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PIONEER ACADEMY's
PATHFINDER
CURRENT AFFAIRS FOR CIVIL SERVICES

INDEX

Topic 1. GM MUSTARD FIELD TRIALS TO BEGIN FROM RABI SEASON

Important for subject: Science and Technology

The field trials for DMH-11, the GM mustard-based hybrid DMH-11 were granted.

- Approval for "environmental release" through an organization called the Genetic Engineering Appraisal.
- Committee (GEAC) has announced that it will begin its work from the current rabi season.
- The trials, referred to in the field as "performance-evaluation trials will be conducted under the supervision of under the direction of the Directorate of Research in Rapeseed-Mustard (DRMR), Bharatpur, Rajasthan, as per the Indian Council of Agriculture Research (ICAR) rules and guidelines.
- The ICAR-DRMR is the responsible agency of the India-wide Coordinated Research Proposals focused on Rapeseed-Mustard in the United States.

Genetically Modified Mustard (DMH-11)-

- The CGMCP researchers have used this barnase-barstar GM technology to They have created what they claim to be a viable and robust hybridisation system for mustard.
- This method was utilized to develop DMH-11 via crossing of a very popular Indian mustard
- Variety called 'Varuna' (the the barnase line) that has the East European 'Early Heera-2' mutant (barstar).
- DMH-11 is said to have produced an average yield of 28% an increase over Varuna during contained field trials conducted in the Indian Council of Agricultural Research (ICAR).

Advantages:

- Genetically modified seeds can increase yields of plants by 28 percent.
- Reduces India's import costs. It helps in limiting the rise in food prices

Disadvantages:

- A few businesses are responsible for developing or selling seeds that have been modified.

- With close to monopoly power which means there aren't many options to the purchasing seeds.
- Seeds cannot be planted again i.e. every plantation has to be purchased new seeds.
- They may reduce the diversity of species.
- The third concern is GM mustard that could undermine or threaten the Honey bee population.
- Mustard flowers are a great source of nectar for honeybees and numerous other pollinator insects.
- Development of a Genetically Modified variety of Mustard.
- The most compelling reason could be India's growing edible price for oil.
- The country only produces 8.5-9 million tons (mt) of oil for cooking each year.
- While import 14-14.5 millimeters, which resulted in record exchange rates of $18.99 billion during the fiscal year that ended on March 31, 2022.

About the Mustard crop

- One of the most important and well-known winter oilseed crops in India is mustard.
- It is mostly produced in India's northern plains although there are some.
- The Eastern region of the country, and It belongs to the crucifer family that includes many cultivated relatives species.
- Toria, Yellow Sarson, Brown Sarson, Gobhi Sarsonor Canola, and Black Mustard and Banarasi Rai are among the other crops that are included in the" Rapeseed & Mustard" group.
- The small brown or yellow seeds contain an oil content that can range from to 45%..
- The cake, which has been de-oiled, is then fed to animals.
- Conditions of the climate that are needed for mustard Subtropical climates are perfect for Growing mustard Because it thrives in hot, dry climate it is usually harvested in the Rabi season is upon us.
- Temperature range- 10 deg0C to 25 deg0C.
- Annual rainfalls ranging between 625 and 1000 mm.
- This crop requires the clear skies and absence of frost, as it will not survive the cold.
- The content of oil in seeds is increased by various circumstances, such as cold temperatures, sun, and enough humidity.

- Soil Alluvial Loamy soil ideal for mustard
- **The Top Ten Mustard producing countries:** Nepal, Canada, Russia, Myanmar, Ukraine, United States of America, China, Kazakhstan, France, Czech Republic.
- **The Top Ten Mustard producers in India:** Rajasthan, Haryana, Madhya Pradesh, Uttar Pradesh, West Bengal, Gujarat, Jharkhand, Assam, Bihar, Punjab.

Topic 2. TRIPS

Important for subject: Science and Technology

The WTO's TRIPS council will meet to discuss IP waivers in Covid therapy and diagnostics this week in order to make a decision on this critical issue before the deadline of 17 December.

- In the 12th WTO Ministerial Conference a temporary IP waiver for Covid-19 vaccines was extended with specific conditions.
- However, a final decision on therapeutics and diagnostics was put off by six months, until the 17th of December.

Current Waiver position:

- It only waives the provisions of Article 31(f) in the TRIPS Agreement.
- 31(f) in the TRIPS Agreement stipulates that the bulk of the product is not to be sold to export countries.
- This restriction restricts the distribution of vaccines under compulsory licences to countries that aren't able to produce them.

- This means that the waiver allows to export only vaccines with an obligation-based license.
- A mandatory license is granted to permit an outside party to manufacture pharmaceutical products that are patent-protected, including medicines.
- Example Globally, the production of vaccines is concentrated in just a few countries, which includes India.
- This means that Indian businesses can use an obligation-based licence in accordance with the Indian Patents Act to export a small portion of the production however, not the majority of it.
- This waiver is not beneficial to Indian vaccine manufacturers.
- In Section 92 of the 1970 Indian Patents Act, the central government is granted the authority to permit the issuance of compulsory licenses anytime at time in the event an emergency in the country or situations that require urgent need.

Trade-Related Aspects Intellectual Property Rights (TRIPS) agreement:

- The TRIPS agreement was reached in 1995 in the WTO and stipulates that all the signatory countries to adopt domestic laws.
- The TRIPS Agreement is described as an "Berne and Paris-plus" Agreement.
- The TRIPS Council is responsible for governing and monitoring the implementation within the TRIPS Agreement.
- It provides the minimum standard for IP protection.
- TRIPS defines minimal standards for the access as well as the use of seven types of intellectual property,namely trademarks, copyrights, trademarks geographical indications patents, industrial designs plans for integrated circuits and unreleased information or trade secrets.
- It applies the basic international trade rules regarding intellectual property for member states.
- TRIPS Agreement lays down the permitted exceptions and limitations to balancing the rights of intellectual property and the public health interests and development economics.
- In 2001 the WTO was the first to sign The Doha Declaration, which stated that in the event of an emergency situation involving public health, governments can compel

companies grant their patents over to producers even if they do not consider the price offered to be acceptable.

- This clause, often called "compulsory licensing", was built into the TRIPS Agreement. The Doha declaration clarified only the application.
- Intellectual rights to property are usually divided into two major areas:

Copyright and other rights that are related to copyright:

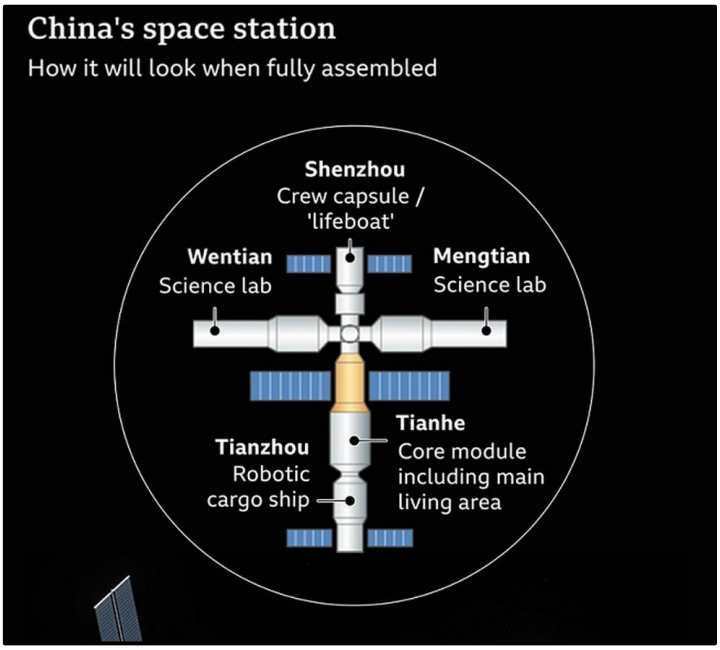
- The rights of the authors of artistic and literary work (such as books, other compositions of music, writings and paintings, sculptures computers, films and computer programs) are covered by copyright for a minimum time of 50 years following their death. writer.
- It also safeguards artists' rights (e.g. musicians, actors and singers) and producers of Phonograms (sound recordings) as well as broadcasting organisations.

Industrial property:

- It relates to protecting distinctive marks including trademarks, as well as geographical designations.
- Other kinds that are industrial properties protected to spur design, innovation and development of technology.
- This category includes inventions (protected by patents) industrial designs, trade secrets.
- Article 8 permits members to take measures that are necessary to advance the public's interest, which includes to safeguard public health - insofar as the actions are in line to the TRIPS Agreement.
- The flexibility identified by the Doha Declaration include "the right to grant compulsory licences".
- A license that is compulsory is granted by a government agency or a court for certain use of a patent invention without the permission of the patent owner.
- The Article 31bis in the TRIPS Agreement provides full legal force to this system , and permits generic medicines at a low cost to be made and sold under a compulsory license exclusively to serve the needs of nations that can't manufacture these products on their own.

Topic 3. CHINA LAUNCHES FINAL SPACE STATION MODULE 'MENGTIAN'

Important for subject: Science and Technology



Recently, China launched its last space station module called 'Mengtian by means of the Long March-5BY4 rocket carrier.

What's the "Mengtian" module:

- The word "Mengtian" means "dreaming of the heavens".
- The third module is final module of the Tiangong space station.
- This module anticipated to remain operational for a period of 10 yearsor more.
- It's one of the second of two modules which will house the research labs necessary for conducting research.
- Mengtian weighs approximately 23 tons. He measures 17.9 meters long, and has a the diameter of 4.2 meters..
- The module is connected to Tianhe, the main module as well.
- It is expected to complete the T-shaped design that is the station, along with the second modules Wentian.
- Mengtian will have workstations to support research related to microgravity research as well as advanced scientific research that focus on combustion, fluid physics and materials science as well as space technologies.

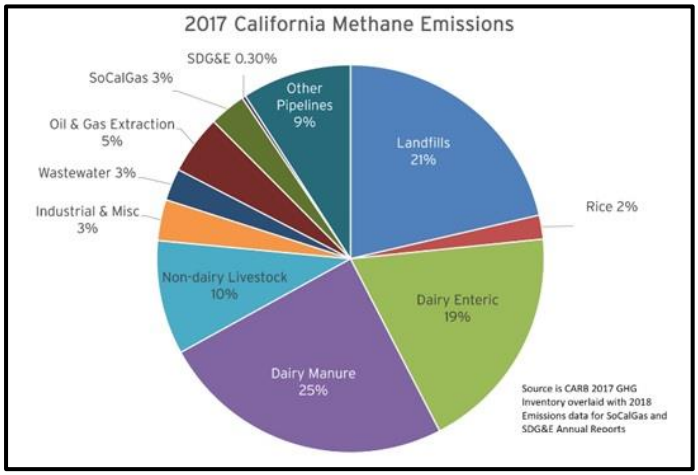
- It will create the atmosphere of pressure that is required to conduct experiments in freefall or at zero gravity and could not be carried out on Earth for more than a couple of minutes.
- It will also facilitate experiments in exposure to cosmic rays, space-based environment as well as solar winds and vacuum.

