerning 'The Color of the Sea' to the journal, Nature, from there the quest began for a solid explanation for the color of the sea. At that time, Scientists believed the sea was blue because it reflected the color of the sky.
- On 28 Feb 1928, a major breakthrough was made, one of CV Raman's experiments gave clear results. The results showed that the light of one color was passed through a liquid, but the light that emerged had small traces of another color. This meant that the molecules in the liquid were changing the color of some of the light passing through it. That was a sensational finding which opened the door for many things.
- The theme for National Science Day 2022:
- Every year the National Science day has a theme and this year the theme is 'Integrated Approach in Science and Technology for a Sustainable Future'. In 2021 the theme was 'Future of STI: Impact on Education Skills and Work'.

5.2 PARAM Ganga

- Petascale Supercomputer "PARAM Ganga" established at IIT Roorkee under National Supercomputing Mission.
- Speed: 1.66 Petaflops.

- The National Supercomputing Mission (NSM) which is being steered jointly by Ministry of Electronics & Information Technology (MeiTY) and the Department of Science and Technology (DST) and implemented by Centre for Development of Advanced Computing (C-DAC) and Indian Institute of Science (IISc), Bangalore, has progressed significantly. The four major pillars of the NSM, namely, Infrastructure, Applications, R&D, HRD, have been functioning efficiently to realize the goal of developing indigenous supercomputing eco system of the nation.
- C-DAC has been entrusted the responsibility to design, development, deployment and commissioning of the supercomputing systems under the build approach of Mission. The Mission plans to build and deploy 24 facilities with cumulative compute power of more than 64 Petaflops. Till now C-DAC has deployed 11 systems at IISc, IITs, IISER Pune, JNCASR, NABI-Mohali and C-DAC under NSM Phase-1 and Phase-2 with a cumulative compute power of more than 20 Petaflops. Total 36,00,000 computational jobs have been successfully completed by around 3600 researchers across the nation on the NSM systems to date. The supercomputer infrastructures installed at various Institutes across the country have helped the R&D community to achieve major milestones, objectives and products for scientific and societal applications.
- Under the build approach, C-DAC is building an indigenous supercomputing ecosystem in a phased manner, which is leading to indigenously designed and manufactured supercomputers. It has designed and developed a computer server “Rudra” and high-speed interconnect “Trinetra” which are the major sub-assemblies required for supercomputers.
- Some of the large-scale applications which are being developed under NSM include the following.
  - NSM Platform for Genomics and Drug Discovery.
  - Urban Modelling: Science Based Decision Support Framework to Address Urban Environment Issues (Meteorology, Hydrology, Air Quality).
  - Flood Early Warning and Prediction System for River Basins of India.

- HPC Software Suite for Seismic Imaging to aid Oil and Gas Exploration.
- MPPLAB: Telecom Network Optimization.

- As part of its tireless journey of success, NSM has now deployed "PARAM Ganga", a supercomputer at IIT Roorkee, with a supercomputing capacity of 1.66 Petaflops.

5.3 SARAS 3 radio telescope

- Indian researchers have conclusively refuted a recent claim of the discovery of a radio wave signal from cosmic dawn, the time in the infancy of our Universe when the first stars and galaxies came into existence.
- In 2018 a team of researchers from Arizona State University (ASU) and MIT in the US detected a signal from stars emerging in the early universe using data from the EDGES radio telescope. The study published in the journal Nature created much excitement in the astronomy community around the world.

- ASU/MIT team had claimed the discovery of a radio wave signalling the birth of the First Stars, which was also hailed by Harvard astrophysicist Avi Loeb as worthy of two Nobel prizes. However, the world awaited confirmation from independent researchers.
- Utilising the indigenously invented and built SARAS 3 radio telescope, researchers from Raman Research Institute, an autonomous institute of the Department of Science & Technology, Govt. of India refuted this claim.
- The SARAS 3 radio telescope invented and built by the astronomers at RRI is the first telescope worldwide to reach the required sensitivity. The signal claimed to have been detected by the ASU/MIT team required exotic and non-standard physics and caused astrophysicists worldwide to invent new theories, which are all now redundant. This research of the Raman Research Institute

restores confidence in our understanding of the evolving Universe, re-establishing the prevailing cosmological model of the cosmos.