What is the Tiangong Space Station?

- It is the Tiangong Space Station is one of the Chinese space station that was built in low Earth orbit .
- It is between 350 and 450 kilometers above the surface of the earth.
- It is part of the China Manned Space Program and is the first country-wide permanent space station.
- Three of the three elements comprise the Tiangong Space Station are The Tianhe means "Harmony of the Heavens" is the central module.
- Wentian is a reference to "Quest for the Heavens"is an experimental cabin module.
- Mengtian is a Chinese word meaning "Dreaming of the Heavens" is an experiment module.
- Once fully functional, space station Space Station China will become the third nation in history to have sent astronauts and spacecraft into space, as well as to construct an space station, following Russia as well as the US.
- It's one-fifth of the volume that is the International Space Station.

Topic 4. TRACKING METHANE EMISSIONS FOR MITIGATION

Important for subject: Science and Technology



Satellites monitoring methane emissions show that landfills are responsible for more than 25 percent of methane emissions in Mumbai and the 6% emissions in Delhi.

Exhaustion of Methane

- Methane Methane is an short-lived climate force (SLCF), a chemical that cools or warms the Earth's climate in shorter time intervals ranging between days and years as opposed to greenhouse gases such as carbon dioxide, which's climate effect can last for years hundreds of years or more.
- Methane's lifespan on the planet of approximately 10 to ten years. But per molecule it's a stronger greenhouse gas in the period of.
- This is the reason it's at the root of a significant portion of the temperature rise we're experiencing now.
- The Global Methane Assessment 2021 declares that the concentration in the atmosphere in methane nearly doubled from pre-industrial times.
- Methane is the second most important ingredient in importance to carbon dioxide (CO2) in driving climate change.
- Reducing global warming by 1.50C or possibly 20C will require massive, fast, and sustained reductions in greenhouse gases, like methane.
- This is in addition to rapid reductions in CO2 emissions until they are net-zero.

The sources for Methane emissions

- Methane is created through the decay or breakdown of organic matter.
- It can be released into the air through natural processes like the decomposition of plant matter in wetlands, the leaking of gas out of underground deposits, or the digestion of animal food by cattle or human-related activities, for example, gas and oil production and rice farming, or the management of waste.
- The majority of all global methane emission originate from human activities in three areas that include the fossil-fuel industry (35 percent in human-based emission), waste (20 percent) as well as agricultural production (40 percent).

Urban landfills generate emissions-

- A scientific study has shown that any landfill deeper than six metres could produce methane.

- Methane monitoring satellites have shown that landfills were responsible for more than 25 percent of methane emissions in Mumbai and the 6% emissions in Delhi.
- Scientists from IITM, Pune found that the emissions of fossil fuels and microbial toxins are the two main sources of methane in Pune.
- Natural gas is the most dominant sector of the fossil fuel industry as was the waste industry, which was the largest contributor to Microbial emissions.
- In Pune the pollution from landfills is quite high in comparison the other resources.
- The cause could be methane that is found in CNG pipelines, CNG stations and gas pipelines for CNG and must be studied
- Waste disposal sites in Kolkata (Dhapa), Mumbai (Deonar) and Delhi (Bhalswa and Ghazipur) are frequently on the news due to landfill fires.
- It is the cause of greenhouse gas emission.
- It also contributes to local pollution within the region.
- In winter, the temperature is able to rise slowly due to the low temperatures.
- Therefore, any smoke or pollution that is released can remain within the layers below for extended time periods..

Why are these landfills methane hotspots?

- The reason is that these landfills located in India were not designed scientifically when they were first created.
- They do not have bottom liner or the gas-harvesting systemduring the construction of landfill.
- Recycling and collection of waste gas (methane emission) remains a technological issue.
- There is also no specific organization that can preserve the past of disposal of waste in landfills.
- This leads to an overestimation of the amount of landfill gas.
- The exaggeration of the concentration of landfill gas resulted in the claim of more carbon credits for Mumbai's Gorai landfill closing and gas capture project that was implemented under the Clean Development Mechanism framework, the largest carbon offset program that was established in Kyoto Protocol. Kyoto Protocol.

Methane emission monitoring

- The Instrument TROPOMI aboard the Copernicus satellite of the European Space Agency. Sentinel-5 precursor satellite and GHGSat's space-based emissions monitoring system are used to identify the location, quantify, and identify emissions from methane-rich point sources all over the world.
- By using this method by focusing on methane emissions, they have identified areas of high concentration within Buenos Aires, Delhi, Lahore and Mumbai.

Emission mitigation

- Landfills could be an ideal target for emissions reduction.

MethaneSAT

- It is an scheduled New Zealand-American space programcurrently set for its launch by 2023.
- The mission is expected to function as an Earth observation satellite which will analyze and monitor methane emissions around the world to fight climate changes.
- It seeks to monitor not just the methane emissions rate and the location of methane emissions, but also the way in which those emissions change.
- The mission is co-funded and managed through the Environmental Defense Fund (EDF) the American non-governmental organization, as well as New Zealand Space Agency.

New Zealand Space Agency:

- This is New Zealand's first space-based science mission.
- These observations can be of value to projects such as such as the International Methane Emissions Observatory (IMEO).
- The International Methane Emissions Observatory (IMEO) was established during the G20 Summit, on the day before the conference COP26.
- UN climate conference.

- IMEO will take the global reporting of methane emissions to a completely different level, while ensuring the public transparency about methane emissions anthropogenic to humans.
- IMEO will initially concentrate specifically on the methane emission from fossil fuels sector before expanding to other sectors that emit methane like waste management and agriculture.

Global Methane Pledge

- The Global Methane Pledge was launched during the current UN COP26 climate conference in Glasgow.
- This is an effort that is led together by both the United States and the European Union.
- Methane happens to be the second-highest greenhouse gas in the atmosphere, second only to carbon dioxide.
- Consequently, the pledges aimed at reducing its emissions are important.
- The pledge was made public at the beginning of the month of September in 2021by the US and EU.
- It is in essence an agreement to cut down on worldwide methane emission.
- One of the main goals of the agreement is to reduce methane emissions up to 30 percent from levels in 2020 until 2030.
- One of the signatories are Brazilas being one of the five major producers methane,
- that is produced by the digestive tracts of cows which is produced in landfill waste, in the production of oil and gas.
- Three other countries including China, Russia and India-They haven't signed up yet.
- Australiahas declared that it will not be backing the pledge.
- According to the most recent Intergovernmental Panel on Climate Change report, methane contributes to around 50% from the 1.0 degrees Celsius net increase in global average temperature since preindustrial period.

Topic 5. BUREAU OF ENERGY EFFICIENCY (BEE)

Important for subject: Science and Technology

It is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation

- Five of the major provisions in EC Act relate to Designated Consumers, Standard and Labelling of Appliances, Energy Conservation Building Codes, Creation of Institutional Set-up (BEE) as well as Establishment of Energy Conservation Fund.
- The mission of the agency is to create programs that can improve the efficiency and conservation utilization for energy resources in India.
- The government has suggested that it be made obligatory that certain devices in India to be rated through BEE. BEE beginning in January of 2010.
- The principal goalwould consist of decrease the energy intensity in the economic system.

- The purpose will be to "institutionalise" energy efficiency services, facilitate delivery mechanisms to be implemented in the country, and lead to improve energy efficiency across every sector of the country.

Mandatory Appliances

- Frost Free (No-Frost) Refrigerator
- Tubular Fluorescent Lamps
- Room Air Conditioners (Cassette, Floor Standing Tower, Ceiling, Corner AC)
- Distribution Transformer
- Color TV
- CST AC
- Direct Cool Refrigrator
- Electric Geyser

Topic 6. ISRO'S RISAT-2 SATELLITE MAKES RE-ENTRY INTO EARTH'S ATMOSPHERE

Important for subject: Science and Technology

ISRO's RISAT-2 satellite launched in 2009 It has experienced an uncontrolled return to the earth's atmosphere to the Indian Ocean near Jakarta.

No explosion expected

- After its injection, RISAT-2's radar payload services were offered for a variety of applications in space.
- At the time of re-entry, there was no fuel within the satellite.

- Therefore, there were no contaminations nor the possibility of explosions caused by fuel.
- The results of studies confirmed that the fragments produced by the aerothermal separationwould not be able to withstand re-entry heating, and therefore no fragments would have been able to impact Earth.
- The orbital data via USSPACECOM were frequently used to determine the time of re-entry time and the impact
- The Indian System for Safe and Sustainable Space Operations Management (IS4OM) facility at ISTRAC, Bengaluru had been keeping track of the re-entry's progress for the past month using analysis performed through VSSC along with ISTRAC teams using its internal analysis software monitoring the target using Multi-Object
- Tracking Radar (MOTR) at SDSC, Sriharikota.

About the Radar Imaging Satellite-2 (RISAT-2)-

- The satellite is one of the Indian radar imaging satellite, which formed part of the Indian RISAT program.
- It was first launched by the PSLV-C12 launch vehicle, which was launched 13 years ago, in 2009.
- The satellite's mass is of 300kg (660 pounds).
- It is the first satellite specifically designed for reconnaissance.
- RISAT-2 was designed in a rapid pace following the attacks of 2008 Mumbai attacks because of a delay in the C-band that was developed in-house for the RISAT-1.
- The introduction of RISAT-1 occurred several years after the launch of RISAT-2.
- In the the RISAT-2 mission was prioritized over the RISAT-1 mission in the aftermath of the attacks of 2008 in Mumbai. Mumbai attack, resulting in the RISAT-1 mission being delayedby many years.
- The main sensor in the RISAT-2 mission was a synthetic-aperture radar (SAR) from Israel Aerospace Industries (IAI).

Technical capabilities

- RISAT-2 was the first Indian satellite equipped with a synthetic aperture radar (SAR).
- It is equipped with night and day as well as an all-weather tracking capability.

- Possible applications include monitoring ships that are hostile at sea which are considered to be as a threat to the military of India.
- It is intended to keep track of India's borders as an element of anti-infiltration as well as anti terrorist activities.
- ISRO claimed that the initial planned lifespan for the satellite had been only four years, thanks to the proper maintenance of the orbit and proper mission planning by the team responsible for spacecraft operations at ISRO and the efficient use of energy, the RISAT-2 satellite was able to provide valuable payload information for 13 years.

About Indian System for Safe and Sustainable Space Operations Management (IS4OM)-

- The control center will facilitate the increased tasks planned to support space Situational Awareness and Management (SSAM) in context of the ever-growing debris load along with operational satellite assets.

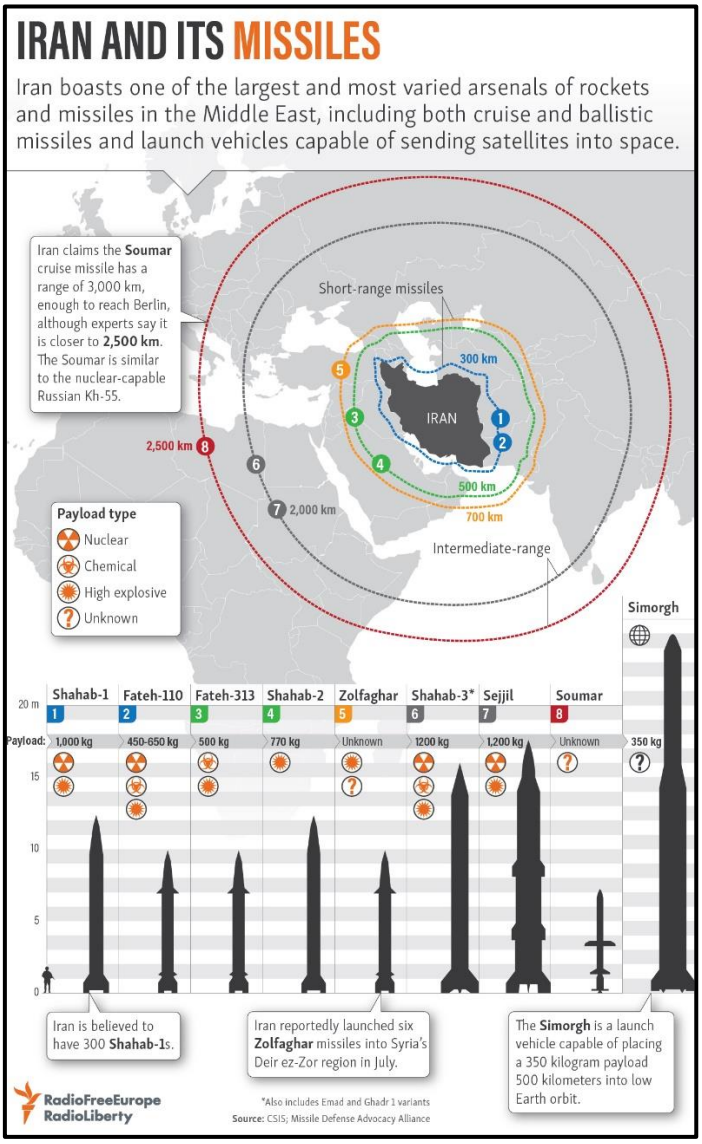
IS40M will be able to undertake

- Monitoring and observation of space objects as well as the space environments, Processing the observations to aid in determination of orbit Cataloguing and characterization of objects Analysing the evolution of the space environment Assessment of risk and mitigation Collaboration and exchange of data.
- The system will protect the security of all Indian Space assets by reducing dangers of collision from space objects by specific orbital maneuvers and in compliance with international standards for post-mission disposal and satellite ending-of-life operations.
- It will incorporate the tracker data from inactive satellites from the local observation facilities, and then generate useful data from observations
- Through an analysis.
- To ensure the sustainability of space the control centre will allow research in the removal of space debris, active modeling and mitigation.
- IS4OM facility will help India in attaining it goals of SSA (Space Situational Awareness) goals by providing accurate and up-to-date information about the environment of space to users.

- Space Situational Awareness (SSA) refers to the ability to understand the environment of space, including the position and purpose of space objects as well as space weather phenomenon.
- SSA is usually thought of as covering three principal areas including Space Surveillance and Tracking (SST) of human-made objects.

Topic 7. IRAN TESTS SATELLITE-CARRYING ROCKET

Important for subject: Science and Technology



Iran's Revolutionary Guards tried a new satellite carrying rocket.

- Washington is concerned that the long-range, ballistic technology used for launching satellites into orbit could be used to launch nuclear warheads.
- About Ghaem100-

- The Ghaem 100 is Iran's first three stage launch vehicle.
- It can place satellites with a weight of 80kg in an orbit that hovers 500km above the earth's surface.
- The flight testing of this satellite carrier equipped with a solid fuelled engine was successful.
- According to the report, the rocket will be used for launch Iran's Nahid satellite at the telecommunications minister,.
- Iran's missile program
- Iran has one of the largest missile programs in the Middle East.
- However, has experienced several failed satellite launches over the years. This was attributed to technical problems.
- UN resolution calling on Iran to stop work on ballistic missiles designed to deliver nuclear weapons for up to eight years.
- A 2015 U.N. resolution called for Iran to stop working on ballistic missiles that could deliver nuclear weapons. This was in accordance with six other world powers.

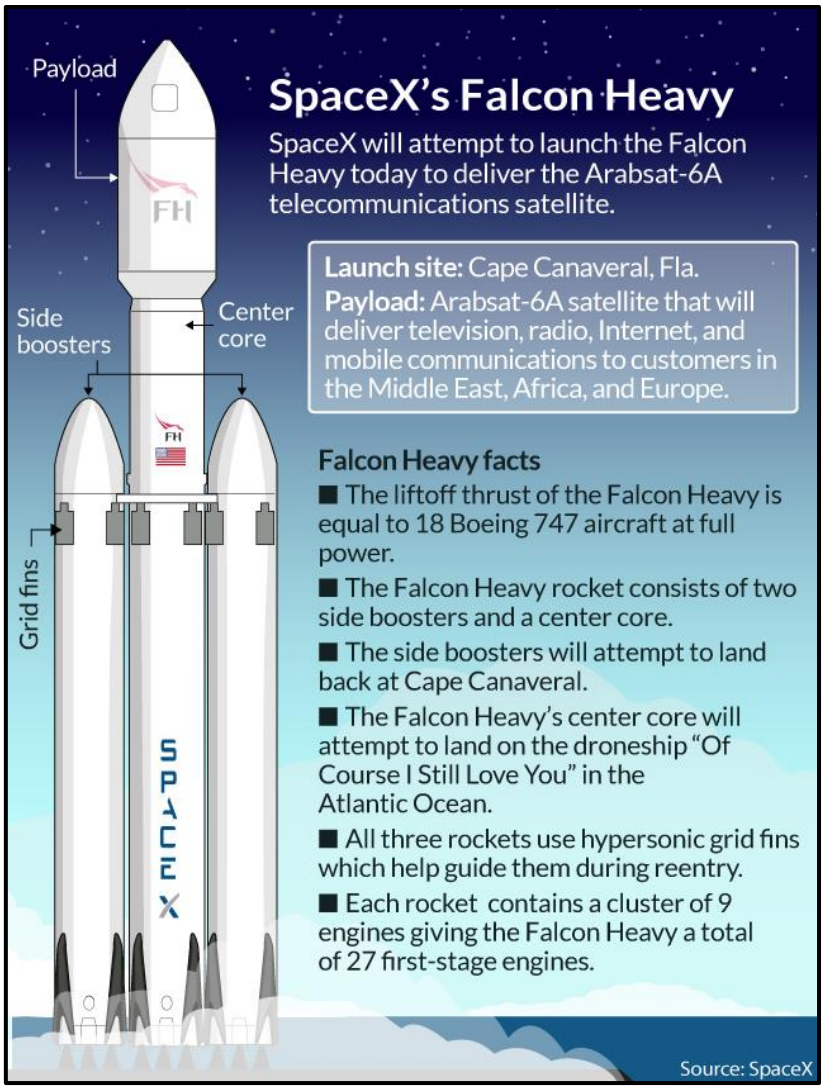
What was the 2015 Iran Nuclear Deal?

- Informally, the deal is known as the Joint Comprehensive Plan of Action.
- The JCPOA was the product of long negotiations between Iran and the P5+1 (China France Russia Russia) in 2013 and 2015.
- Iran was required to drastically reduce its stockpiles of heavy-water, enriched uranium, and centrifuges as key components for the nuclear weapons program.
- Iran also accepted to implement a protocol which would allow inspectors from all over the world to access the
- International Atomic Energy Agency to gain access to its nuclear sites in order to prevent Iran from developing nuclear weapons in secret.
- The West has agreed to lift the sanctions on Iran's nuclear proliferation.
- However, there are still other sanctions that address alleged human rights abuses and Iran's missile program.
- The US pledged to lift sanctions on oil exports, however, it continued to restrict financial transactions which has deterred international commerce with Iran.
- After years of inflation, currency depreciation and recessions, Iran's economy stabilized after the agreement was in effect. Iran's exports also increased significantly.

- Israel isAmerica's closest ally.
- Strongly rescinded the deal. and other countries, such as Iran, a great regional rival, complained that they weren't involved in negotiations despite the fact that Iran's nuclear program posed security threats for all countries in the region.
- Trump ended the deal and reinstated oil and banking sanctions.
- Iran then ramped-up its nuclear program in earnest and returned to 97% of its pre2015 nuclear capabilities.

Topic 8. FALCON HEAVY LAUNCH

Important for subject: Science and Technology



Launch of the Falcon Heavy: The most powerful operational rocket anywhere in the world.

What specifications are there for the Falcon Heavy rockets?

- SpaceX claims that Falcon Heavy is the strongest rocket today by two. Falcon Heavy has a lift capacity of 64 metric tonnes and can carry twice as much payload into orbit than the Delta IV Heavy.

When was the Falcon Heavy launched last?

- SpaceX's Falcon Heavy rocket was launched in June 2019 by NASA's Kennedy Space Center. It was carrying 24 satellites in the Space Test Program-2 of the Department of Defense.

What about other Falcon Heavy launches?

- The Falcon Heavy was introduced in 2018 by SpaceX CEO Elon Musk, who sent his red Tesla Roadster (an electric sports car with an occupant driver) into space as a test payload.

Geosynchronous orbit:

- A sweet spot is a place above the Earth that allows a satellite to match the same orbit as the Earth. This is called , a geosynchronous orbit.
- You would view the satellite as if you were an observer at the ground.
- Geosynchronous satellites are therefore particularly useful in remote sensing and telecommunications.

Geostationary Orbit:

- Geosynchronous satellites can be at any angle.
- However, their key distinction from geostationary orbits is that they lie in the same plane with the Equator.
- Geostationary orbits are in the same category as geosynchronous orbits .
- However, they're parked above the Equator.
- This unique quality is what makes different from geosynchronous orbits.
- Weather satellites such as GOES have constant views of the same area and are placed in geostationary orbits. It's useful for searching and rescue beacons as well as in a high Earth orbit.
- Here are the orbits of both.

- The geostationary orbit is located on the same plane with the equator.
- However, the inclined satellites are different.
- This is the main difference between the two types.

Semi-Synchronous Orbit

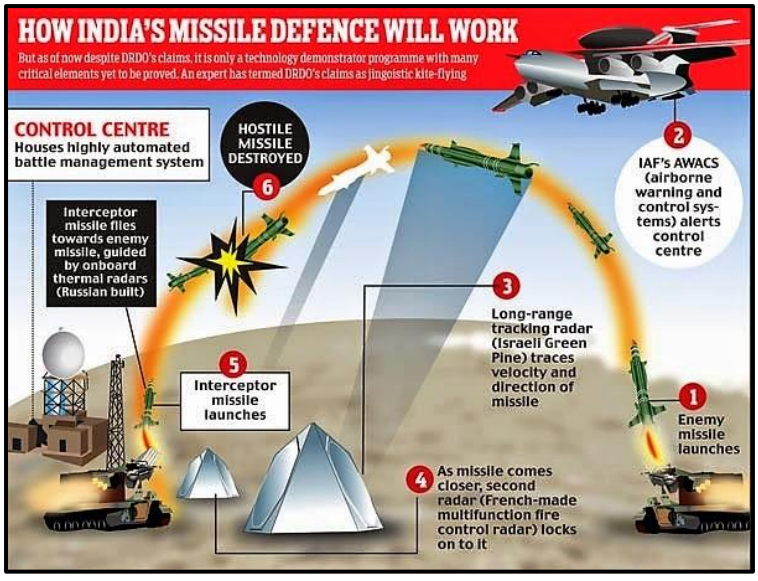
- Global Positioning System satellites can be found in another sweet spot called semi-synchronous orbits.
- Semi-synchronous orbits are faster than geosynchronous orbits (24 hours) and match the Earth's rotation (24 hours).
- Semi-synchronous orbits, which are about 20,200 kilometers above Earth's surface, have a 35,786 km elevation. They are now in the medium Earth orbit range, which is the lowest of all three classes.
- These orbits are close in eccentricity to zero, which means they are near circular.