SARAS: experiment and science

- SARAS is a niche high-risk high-gain experimental effort of RRI initiated and led by Prof. Ravi Subrahmanyan, along with Prof. N. Udaya Shankar. It was a courageous attempt to design, build and deploy in India a precision radio telescope to detect extremely faint radio wave signals from the depths of time, from our "Cosmic Dawn" when the first stars and galaxies formed in the early Universe.
- The CMB Distortion Laboratory at RRI has pioneered the development of state-of-the-art radio telescopes which are designed to detect faint cosmological signals, especially radiation emitted by hydrogen atoms at the 21-cm wavelength (1.4 GHz) arising from the depths of the cosmos. The signal from Cosmic Dawn is expected to arrive on Earth stretched in wavelength to metres and lowered in frequency by the expansion of the Universe to lie in the radio frequency band 50-200 MHz.

Findings

- After a rigorous statistical analysis led by Dr. Saurabh Singh, a research scientist at RRI, SARAS 3 did not find any evidence of the signal claimed by the EDGES experiment. The presence of the signal is decisively rejected after a careful assessment of the measurement uncertainties.
- Therefore, the finding implies that the detection reported by EDGES was likely contamination of their measurement and not a signal from the depths of space and time. SARAS 3 was indeed the first experiment to reach the required sensitivity and cross-verify the claim of the signal detection.
- However, astronomers still do not know what the actual signal looks like. Having rejected the ASU/MIT claim, the SARAS experiment is geared towards discovering the true nature of Cosmic Dawn.

5.4 Quantum Key Distribution

- A joint team of scientists from Defence Research and Development Organisation (DRDO) and Indian Institute of Technology (IIT) Delhi, for the first time in the country successfully demonstrated Quantum Key Distribution link between Prayagraj and Vindhyachal in Uttar Pradesh, a distance of more than 100 kilometres. This technological breakthrough was achieved over a commercial grade optical fibre already available in field.
- With this success, the country has demonstrated indigenous technology of secure key transfer for bootstrapping military grade communication security key hierarchy. The performance parameters have been measured and have been found to be repetitively within the reported international standards at sifted key rates of up to 10 KHz. This technology will enable security agencies to plan a suitable quantum communication network with indigenous technology backbone.

5.5 Vigyan Sarvatra Pujyate: Celebrating Science & Technology

- The Government of India is paying homage to its freedom fighters through various initiatives. As part of the process, Vigyan Sarvatra Pujyate, a week-long program is being held from February 22 to 28 simultaneously in 75 locations across the country.
- Furthermore, National Science Book Fair, a science and technology mega expo, is also being held in New Delhi's Jawaharlal Nehru stadium. In addition to this, quiz, essays, poster, and poetry contests are also being held to promote scientific temper in different parts of the country.

Celebrating Science & Technology

- The Government's various science and technology organizations, in partnership with agencies at the State level, are celebrating various achievements in the field of science and technology over the 75 years.
- The event would display the country's scientific legacy and technology prowess that has helped find solutions to defence, space, health, agriculture, astronomy, and other sectors. The event is jointly being organized by the Department of Science and Technology, Department of Biotechnology, Council of Scientific and Industrial Research, Ministry of Earth Sciences, Department of Atomic Energy, Department of Space, Indian Council of Medical Research, All India Council for Technical Education, and Defence Research Development Organisation.

Vigyan Sarvatra Pujyate

- Vigyan Sarvatra Pujyate celebrates science and technology (S&T). The festival will be conducted at 75 locations and host 75 expositions, 75 lectures, 75 films, 75 radio talks, 75 science literary activities, and more through a hybrid mode.
- The programmes will be held in various Indian languages, including Kashmiri, Dogri, Punjabi, Gujarati, Marathi, Kannada, Malayalam, Tamil, Telegu, Odiya, Bengali, Assamese, Nepali, Maithili, and Manipur.
- Vigyan Sarvatra Pujyate also aims to inspire India's youth and help them navigate into building a progressive nation; bring to the fore stories of people in science and their achievements; reinforce the commitment of the scientific community towards the economic and social development of the country. It also highlights the work being done by the R&D organizations from across the country.

Themes of the week-long event:

The programmes have been grouped under four different themes –

1) 'From the annals of the history of S&T' to acknowledge the contributions of founders of modern science and institutions. 75 films on 75 scientists and 75 lectures by eminent scientists and technocrats will be screened across the 75 locations.
2) 'Milestones of Modern S&T' to highlight critical discoveries, innovations, or inventions that made a mark in the global science or India's development story.

3) `Swadeshi Paramparik Inventions and Innovations', to showcase 75 inventions or technologies that led India towards self-reliance by drawing upon the reservoir of traditional knowledge systems, such as drugs from herbs.
4) `Transforming India', to look at the road ahead for the next 25 years of Indian S&T.

- North India's First centre for Space Science Inaugurated: A march of Space Journey from Kerala to Kashmir:
- Asserting it as a "historic decision & a historical day" in furthering the strength of science in the nation, Union Minister of State for Science & Technology Dr Jitendra Singh inaugurated North India's first-ever Space Centre in Jammu. Satish Dhawan Centre for Space Science at the Central University of Jammu, this year will offer the first course – B.Tech in Aviation and Aeronautics, with an intake capacity of 60 students.

Why the need is felt for this?

- It has come to the notice that most space technology institutes were in the past confined to the Southern States and the only-of-its-kind Indian Institute of Space and Technology imparting Engineering, Aeronautics and other streams were located in Thiruvananthapuram.
- "Most of the Space Technology from the last seventy years has been confirmed to South India mostly to the states of Andhra Pradesh, Karnataka, Kerala which was an anomaly in the spread of the space technology in the country. The government is steadfast to take space technology to the remote corners of the country which is evident today with the inauguration of the Satish Dhawan Centre for Space Sciences at the Central University of Jammu," Union Minister Dr Jitendra Singh said.
- According to the Science & Technology Minister, the opening of the Space Centre and India's second-of-its kind Space Training Institutes in Jammu & Kashmir in 75th years of independence simultaneously marks the march of space journey from Kerala to Kashmir.

The Facility:

- The Indian Space Agency – ISRO, in October 2018, had signed a Memorandum of Understanding (MoU) with the Central University of Jammu to set up the centre with facilities for geospatial data analysis that will aid in sustainable use of natural resources and plan land-use patterns. The newly-inaugurated centre has ground-based observations for atmospheric studies, a research lab for astrophysics, atmospheric sensing and glacier studies lab for better use of large quantities of water stored in the form of seasonal snow, ice and glaciers in the rivers of North India.

Big boost to Space Technology:

- According to Dr Singh, the future of the world will hugely depend on three things – Space Economy, Space Collaboration and Space Diplomacy. Referring to the space economy, he mentioned that India is already receiving revenue worth millions of European Euros and US

Dollars through the launching of foreign satellites. Referring to space collaboration, he cited the example of the SAARC satellite which was visualised and developed on the instructions of Prime Minister NarendraModi, which caters to the needs of most of the neighbouring countries including Bangladesh, Bhutan, Sri Lanka, Nepal, etc.

- Addressing the conference on 'Frontiers of Space Technology and Applications for Humanity' at CUJ, Dr Singh stressed that with the inauguration of SatishDhawan Centre for Space Science at the Central University of Jammu, this institute would be an institution for startups in space technology as well, especially in J&K. The Minister said that the people from this region should use this enormous opportunity to shape their future. Dr Singh added that the Ministry of Science and Technology will start the awareness programs related to Startups across the country from the next month.

5.6 Breaking myths regarding health effects of EMF exposure from mobile towers

- Telecommunications is an effective tool for the socio-economic development of a country. It has become the core infrastructure for the rapid growth and modernization of various sectors of the economy.
- Radio communications are a part of everyday life in today's society. To make consumers aware of the growing need for mobile towers to build a reliable telecom infrastructure, the Department of Telecommunications (DoT), Delhi License Service Area (LSA) organized an awareness webinar on "EMF Emissions and Telecom Towers" on 15th March 2022.