How stretched are orbits defined by eccentric orbits?

- The orbit is closer to a circle the closer it is to zero.
- The orbit gets longer and more skinnier the closer it is to one.

Topic 9. INDIA SUCCESSFULLY TESTS BALLISTIC MISSILE DEFENCE INTERCEPTOR CAPABLE OF NEUTRALIZING LONG-RANGE ADVERSARY MISSILES

Important for subject: Science & Technology



The Defence Research and Development Organisation (DRDO) conducted the first successful flight test of Phase II Ballistic Missile Defence (BMD) interceptor AD-1 missile with a massive kill altitude bracket, from APJ Abdul Kalam Island. APJ Abdul Kalam Island off the coast of Odisha on November 2.

Information about AD-1 missile

- The system, capable of destroying incoming enemy missiles and aircraft was developed as part of the Ballistic Missile Defence programme.
- AD-1 (Air Defence) AD-1 (Air Defence) is a long-range interceptor missile that is designed to be used for low-exo-atmospheric as well as endo-atmospheric intercepting of ballistic long-range missiles and aircraft.
- The missile is powered by the dual-stage motor and comes by the indigenously created advanced control system, as well as an algorithm for navigation and guidance that precisely guides the vehicle towards the targets which move at extremely high speed.
- The defense system for ballistic missiles was equipped with powerful radarsand could be able to shield large areas from enemy missiles, or air attacks.

India's Ballistic missile defence (BMD) programme

- Development of missiles that are antiballistic believed to have begun with the DRDO during the late in the 2000s (after in 1999's Kargil war) due to the growth of ballistic weapons by Pakistan along with China.
- The first phase of the programme was believed to be completed by the end of 2010 and consisted of the most advanced air defence systems as well as air defence systems that were based on the Prithvi missile.
- Pradyumna Ballistic Missile Interceptor will be replacing that of the Prithvi air defence according to DRDO.
- AAD's next phase concentrates on the creation of anti-ballistic defense systemlike the American Theatre High-Altitude Area Defence technology, which can neutralize intermediate-range ballistic missiles. Akash Surface-to-Air Missiles (SAM) is part of AAD.
- AD-II AD-II, which can neutralize missiles with even greater distances, is believed to be in testing.
- India also has conducted their first successfully anti-satellite (ASAT) test in the context of Mission Shakti in March of 2019.

Ballistic Missile

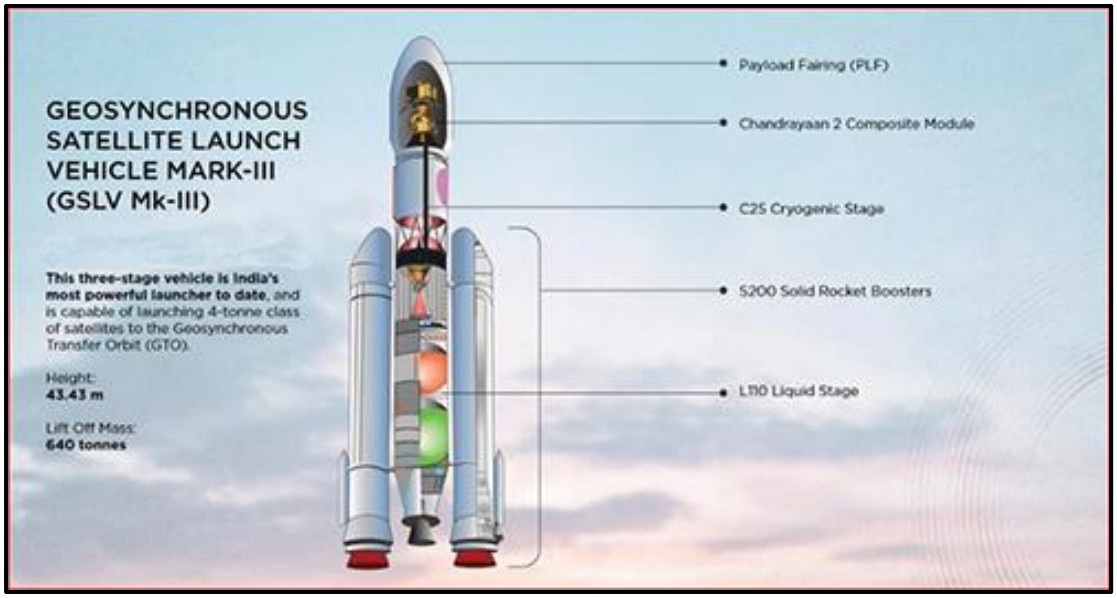
- Ballistic missiles follow the ballistic path to launch at least one warhead at the predetermined area.
- It is a self-guided rocket-powered system for strategic weapons that follows a ballistic path to carry the payload from its launch location to a target that is predetermined.
- They are only guided for brief periods of time, and the majority of the time, they are not powered.
- Ballistic missiles with short range stay in the atmosphere of the Earth, while the intercontinental ballistic weapons (ICBMs) can be launched from sub-orbital orbits.
- They fall into the same category as cruise missiles that are guided by aerodynamics with a powered flight.
- They are launched from ships, aircrafts and submarines, in addition to silos on land or mobile platforms.
- Ballistic missiles may be equipped with conventional explosives, as in addition to biological, chemical or nuclear weapons.
- Ballistic Missile Classes and Range

Difference Between Ballistic Missiles and Cruise Missiles

- In contrast to the long-arcing path of ballistic missile cruise missiles travel at lower altitudes, and has longer, straighter paths.
- Cruise missiles do not quit the air at any point in their flight, and neither are they powered for any time period.
- Cruise missiles can be fired either from the sea, land, or air for land-based attacks as well as anti-shipping, and can be launched at subsonic, supersonic and hypersonic speeds.
- A cruise missile is either able to locate its target or has a pre-set target.
- Because they are so close to the earth's surface They are not able to be easily detected by anti-missile systems.
- They are specifically designed to carry huge payloads, with high-precision.

Topic 10. GSLV MKIII LIFTS INDIA INTO A NEW ORBIT IN SATELLITE LAUNCHES

Important for subject: Science & Technology



What is ISRO's GSLV Mk III?

- India's biggest rocket launcher the GSLV MkIII is the third generation rocket developed by the Indian Space Research Organisation (ISRO).
- The idea to create this satellite has been approved since 2002 with the aim of achieving the capacity to launch a class four satellite to Geosynchronous orbit.
- With a weight of 641 tonnes, which is the equivalent of a huge airplane, GSLV (Geosynchronous Satellite Launch Vehicle) MkIII launched its first launch on the 5th of June 2017 at the Satish Dhawan Space Centre in Sriharikota.
- The launcher is capable lifting satellites of four tonnes in geosynchronous transfer orbit (GTO) and around 10,000 tonnes into Low Earth Orbit (LEO).
- The rocket's weight is estimated at 400 crores.

ROCKET'S SETTINGS

- GSLV MkIII is configured as three-stage vehicle, with two motors that are strap-on solid (S200) as well as a Liquid Core Stage (L110) as well as an ultra-thrust cryogenic upper stage (C25).
- The S200 solid motor is one of the largest solid boosters the worldwith the capacity of 204 tonnes of propellant solid.

- The L110 stage is equipped with the twin engine configuration that includes an armamentarium of 115 tonnes of liquid propellant as well as the C25 is equipped with the full-autonomous high-thrust cryogenic engine (CE20) with the propellant loading at 28 tons.
- The total dimension of this vehicle measures 43.5 meters with the total liftoff mass of 664 tonnes and an five-meter-diameter payment fairing.
- The cryogenic stage is powerful and allows it to deploy massive payloads into LEO at an altitude of 600 km as demonstrated during the launches of 36 satellites from OneWeb.

Launch vehicles other than HTML0 from ISRO

- India includes two launchers that are operational which include the reliable and the most stable launcher Polar Satellite Launch Vehicle (PSLV), and the GSLV. The next variant of GSLV is GSLVMkIII.

Relevance of GSLV's most recent launch

- The Chandrayaan-2 spacecraft was launched on June 22, 2019 into its intended orbit. the perigee (nearest point to Earth) of 169.7 km and an apogee (farthest point from Earth) at 45,475 kilometers.
- It was an extremely complicated mission.
- It was a major technological advancement compared to prior missions of ISRO that comprised of three components: an Orbiter, Lander and Rover to investigate the previously unexplored South Pole of the Moon.
- The recent launch success of OneWeb satellites has made India an affordable location for commercial satellites.

The next big goal for the GSLV Mk-III

- The GSLV MkIII is regarded as the vehicle used to launch Gaganyaan. Gaganyaan project, which aims at transporting three crew members to LEO and bringing them back securely to an established site on Earth.

Where do India is today on the satellite launch market?

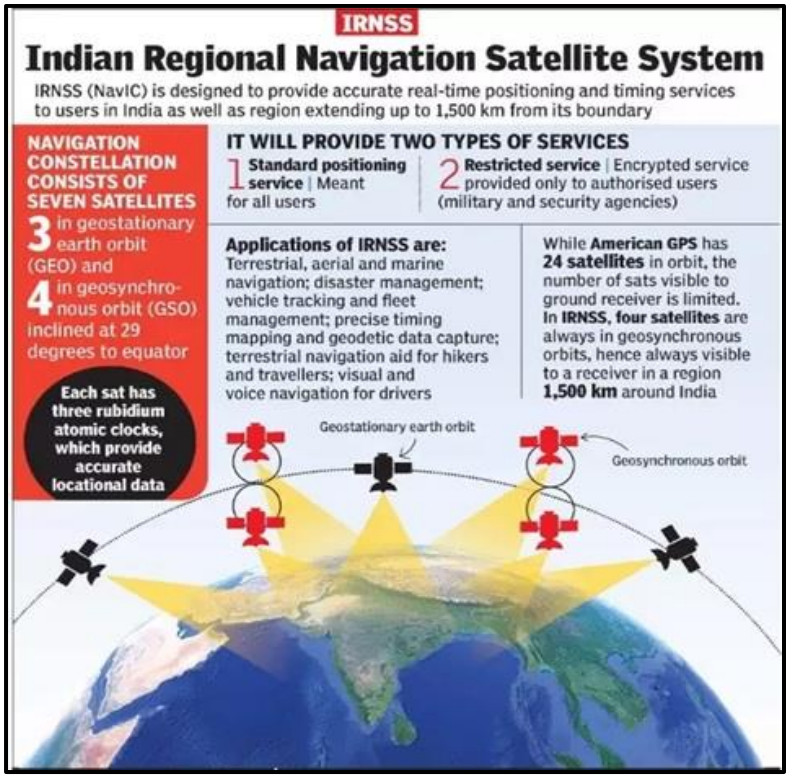
- The ISRO through its commercial arm has earned $ 279 million (as as of July 2022 information) as foreign currency earnings by the launch of satellites for clients around the world.
- ISRO has provided launch services for customers' satellites from 1999 More than 350 satellites of customers from over 30 different countries were launched through PSLV.
- With the announcement of OneWeb,GSLV has made a huge entry into the commercial launch market for satellites with heavier weights.