What are EMFs?

- Electromagnetic fields (EMFs) are created by electric power charges. There are two types of fields – electric fields which result from the strength (voltage) of the charge and magnetic fields which result from the motion (amperage) of the charge.
- A stationary charge will produce only an electric field in the surrounding space. If the charge is moving, a magnetic field is also produced. The mutual interaction of electric and magnetic fields produces an electromagnetic field.
- All radio communication systems utilise EMF in the radiofrequency (RF) part of the electromagnetic spectrum.

Are there any hazardous health effects of EMF exposure from mobile towers?

- World Health Organisation (WHO) conducted an in-depth review of scientific literature of almost 25,000 articles published around the globe over the past 30 years, and reached a conclusion that "current evidence does not confirm the existence of any health consequences from exposure to low-level electromagnetic field".

- The public is concerned about the potential health implications of exposure to Electromagnetic Field Radiation (EMR) from various EMR sources, particularly Mobile BTS antennae and mobile phones.
- In reference to Electromagnetic Radiation emanating from cellular mobile towers, WHO in its Fact Sheet No. 304, May 2006 on Electromagnetic Fields and Public Health (Base Stations and Wireless Technologies) stated that:

➢ Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak Radio Frequency (RF) Signals from base stations and wireless networks caused adverse health effects.

➢ From all evidence accumulated so far, no adverse short or long term health effects have been shown to occur from the RF signals produced by base stations.

➢ In the webinar organised by DoT- LSA, Arun Kumar, DDG and Vijay Prakash, Director, Delhi LSA iterated that the EMF emissions from a mobile tower, which are below the safe limits prescribed by International Commission on Non-Ionizing Radiation Protection (ICNIRP) and recommended by WHO, have no convincing scientific evidence of causing adverse health effects.

➢ Infact, various judgements of the High Courts of India on the issues of radiation from mobile towers also mention that there is no conclusive data to show that radiation from the mobile tower is in any way harmful or hazardous to the health of citizens.

Steps taken by DoT to monitor safety against EMF radiation emissions

- The Department of Telecommunications (DoT) has already taken the required steps and implemented stronger standards for safety against EMF radiation emitted by mobile towers through its field units.
- The Department of Transportation has adopted radiation standards that are ten times stricter than those set forth by ICNIRP and recommended by WHO.
- DoT has issued an informative guide on ‘Mobile Communications-Radio Waves and Safety covers a basic introduction to radio waves, various terminologies, Do’s & Don’ts related to mobile phone usage, clarification of various myths regarding deployment, use of Radio waves / Safety Standards and frequently asked questions relating to Mobile phones Human health.
- Busting the Myth; 5G mobile networks and health risks
- As per the information of WHO, till date a lot of research has been conducted which indicate that there are no adverse health effects causally linked with exposure to wireless technologies.
- Health-related conclusions are drawn from studies performed across the entire radio spectrum but, so far, only a few studies have been carried out at the frequencies to be used by 5G.

- The main mechanism of interaction between radiofrequency fields and the human body is Tissue heating. Radiofrequency exposure levels from current technologies result in negligible temperature rise in the human body.
- Currently, the WHO is conducting a health risk assessment from exposure to radio frequencies that cover the entire radiofrequency range, including 5G.

5.7 Fuel Cell Electric Vehicle launched to push India's Green Hydrogen Ecosystem

- India is looking towards promoting clean energy methods for a sustainable future. The goal is to make India 'Energy Self-reliant' by 2047 by reducing its dependence on fossil fuels.
- In a big step towards achieving this goal, Union Minister NitinGadkari on 16 March launched the world's most advanced technology – Green Hydrogen Fuel Cell Electric Vehicle (FCEV) Toyota Mirai, in India. This is a first of its kind project which aims to create a Green Hydrogen based ecosystem in the country.

What is Fuel Cell Electric Vehicle?

- Fuel cell electric vehicles (FCEVs), powered by hydrogen, are one of the best clean energy alternatives used in vehicles. They are more efficient than conventional internal combustion engine vehicles and produce no tailpipe emissions while only emitting water vapour and warm air.
- FCEVs use a propulsion system similar to that of electric vehicles, where energy stored as hydrogen is converted to electricity by the fuel cell.

How is this technology more advanced than EVs?

- In contrast to electric vehicles, fuel cell electric vehicles are equipped with regenerative braking systems to capture the kinetic energy normally lost during breaking and store it in the battery. This allows FCEVs to significantly increase efficiency as compared to various other alternatives.
- FCEVs use fuel cell stacks to convert onboard gaseous hydrogen to electricity, which is then stored in a battery to power the vehicle's electric motor.
- Toyota Mirai – a first of its kind project in India
- Toyota Kirloskar Motor Pvt. Ltd and the International Center for Automotive Technology (ICAT) are collaborating on a Pilot Project to test and assess the world's most advanced, hydrogen-based, Fuel Cell Electric Vehicle (FCEV) called Toyota Mirai, on Indian roads and weather.
- This is India's first project of its sort, with the goal of establishing a Green Hydrogen-based ecosystem by raising awareness about the benefits of Green Hydrogen and FCEV technology.
- Non-conventional fuels including green hydrogen are the way forward, and because of this Fuel Cell Electric Vehicles (FCEVs) are one of the best Zero-Emission solutions for a sustainable future.

Why Green Hydrogen?

- Green hydrogen is defined as hydrogen produced by splitting water into hydrogen and oxygen using renewable electricity. It can be generated from renewable energy and abundantly available biomass.
- Introduction and adoption of technology to tap into the Green hydrogen's potential will play a key role in securing a clean and affordable energy future for India. It is a critical enabler of the global transition to sustainable energy and net-zero emissions economies.

5.8 Kalpana Chawla: Tracing the incredible journey of a Karnal girl

- "The Journey matters as much as the goal – Kalpana Chawla"
- Kalpana Chawla was born on March 17, 1962 in Karnal, Haryana. But the girl grew up to become one of the dearest daughters of India, who made India proud on various occasions.
- She came from a place where education was a luxury for girls at that time. She once said in an interview "Forget about space, I didn't even know if my folks were going to let me go to the engineering college."

Kalpana's Journey from Karnal to Space

- "Here was this small-town girl in Karnal who dreamt of going into space. She chased her dream. It wasn't available in the country. She went halfway around the world and went after her dream and grabbed it"

- **Rakesh Sharma, (February 5, 2003) on Kalpana Chawla**

- The young mind of Kalpana was always fascinated by aeroplanes and flights. It was her mother who always pushed her hard for her dreams which eventually landed her at NASA and she became the first Indian-born woman to go to space.
- After completing her school education, Kalpana graduated in aeronautical engineering from Punjab Engineering College. And when she was 20, Kalpana moved to the US.
- Kalpana inspired several in India to dream big irrespective of the place they came from. Before she made it to space, Kalpana was a certified pilot for seaplanes, multi-engine aircraft and was also licensed as a flight instructor for gliders.
- At 26, Kalpana joined NASA and worked at the Ames Research Center. Three years later, she got citizenship of the United States which opened the doors for her. She then applied for the NASA Astronaut Corps to participate in US space missions. There, she passed the competitive process and began her training and education as an astronaut.

Kalpana's love for India and her School

- Kalpana was a visionary in her field and her love for his school was immense. She helped in organizing a program that allowed two students from her school in Haryana to visit NASA every year.

Kalpana's first trip to Cosmos

- "It's a dome of a dark sky and stars everywhere and, the Earth a lot of time covered with thunderstorm here and there with some small sprays of lightning and every once in a while city lights peep through the clouds. It's very much like a storybook".

Kalpana Chawla shared her thoughts from space

- The ultimate dream of Kalpana was to go to space and her first opportunity came when she was 35. The flight STS-87 launched into space with Kalpana and her crew. The observational trip was successful. The Space Shuttle Columbia orbited the Earth 252 times, covering 6.5 Million miles in 15 days 16 hours, and 34 minutes.