Corporate arms from ISRO-

- Antrix Corporation Limited is an Indian state-owned corporation that is under the administrative oversight by the Department of Space.
- It was established within October 1992 as an ISRO-owned marketing and commercial part of ISRO through prompting commercially delivering and marketing services and products coming from ISRO.
- New Space India Limited (NeSL) is an Public Sector Undertaking of the Government of India and the commercial branch of the Indian Space Research Organisation.
- It was created on March 6, 2019 under the administrative oversight by the Department of Space and the Company Act 2013.
- IN-SPACe is an independent nodal agency, endorsed by the Union Government and will be managed by the Department of Space.
- This organization is expected to serve as a bridge to connect ISRO as well as the Private Space Sector that is based in India.
- In the Indian National Space Promotion and Authorisation Centre, private companies will be permitted to conduct activities in space, and to use the facilities and equipment from the Department of Space (DoS) to create creating the manifest for launch.

Topic 11. CHINA'S HOME-GROWN BEIDOU SATELLITE SYSTEM EYES GLOBAL FOOTPRINT

Important for subject: Science and Technology



China on the 4th of November, 2022, laid out plans to expand the coverage of its own Beidou GPS satellite system. described as a possible alternatives to the US's Global Positioning System (GPS).

- A white paper issued from the Chinese government stated that Beijing has been "strengthening regional cooperation with organisations such as ASEAN, the African Union, the League of Arab States, and the Community of Latin American and Caribbean States".
- Beijing is since the year 2020 also launched an attempt to reach South Asia and has already begun
- Working, or in discussions with, several countries within the region which includes
- Pakistan, Nepal, Bangladesh and Sri Lanka, over adopting the Beidou satellite (BDS) navigation system.
- They are the Belt and Road (BRI) countries are their first priority.

The Beidou satellite (BDS) navigation system

- The navigational system in China, BeiDou Navigation Satellite System China is based on satellites to give a positioning accuracy of less than 10 meters.
- Chen Fangyun and his colleagues were the first to come up with the idea of an Chinese satellite navigation system in the early 1980s.
- BeiDou Satellite Navigation Experimental System BeiDou Satellite Navigation Experimental System, often known as BeiDou-1 was the initial BeiDou Navigation Satellite System in China.
- BeiDou Navigation Satellite System China consisted consisting of three satellites that started providing restricted coverage as well as navigation around the year 2000.
- They provided navigation services most notably to the consumers within China and its surrounding regions.
- In December of 2011,China launched the second versionof the system.
- It is called"the BeiDou Navigation Satellite System (BDS)and also known as Compassor BeiDou-2 with BeiDou-2, which is a partially-constructed constellation comprising 10 satellites in orbit.
- BeiDou-1 was cancelled towards the close of the year and BeiDou-2 has been offering services to customers in the Asia-Pacific region since the end of December.
- China has launched its BeiDou-3 network, the third generation BeiDou system during 2015for global coverage.
- The 31 March, 2015 on March 30, 2015, the the first satellite BDS-3 came into orbit.
- In 2016, it was anticipated in 2016 that BeiDou-3 will be able to achieve millimetre precision (with the aid of post-processing).
- BeiDou Navigation Satellite System China BeiDou Navigation Satellite System China began to offer worldwide services on December 27, 2018.
- On June 23, 2020 the 35th and final BDS-3 satellite was launched into orbit.
- Features of BeiDou Navigation Satellite System China
- It is the BeiDou Navigation Satellite System China was createdy CAST. China Academy of Space Technology (CAST) and is managed by the China National Space Administration (CNSA) at a Global scale.
- There are 35 satellites within BeiDou Navigation Satellite System China orbit, which was launched from its initial launch on October 31, 2000 until its final launch on June 23, 2020.

- It has a signal precision of 0.41 meters.

Other countries also use other countries to use Beidou satellite (BDS) navigation system?

- The BDS is now an "constellation" of 30 satellites in orbit, started its international outreach after the installation was completed in the year 2018.
- It's now being used "in more than half of the world's countries".
- China is also helping a number of BRI partner countries, including Pakistan and Sri Lanka, launch communications satellites.
- Saudi Arabia is using Beidou Beidou in mapping and surveying in locating vehicles and individuals within the desert.
- Tajikistan uses BDS to monitor lakes and dams with accuracy.
- Lebanon uses BDS in the Beirut port to conduct marine surveys and construction.
- Within Burkina Faso, it is utilized for surveying and the construction of hospitals.
- Pakistan along with Russia have two important Beidou centers.
- Chinaand Russia both have reached a framework of strategic cooperation on the two systems of navigation, bringing forward a deal from 2015 regarding connectivity between Beidou as well GLONASS.
- Pakistan in 2014 was the first country outside of the United States to create the Beidou network.
- South Asia and Southeast AsiaBoth of which are important BRI areas - have become the momentous focus for Beidou to increase its presence.

Searching for expansions

- Beidou has established its first three continuous operating Reference Stations (CORS) for its network in Thailand in 2013 to serve as a hub to ASEAN.
- China along with Sri Lanka also agreed on plans to establish 10 CORS.
- The year 2020 was the first time Beijing extended its hand to Bangladesh as well as Nepal.
- The next goal was to enhance Beidou's capabilities. They have been able to China made it a step closer in GPS in regards to accuracy, however Beidou's overseas services are still in comparison to the Indian system for navigation NavIC

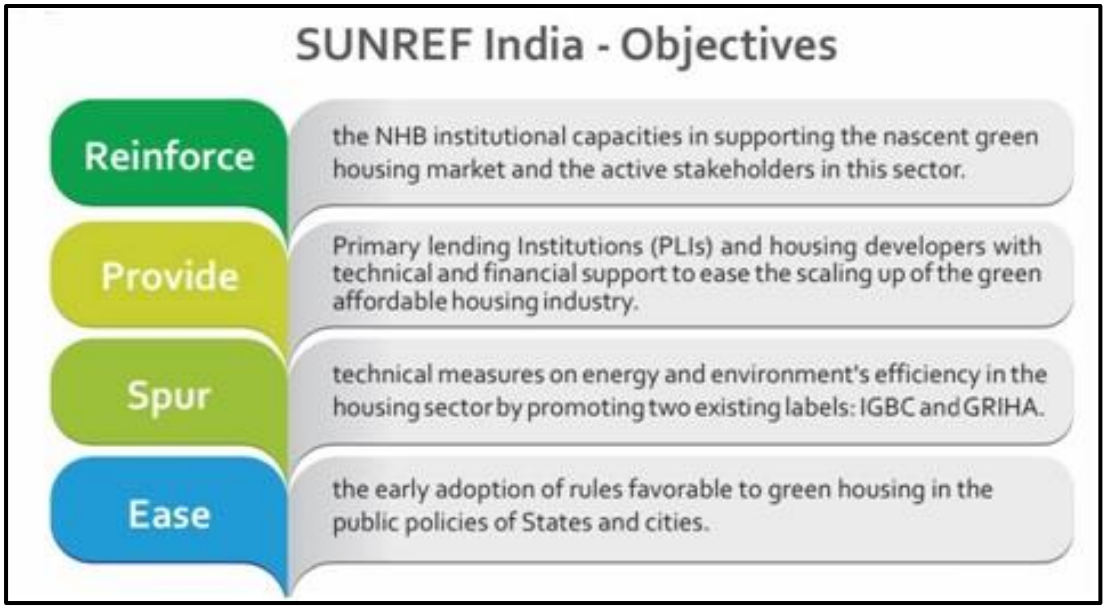
- NavIC is also known as Indian Regional Navigation Satellite System (IRNSS) is designed using seven satellites as well as a network of ground stations that operate all hours of the day.
- There are eight satellites, however only seven are still in active.
- Three satellites are located in geostationary orbit. Four satellites are that are in geosynchronous orbit.
- The constellation's first satellite (IRNSS-1A) first launched July 1, 2013, and the 8th satellite IRNSS-1I was launched on April of this year.
- In the 7th launch date of the satellite of the constellation (IRNSS-1G), IRNSS was changed to the NavIC satellite by the Indian Prime Minister in 2016.
- It was recognized as such by International Maritime Organization (IMO) as element of the world-wide Radio Navigation System (WWRNS) for operation within the Indian Ocean Region in 2020.

Potential Uses:

- Marine, aerial, and terrestrial navigation; Disaster management Fleet management and tracking of vehicles (especially in the mining and transportation sector); Integration with smartphones Time precision (as for the power grid and ATMs); Geodetic and mapping data capture.

Topic 12. SUNREF INDIA – CONTRIBUTION TO GREEN HOUSING IN INDIA

Important for subject : Science and Technology



National Housing Bank (NHB) organized the event that concluded the SUNREFThe SUNREF - India Housing Programme.

Information about the occasion

- The National Housing Bank (NHB) organised the final event to highlight the benefits from sustainability. Sustainable Use of Natural Resources and Energy
- Finance (SUNREF) India Housing Programme towards green housing throughout the country on the 25th of July 2022.
- CRISIL Risk and Infrastructure Solutions (CRIS) Limited provides technical assistance for CRISIL's SuNREFprogram.
- The event saw the participation of more than 100 representatives from multilateral/bilateral agencies, housing finance companies, real estate developers, government agencies, green-building experts, architects, and green material producers from various parts of the country.
- The EU as well as India's Government of India are cooperating closely as part of the partnership on Smart and sustainable Urbanisation.

SUNREF program

- Commenced in April 2019.
- The goalScaling upwards sustainable affordable green housing developments within India.

The major contribution

- The NHB's efforts in promoting green affordable housing throughout the country is in alignment with the government of India's priority to combat the fight against climate change.
- In the last three year, SUNREF India Housing Programme has offered refinancing of about 100 million Euro up to five 300 households with over 60% are female owners . Moreover, more than 50% of households belong to low income or economically poorer segments.

What is green building?

- Based on the World Green Building Council: "A ' green' building is a structure that, through its construction, design or operation, minimizes or eliminates negative effects, and may have a positive effect on our climate and the natural environment.

About green affordable housing

- Housing is among the fastest-growing segments within the Indian construction industry.
- But however, the rapid growth of urbanization is also leading to numerous challenges, including increased traffic congestion, pressure on essential amenities like water, energy, and natural resources and, perhaps most important, unavailability of affordable housing for those who are at lower levels of the ladder.
- These issues create the need for eco-friendly and affordable construction in India.

Green building rating systems:

- The primary goal that the ratings system must meet is guarantee the highest degree of sustainability, with minimal impact on the environment.
- A variety of green building labels are accessible in India to evaluate and verify projects, for instance

Green Rating for Integrated Habitat Assessment (GRIHA)-

- GRIHA can be described as an assessment tool that assists users evaluate the building's performance against specific benchmarks that are accepted nationally.
- It examines the green performance of buildings all encompassingly throughout its lifespan, and provides an unambiguous definition of what is a "green building'.
- This rating scheme, built on the accepted environmental and energy principles, will aim to find a compromise between established methods and the newer ideas, both local and international.

Indian Green Building Council (IGBC)-

- It is a member of the Confederation of Indian Industry (CII).

- It was founded during the year Vision- To create an environmentally sustainable built environment for everyone and enable India to be among the world leaders in sustainable building by the council.
- It offers various services that include the development of the latest green building ratings programs along with certification and green building-related training programs.
- The council also hosts Green Building Congress, its annual main event focusing about green buildings.

Excellence in Design for Greater Efficiencies (EDGE)

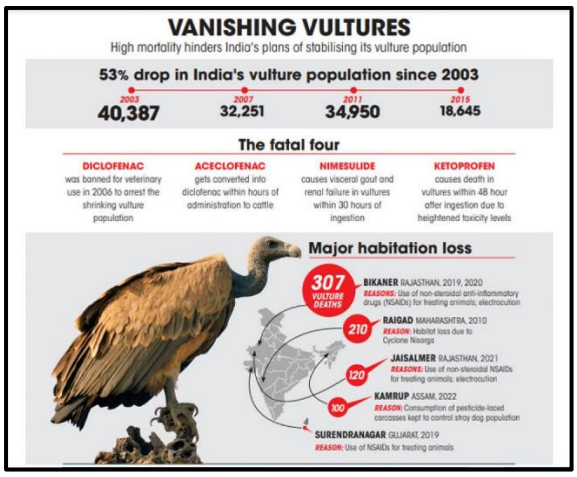
- In more than 100 countries, EDGE is a no-cost software that is a green building standard, as well as an international green building certification system.
- A green building option developed in collaboration with the International Finance Corporation (IFC) which is part of the World Bank Group, The EDGE system allows one to optimize the design of buildings to consume less water, energy and embodied energy the construction materials.

GEM Sustainability (Green) Certification Program

- It seeksto examine the sustainability of a particular project throughout its entire life cycle from concept to construction and the time of operation.
- GEM's Sustainability Guide Reference offers specifications and design guidelines to assess a project's performance.

Topic 13. BAN USE OF ACECLOFENAC ON CATTLE TO SAVE VULTURES

Important for subject: Environment



Indian Veterinary Research Institute (IVRI) has called for a complete stop to the use of aceclofenac in cattle following a recent study that found that the drug transforms into diclofenac when water buffaloes are used similar to what it does in cows.

- The researchers administered the recommended dosage of Aceclofenac in the form of nine water buffaloes.
- They took blood samples every at least 48 hours.
- They also conducted the analysis of Aceclofenac along with its metabolite diclofenac found in their plasma.
- It was discovered that Aceclofenac was quickly converted to diclofenac by water buffaloes as well..
- Diclofenac was found on the blood within the first 20 minutes after the treatment.
- Concentration reached its maximum between four and eight hours.
- Acclofenac's use was a very unlucky loophole in India's conservation of vultures in accordance with the press release from SAVE.

Background

- Aceclofenac can be described as an pro-drug for diclofenac which behaves the same with domestic buffalo just like it does in cattle domestically and poses the same danger for vultures.
- It is one of three of the three non-steroidal anti-inflammatory (NSAIDS) substancesnamely ketoprofen, aeclofenac and Nimesulide--were developed in the form of alternatives to diclofenac which India prohibited in 2006 to be used on animals because it led to a lot of deaths of vultures.
- However India's action plan to conserve vultures for 2020-2015recommends an end to the usage of veterinary medicines with the three medications.

Diclofenac

- Diclofenac is an treatment for cattle, has been linked to kidney failure in Vulturesand a decrease in the population of the bird.
- While it was removed in the year 2006 However, it is still in use.
- Diclofenac is toxic to vultures and is utilized by vets to treat cattle.
- The drugs are absorbed into the vulture's digestive system when they eat carcasses.

- Three species of Indian vultures of the genus "Gyps"- that with a long bill (Gyps indicus) and the slim-billed (G. tenuirostris) were down by 97% while those with white-rumped (G. bengalensis) decreased by more than 90 percent between 1992 and 2007.

Action Plan for Vulture Conservation 2020-2025

- It is proposed to establish Vulture Conservation Breeding Centers located in Uttar Pradesh, Tripura, Maharashtra, Karnataka and Tamil Nadu.
- It would also include an conservation breeding program that would include red Headed vulture as well as Egyptian Vulture as well as at the very least, an "Vulture Safe Zone" in every state to protect the populations that remain.

There will have to be at least four centres for rescue in various geographical regions:

1. Pinjore in north India,
2. Bhopal situated in central India,
3. Guwahati in northeast India and
4. Hyderabad in South India,

- Additionally, there will regular surveys to keep track of population growth, as the plan aims to.
- Additionally, the vulture action plan recommends meloxicam instead of diclofenac. Tolfenamic acid asthe alternative to diclofenac.

Save (Saving Asia's Vultures from extinction)

- The association made up of similar-minded international and regional organisations, created to oversee and manage conservation, campaigning and fundraising efforts to alleviate the poor situation of the south Asia's Vultures of South Asia.
- **Goal:** To help save three vital species from extinction with the use of a single program.
- **Partner organizations of Save:** Bombay Natural History Society, Bird Conservation Nepal, RSPB (UK), National Trust for Nature Conservation (Nepal), International Centre for Birds of Prey (UK) and Zoological Society of London.

Indian Veterinary Research Institute (IVRI)

- It was first established in 1889 in Bareilly, UP.

- IVRI is among the most prestigious research institutes focused on livestock research and development of the region.

Topic 14. BIOSPHERE RESERVES

Important for subject: Environment

The 3rd of November is the very first "The International Day for Biosphere Reserves', to be commemorated beginning in 2022.

What are Biosphere Reserves?

- They provide a platform for testing multidisciplinary strategies for understanding and managing the effects of changes in the ecological and social systems which includes conflicts prevention and the management of biodiversity.
- They provide locally-based solutions for global problems.
- Biosphere reserves encompass marine, terrestrial and coastal ecosystems. Each site offers solutions that reconcile the conservation of biodiversity and its sustainable utilization.
- The biosphere reserve is selected by government officials of the national level and are under the sovereignty that of each state in which they are located.
- Biosphere Reserves include the local community and all other interested participants in their planning and management.
- They combine three principal "functions":
- Preservation in biodiversity as well as cultural diversity
- Socio-culturally and ecologically ecologically sustainable
- Logistic support that supports the development process through research monitoring, education and training
- These three roles are being carried out by Biosphere Reserves' three major zones.

Core Areas

- It's a protected area that is essential to the preservation of ecosystems, landscapes as well as species as well as Genetic variation

Buffer Zones

- It is located around or connects to that area(s) It can be used to carry out activities that align with sustainable ecological practices that may enhance research monitoring, education and training.

Transition Area

- The transition zone is the place in which communities promote culturally eco-sustainable human and economic activities.

What are the Functions of Biosphere Reserve?

Conservation:

- The management of biosphere reserve's natural resources and endemic species landscapes and ecosystems.
- It could help prevent conflict between man and animal such as. death of a tiger Avni who was killed after she became a man-eater
- Alongside the traditional customs, culture, and wildlife of the tribals are also protected.

Development:

- Enhancing human and economic growth that can be sustained on a sociocultural as well as ecological level.
- It is aimed at strengthening the three foundations for sustainable development: economic, social and environmental protection.

Support for Logistic:

- Promotion of research activities and environmental education, as well as training and monitoring within the environment of national, local and international conservation, as well as sustainable development.

What number of Biosphere Reserves are in India?

In India:

1. Cold Desert, Himachal Pradesh
2. Nanda Devi, Uttarakhand
3. Khangchendzonga, Sikkim
4. Dehang-Debang, Arunachal Pradesh
5. Manas, Assam
6. Dibru-Saikhowa, Assam
7. Nokrek, Meghalaya
8. Panna, Madhya Pradesh
9. Pachmarhi, Madhya Pradesh

10. Achanakmar-Amarkantak, Madhya Pradesh-Chhattisgarh
11. Kachchh, Gujarat (Largest Area)
12. Similipal, Odisha
13. Sundarban, West Bengal
14. Seshachalam, Andhra Pradesh
15. Agasthyamala, Karnataka-Tamil Nadu-Kerala
16. Nilgiri, Tamil Nadu-Kerala (First to be Included)
17. Gulf of Mannar, Tamil Nadu
18. Great Nicobar, Andaman & Nicobar Island

What is the International Status of Biosphere Reserve?

- For natural zones, UNESCO has created"Biosphere Reserves " Biosphere Reserve" to help reduce conflicts between conservation and development.
- As part of the Man and Biosphere Reserve Program of UNESCO the country
- States that meet a minimum set of criteria can be granted biosphere reserves.
- There are 738 biosphere reserves spread across over 134 countries, which includes 22 , transboundary, sites.
- There are twelve biosphere reserve of India that are acknowledged internationally under the Man and Biosphere Reserve program:

1. Nilgiri (First to be added)
2. Gulf of Mannar
3. Sunderban
4. Nanda Devi
5. Nokrek
6. Pachmarhi
7. Similipal
8. Achanakmar - Amarkantak
9. Great Nicobar
10. Agasthyamala
11. Khangchendzonga (under Man and Biosphere Reserve Program in 2018)
12. Panna, Madhya Pradesh (The most up-to-date version that includes BR)

What is Man and Biosphere Programme?

- In 1971, the UNESCO's Man and the Biosphere Programme (MAB) is an inter-governmental science program that seeks to establish the scientific foundation for improving the relationships between individuals as well as their surroundings.
- MAB is a combination of social and natural sciences including economics, education and sociology to enhance human lives and ensure equitable sharing of the benefits, and also to ensure the protection of ecological ecosystems that are managed and natural. This is encouraging innovative strategies for economic development that is socially and culturally acceptable, as well as ecologically sustainable.

What is Biosphere Conservation?

- A scheme known as Biosphere Reserve was implemented by Government of India since 1986 where financial assistance is offered in a 90:10 proportion to the
- Northeastern Region States and three Himalayan states in the ratio 60:40 with other states for maintenance, improvement and the development of specific items.
- The State Government prepares the Management Action Plan which is then approved followed by the Central MAB Committee.