The Final flight for Kalpana

- When Kalpana was 40, the space shuttle Columbia flew for the 2nd time taking seven astronauts to space. The flight took off on January 16, 2003, for a 16-day flight. Kalpana was responsible for conducting different experiments for which she worked 24 hours a day in alternative shifts.
- "You simply do not have time to dwell on yesterdays because you have to finish the whole mission properly. I think once we get back to Earth we will have a lot of time to talk about this and that's when I plan to do that", Kalpana shared her feeling while on the mission but unfortunately, things were not in her hands.

- The shuttle wing had got damaged during the take-off. When the space shuttle Columbus re-entered the Earth's atmosphere, hot atmospheric air entered the damaged shuttle wing. As a result, the shuttle broke apart in which the entire crew lost their lives.

  The entire world was in shock. But India was remorseful and mourning the loss of her dear daughter. She may not be with us today but her legacy and her journey have inspired millions to aim big and imagine the unimaginable. Today, on her birth anniversary, India fondly remembers its daughter who ignited a fire in little hearts to carry on and achieve big.

5.9 Corbevax

- India's Drug Regulator on 21st February 2022, gave Emergency Use Authorisation (EUA) to Biological E Ltd's COVID-19 vaccine, Corbevax for use in children aged 12 to 18 years based on the interim results of the ongoing phase-2 and 3 clinical study. With the Drug Controller General of India's approval, Corbevax became the third coronavirus vaccine to be approved for children in India apart from Bharat Biotech's Covaxin and Zydus Cadila's ZyCoV-D.
- The Corbevax Vaccine is created using protein subunit technology. Subunit Technology is defined by World Health Organisation as, "the one that uses the very specific parts (the subunits) of a virus or bacterium that the immune system needs to recognize. It doesn't contain the whole microbe or uses a safe virus as a vector.
- Corbevax is a "recombinant protein sub-unit" vaccine, developed from a component of the spike protein on the virus' surface, which helps the body build the immune response against the virus.
- The vaccine was earlier approved by the DCGI in December 2019 for restricted use emergency situation among adults.

5.10 ISRO successfully carried out ground test of solid booster stage for SSLV

- Signalling another milestone in India's trajectory for space launches, the Indian Space Research Organisation (ISRO) on Monday i.e 14th March 2022 successfully carried out the ground testing of the newly developed solid booster stage (SS1) for its new launch vehicle Small Satellite Launch Vehicle (SSLV) at Satish Dhawan Space Centre at Sriharikota.

- The testing by ISRO comes at the rear of conducting the maiden launch of the new vehicles this year.
- The newly developed Solid Booster Stage (SS1) motor is a three-segmented solid propulsion stage incorporating various new technologies and innovative processes which includes a bond-free joint between the segments, high power electromechanical actuator with digital control electronics, optimized ignitor and simultaneous propellant casting of all segments, which have been successfully validated in the ground test.

ISRO SSLV:

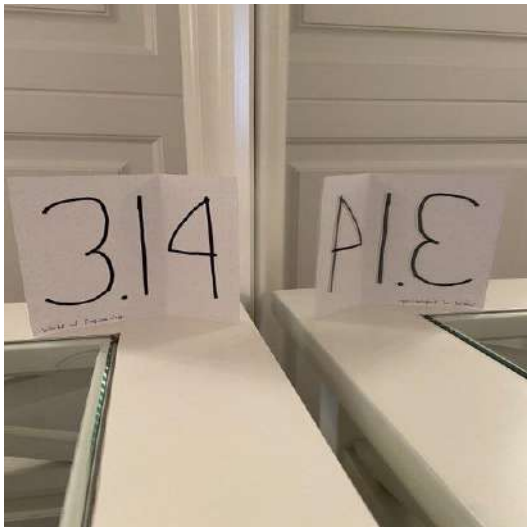
- With the view to cater to the emerging global small satellite launch service market, ISRO has taken up the development of a Small Satellite Launch Vehicle (SSLV). Until now, the launch of small satellites has been dependent on 'piggy-bank' rides with big satellite launches on ISRO's work-horse – the PSLV (Polar Satellite Launch Vehicle) which has had over 50 successful launches so far.
- The chairman of ISRO Dr S Somanath, himself is credited with the design and development of SSLV during his term as the director of the Vikram Sarabhai Space Centre in Thiruvananthapuram since 2018.
- The indigenously designed SSLV can carry satellites weighing up to 500 kg to a low earth orbit. Comparing it with PSLV, the ISRO's work-horse can take up to a 1,750-kilogram payload. During an annual press conference back in 2019, former ISRO chairman K Sivan stated that the SSLV – the smallest vehicle at 110-ton mass, will take only 72 hours to integrate, unlike the 70 days taken