World Network of Biosphere Reserves(WNBR)

- The UNESCO World Network of Biosphere Reserves (WNBR) includes
- Internationally designated protected areas also known as Biosphere Reserves that are intended to establish a healthy relation between nature and humans (e.g. encourage sustainable development). They are formulated as part of an initiative called the Man and the Biosphere Programme (MAB).
- The World Network of Biosphere Reserves encourages SouthSouth, North-South and SouthSouth cooperation and provides an exceptional tool to facilitate international cooperation by sharing of knowledge, sharing experiences and capacity building, as well as encouraging the best practices.
- World Network of Mountain Biosphere Reserves is an initiative that is new under the MAN and BIOSPHERE PROGRAMME

Ecological Footprint

- Ecological Footprint is the only metric that measures how much nature we use. Ecological Footprint can be described as the sole metric to measure the amount of nature we have as well as how much of nature we make use of

What is the Ecological Footprint?

- The footprint of the Ecological is an indicator of the amount of bio-renewable land and water space an individual, a population or business uses to generate all the resources that it needs and to store all its infrastructure, as well as to be able to absorb the waste it produces, based on the current techniques and methods of managing resource.
- People get their food from crops, forests as well as fisheries and the grazing land. They also make use of these areas to accommodate homes, roads, and infrastructure for energy.
- Waste absorption also makes use of ecosystem services that are based on area for example, to help absorb CO2 emissions from fossil fuel combustion or the production of cement.
- The Ecological footprint includes the area required to produce materials or
- take in waste to the degree that they can be mutually and mutually. The sum of these zones determines the total human burden on nature.
- In the sense of ecological footprint analysis is based upon " mass flow balance," where every flow is converted into productive ecosystems that provide them with the necessary resources.

How the Footprint Works

- Ecological Footprint accounting is a way to measure the amount of demand and the supply of natural resources.
- For the side of demand The Ecological Footprintadds all the productive areas in which an individual, a group of people or product is competing.
- It evaluates the ecological assets that a specific product or population requires in order to generate the natural resources it needs (including the plant-based food as well as fiber-based products fish and livestock products as well as timber as well as other products from the forest, and space to build urban infrastructure) and to take in its waste, particularly carbon emissions.

- The Ecological Footprint records the utilization of productive areas.
- The most common areas to be tracked are cropsland, grazing land fishing areas, built-up land forest areas, as well as soil carbon demands.
- In terms of supply, a city's, the nation's or state's bio-capacity is the efficiency of its natural resources (including the land that is used for cropland, grazing forests fishing grounds, and constructed-up land).
- These areas, particularly if left unharvested, may help to take up the waste that we produce particularly carbon emissions generated by burning fossil fuels.
- The Ecological Footprint as well as bio-capacity are measured in the global acreswhich are globally equivalent, standardized hectares world typical productivity.
- If the Ecological Footprint of a particular population exceeds that of the region's biocapacitythe deficit in biocapacity.
- The demand for the products and services its oceans and land provide -- meat and fruits, vegetables and fruits and wood, fish as well as cotton for clothing in addition to carbon dioxide absorption -- exceeds the capacity of the ecosystems that the region has to regenerate.
- In the more common communications, we call the situation " an ecological deficit."
- A region with an ecological deficiency is able to meet the demand for food by the importation of goods and reselling its ecological resources (such such as excessive fishing) and/or releasing carbon dioxide to the atmosphere.
- If the area's biocapacity is higher than the Ecological Footprint then it is in an bio capacity reserve. reserve of capacities.
- The idea was first conceived in the year 1990.
- Ecological Footprint began the larger Footprint movement, which included carbon Footprint.

Bio-capacity:

- Ecosystems are not able to provide us with natural resources.
- This is based on variables like water availability as well as climate and the fertility of soils, sun energy techniques and management methods.
- The ability to replenish through photosynthesis is known as bio-capacity.

Biocapacity deficit vs Ecological overshoot

- If the ecological footprint of a particular population is greater than the bio-capacity of its region, it has an imbalance in bio-capacity. This deficit can be redressed by the use of bio-capacity that comes from other places or locally overuse. This is called ecological overshoot. On a global scale the deficit and the overshoot are the same because there is no trade between the planets permitting the use of bio-capacity anywhere else.

Global Footprint Network

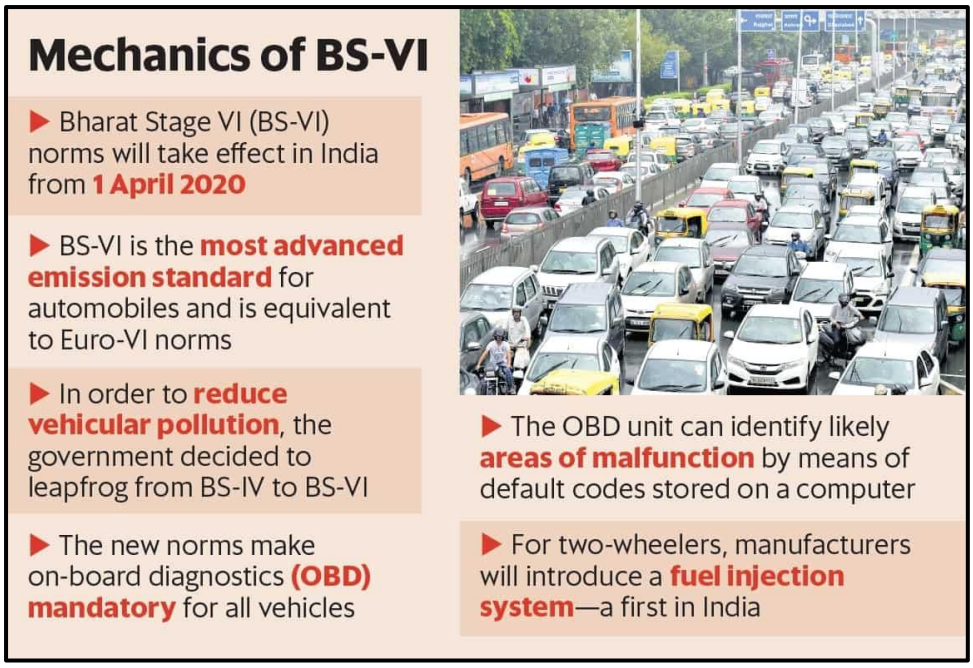
- Global Footprint Network calculates the ecological footprint of nations on an a per-year basis.
- Global Footprint Network was created by the Global Footprint Network in 2003 with the aim to transform the way people around the world handles its resources, and how it responds to the effects of climate change.
- Global Footprint Network publishes yearly national footprints and Biocapacity
- The Accounts are used to evaluate the use of ecological resources and capacity of the nations in time.

What is UNESCO?

- UNESCO is the United Nations Educational, Scientific and Cultural Organization.
- It promotes security and peace by encouraging international cooperation in science, education and communication, as well as information.
- UNESCO encourages sharing of knowledge and the free flow of ideas in order to increase mutual understanding and more complete understanding of one another's lives.
- Programmes of UNESCO aid in the attainment in achieving the Sustainable Development Goals defined in the 2030 Agenda, adopted by the UN General Assembly in 2015.

Topic 15. BS VI NORMS

Important for subject: Environment



Every year, there is a incident of Delhi pollution at this time in winter. Bharat stage (BS):

- Bharat Stage (BS) emission standards are set by government officials to control the release of air pollution from engines such as the inside combustion engines and spark-ignition engine components which includes motor vehicles.
- It is the central government that has decreed that car makers create, sell and then have registered exclusively BS-VI (BS6) vehicle starting April 1st, 2020.

Background:

- It was the first emission standards were adopted within India in 1991 for petrol and, in 1992, to diesel cars. After that regulations, in 1992, the catalytic converter was made required for petrol-powered vehicles and the unleaded gasoline was launched on the market.

Difference Between BS4 and BS6

- The two BS-IV along with BS-VI are units emission norms that establish the maximum acceptable levels for pollutants that an automobile or two-wheeler exhaust may emit.

What are the areas that comprise BSI, BSII, BSIII, BSIV, and BSVI emission standards?

- The abbreviation BS as we have mentioned previously refers to "Bharat Stage'.
- BSIwas launched in 2000.
- BSII (BS2) introduced in 2001. first introduced in 2001.
- BSIII (BS3) first first introduced in 2005.
- BSIV was first introduced in the year the year 2017.
- The the delay in between the introduction the BS3 norms and the BS4 norms BS3 along with BS4 led to the rapid adoption of to the BSVI and BS6 emission norms instead of BSV (BS5) norms.

Supreme court decision -

- In the 29th of April, 1999 on 29 April 1999, the Supreme Court of India declared that all automobiles within the country must be compliant with Euro I or India 2000 standards by June 1, 1999 as well Euro II would be mandatory within the National Capital Region (NCR) starting April 2000..
- The carmakers were not ready for this transition , and in a later decision that was issued, the introduction of Euro II was deferred.
- In a recent ruling that was handed down in the last few days, it was decided that the Supreme Court banned the sale and registration of motor vehicles that conform to the Bharat Stage IV emission standard throughout the country beginning the 1st of April, 2020.

Committee Recommendations: Mashelkar Committee

- in 2002 the government approved the report of the Mashelkar committee that proposed an roadmap for the introduction of EU-based emission norms for India.
- It also suggested a gradual introduction of the new norms and regulations will be implemented first in the major cities first, and then expanded to the rest of the country in a couple of years.
- Following the recommendation of this committee following the recommendations of the committee, National Auto Fuel policywas made public publicly in 2003..
- The route map for introduction of BS standards was drawn up until the year 2010.

- The policy also set out guidelines for fuels for automobiles as well as a reduction in pollution caused by older vehicles, and R&D for data on air quality production in health and environmental administration.
- The guidelines as well as the timeframe to implement them are determined through the Central Pollution Control Board which is part of the Ministry of Environment, Forest and Climate Change.
- Since October 10, 2010, Bharat Stage (BS) III standards were implemented all over the entire country.
- The emission norms of BS-IV were put into effect in 13 major cities in April 2010 and across the country since April 2017.
- In the year 2016 The government declared that it would not follow the BSVnorms completely and instead adopt the BS-VI norms by 2020..
- However In Delhi due to the sudden increase of pollution, the policy was planned to be introduced the policy in the year 2018 only however, this was opposed by car companies, as they had planned their policies in accordance with the 2020 timeframe.

What is it that makes BS-VI fuel superior?

- The presence of sulfur in the fuel is one of the main reasons to be concerned. Sulphur dioxide that is released from combustion of fuel is a huge pollutant that can affect health too.
- BS-VI fuel's sulfur content is lower than that of BS-IV fuel. It's reduced by 10 mg/kg in BS-VI instead of 50 mg/kg in the BS-IV.
- However, cars that comply in accordance with BS VI will also be more costly.
- AIR QUALITY INDEX (AQI)
- It is the Air Quality Index (AQI) can be described as an indicator to measure air quality on an every day basis.
- It's an measurement of the effects of air pollution on your health in a brief time period.
- The goal for theAQI's purpose is to assist people understand how regional air quality affects their health.
- The Environmental Protection Agency (EPA) calculates the AQI of five air pollutants that are major that are subject to national standards for air quality have been set to protect the health of the public.