now for a launch vehicle. It is pertinent to mention that the government has sanctioned an amount of Rs 169 crores for the development of the project.

- The SSLV project received a commercial booking from the US space launch services intermediary Spaceflight Inc, back in 2019.

5.11 Pi (03/14) Day – the enigmatic number that changed the course of Humankind

- "Probably no symbol in mathematics has evoked as much mystery, romanticism, misconception and human interest as the number pi" ~William L. Schaaf, Nature and History of Pi.
- Pi or π or 3.14 or 22\7, one of the most enigmatic numbers of the universe which has puzzled many throughout humankind's odyssey to compute, approximate, and understand. To celebrate the unique constant, 'Pi Day' is celebrated on March 14th (3/14) around the world. 14th march is also Albert Einstein's birth date. Also, in November 2019, in its General Conference, UNESCO, announced Pi Day as the International Day of Mathematics.



What is Pi or π?

- Pi is the ratio of a circle's circumference to its diameter. A pi is an irrational number, which means that it is a real number that cannot be expressed by a simple fraction. Pi is an "infinite decimal", which means that after the decimal point, the digits go on forever and ever.
- School Students are usually introduced to the number pi as having an approximate value of 3.14 or 3.14159. Though it is an irrational number, some people use rational expressions, such as 22/7 or 333/106, to estimate pi.
- Over the past centuries, the enigmatic number has applications ranging from simple geometry to space exploration. The number is relevant for anything circular, elliptical and spherical.

Pi: The Most Important Number in the Universe?

- The constant π has great implications in understanding the vast scenarios of the cosmos. For almost 4,000 years, Pi (π) has been there in different cultures across the world. But even if we calculated the number of seconds in those 4000 years and calculated π to that number of places,

we would still only be approximating its actual value. Here's a brief history of the enigmatic number.

- The ancient Babylonians calculated the area of a circle by taking 3 times the square of its radius, which gave a value of pi = 3. One Babylonian tablet (ca. 1900–1680 BC) indicates a value of 3.125 for π, which is a closer approximation.
- After that around 1650 BC, ancient Egyptian mathematics gave some insights in Pi. The Egyptians calculated the area of a circle by a formula that gave the approximate value of 3.1605 for π.
- The Greek letter π was used by mathematicians in the 1700s for the first time. Introduced by William Jones in 1706, the use of the symbol was popularized by Leonhard Euler, who adopted it in 1737.
- Johann Lambert showed in 1761 that π is an irrational number, and later, in 1882, Ferdinand von Lindemann proved that π is not a solution to any polynomial equation with integers.
- Infinite digits of Pi continues to mesmerize mathematics lovers
- The value of Pi has been calculated over 60 trillion digits beyond its decimal point. As an irrational and transcendental number, the value of Pi will continue infinitely without repetition or pattern. While only a handful of digits are needed for typical calculations. Here is a glimpse into how many digits are known and its recent history:
- In 2009, Fabrice Bellard, a French computer programmer calculated the value of pi decimals to 3 trillion.
- In 2010, Alexander J. Yee and Shigeru Kondo calculated the value of pi decimals to 5 trillion.

➢ Shigeru Kondo – 10 trillion, in 2011
➢ Alexander J. Yee and Shigeru Kondo – 12 trillion, in 2013
➢ Sandon Van Ness – 13 trillion, in 2014
➢ Peter Trueb – 22 trillion, in 2016
➢ Emma HarukaLwao – 31 trillion, in 2019
➢ Timothy Mullican – 50 trillion, in 2020
➢ DAViS at University of Applied Sciences of the Grisons – 63 trillion, in 2021.

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