Ground-level ozone

- Particle pollution/particulate matter (PM2.5/pm 10)
- Carbon Monoxide
- Sulfur dioxide
- Nitrogen dioxide
- The more high an AQI value the more severe the degree of pollution in the air and the more serious the health risks.
- It is a concept that AQI is widely utilized in numerous advanced nationsfor in the past three decades.
- AQI rapidly disseminates information about air quality in real-time.
- In India The National Air Quality Quality (AQI) India was established at the 17th of September, 2014. at New Delhi under the Swachh Bharat Abhiyan by then Minister of Environment Shri PrakashJavadekar.
- Objectives of Air Quality Index (AQI)
- Comparison of air quality conditions in different cities/locations.
- It also assists in identifying flawed standards and poor monitoring programmes.
- AQI aids in understanding the shift in the quality of air (improvement or degrading).
- AQI informs the general public about environmental issues.
- It is particularly useful for those suffering from ailments caused or aggravated by pollution in the air.

Who is most at risk of the effects of air pollution?

- People suffering from lung ailments like chronic bronchitis, asthma, and emphysema. Children, too, teens Active individuals of all age groups who exercise or work often outdoors. Healthy people are more susceptible to Ozone

What is the National Air Quality Index?

- It was launched at the end of 2014. with an outline called "One Number - One Color One Description' to allow people of all ages to assess the quality of air in the vicinity of his home.
- The assessment of the quality of air is based upon eight pollutants which include Particulate matter (PM10) Particulate matter (PM2.5) (PM2.5), nitrogen Dioxide

(NO2), Sulphur Dioxide (SO2) and Carbon Monoxide (CO) Ozone (O3) and Ammonia (NH3) and lead (Pb).

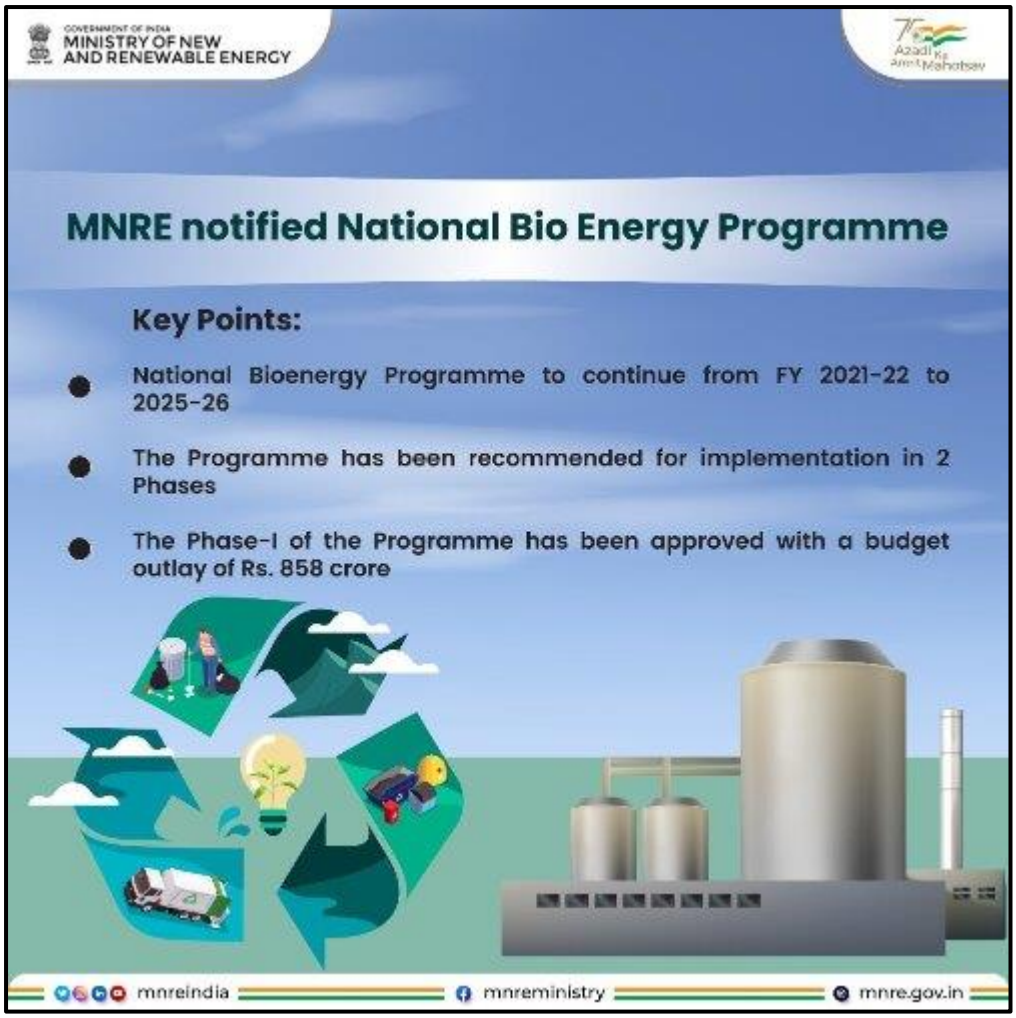
- AQI includes six the air's quality. They are: Good Very Satisfactory, Moderately Polluted Poor Very Poor and Severe.
- It was created in collaboration with the CPCB in consultation with IIT Kanpur along with an experienced group made up of professionals in the field of medical and air quality.
- Commission for Air Quality Management in National Capital Region and Adjoining Areas
- The idea was to address the problem of pollution in the regions around Delhi NCR.

SAFAR

- The System of Air Quality and Weather Forecasting And Research (SAFAR) is a government-wide initiative launched in the Ministry of Earth Sciences (MoES) to evaluate the quality of the air of cities, by measuring the level of pollution overall and the air quality that is specific to the location that the town has.
- The system is developed in-house through the Indian Institute of Tropical Meteorology (IITM), Pune and is operated through the India Meteorological Department (IMD).
- SAFAR is an integral component of India's very first Air Quality Early Warning Systemoperational in Delhi.
- It keeps track of every aspect of weather such as temperatures, rainfall, humidity the speed of wind, the direction of the wind along with UV radiation, as well as solar radiation.
- **Pollutants that are monitored:** PM10, Ozone, Carbon Monoxide (CO) (CO), the Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Benzene, Toluene, Xylene, and Mercury.

Topic 16. NATIONAL BIO-ENERGY PROGRAMME

Important for subject: Environment



The Waste-to-Energy Program Guidelines to guide creating Biogas, BioCNG, and energy from industrial, urban and agricultural wastes as well as residues have been published from the Center.

- The program is part of an umbrella scheme called known as the National Bioenergy Programme.

National Bioenergy Programme

- The Indian Renewable Energy Development Agency (IREDA)will be the agency that implements the program.
- IREDA will be charged an amount of service fee equal to 1percent of CFA to process applications along with 1% of CFA (minimum $50,000) to implement and monitoring performance of the plant after it has been installed.

- Its goal is to create biogas and bio CNGas well as electricity from industrial, urban and agricultural waste and leftovers.
- The government will provide financial assistance to developers and will pay for service fees to organizations that are implementing the project, which includes inspection companies for commissioning the waste-to-energy facilities.
- It also encompasses biomass and biogas programs.
- Central aid to finance (CFA) for biogas project will be Rs25 lakh, for 12,000 cubic metres daily and the maximum is set at 5 crore.
- A financial aid of 75 lakhs per MW for new biogas plants as well as 50 lakh per MW for existing units.
- If the power plants that convert waste into energy are constructed in specific states that are classified as states like the North East, Himachal Pradesh, Sikkim, Jammu and Kashmir, Ladakh, Lakshadweep, Uttarakhand, and Andaman and Nicobar Islands, the CFA that is eligible for approval CFA can be up to 20 percent higher than the regular CFA pattern.

Biomass Energy (Bio-energy)

- Biomass is an organic material that is renewable that is derived from plants and animals.
- Biomass energy is energy that is generated by living or previously-living organisms.
- Biomass is a storehouse of chemical energy generated by the sun.
- The process of photosynthesis produces biomass. Biomass can be burnt directly to generate heat or transformed into energy-efficient gaseous and liquid fuels using a variety of methods.

Biomass energy sources include:

- The wood-processing wastes--firewood wood pellets as well as wood chips as well as lumber as well as furniture mill sawdust as well as waste, as well as black liquor from paper and pulp mills
- The agricultural crops and materials--corn soybeans, soybeans, Switchgrass algae, and woody plants as well as food and crop process residues Biogenic waste materials found that are found in solid waste from municipal sources--paper cotton, wool products, as

well as food yard and wood wastes Human and animal manure wastewater Converting biomass into power directly burning (burning) to generate heatAll biomass can be directly burned to heat water and buildings and heating industrial processes, or to generate electricity in steam turbines.

- Thermochemical concoctionn to create solid, gaseous and liquid fuels Thermochemical transformation of biomass involves pyrolysis as well as gasification. Both are processes of thermal decomposition where biomass feedstock materials are heated in pressurized, closed vessels known as gassifiers, at high temperatures.

Chemical conversion that produces liquid fuels

- A process of chemical conversion called transesterification is employed for the conversion of the vegetable oils and animal fats as well as greases, into fat acidmethyl esters (FAME) which are used to create biodiesel.
- Conversion to biological to make gases and liquid fuels.
- The biological conversion process involves fermentation that converts biomass into ethanol, and anaerobic digestion for the production of natural gas that is renewable.
- Ethanol can be used as an engine fuel.
- Renewable natural gas, sometimes referred to biomethane or biogas - is created in digesters for anaerobic digestion at sewage treatment plants as well as at livestock and dairy farms. It is also formed in and can be sucked from landfills for solid waste.

Anaerobic digestion, also known as Biomethanation:

- Biomethanation or methanogenesis is a scientific procedure which sees microorganisms that live in an anaerobic setting break down biodegradable matter, resulting in methane-rich biogas as well as effluent.
- The three tasks that happen in succession are acidogenesis, hydrolysis methanogenesis, and acidogenesis.

Cogeneration

- Co-generation produces two types of energy using a single fuel. One form of energy has to be heat while the other can be mechanical energy or electricity. In a traditional

energy plant, the fuel gets burned in a boiler, generating an extremely high-pressure system. The steam is then used to power a turbine in order that produces electricity. It is typically condensed into water, which is then taken through the boiler.

Topic 17. IN THE AMAZON A GIANT FISH HELPS SAVE THE RAINFOREST

Important for subject: Environment

On the Jurua River, a tributary of the Amazon Riverine settlers as well as Indigenous villages are working together to encourage an environmentally sustainable method of fishing for the the pirarucu, a magical fish.

About the fish pirarucu

- The arapaima or pirarucu or paiche is a large species of bonytongue belonging to the Arapaima genus indigenous in the Amazon as well as the Essequibo basins in South America.
- The Portuguese term, "pirarucu, comes from the Tupi words for language"pira and urucum" which translates to "red fish".
- It is prevalent in floodplain lakes throughout the Amazon basin, including the region of Medio Jurua.
- The species is among the largest freshwater fish, with at least 3 meters (9.8 feet) long and 200 kg (440 pounds) in weight.
- Another interesting feature of Pirarucuis that it is among the few species of fish that exist in the world that allows breathing to surface.
- They are a significant source of food fish.

The exploitation of pirarucus

- They've declined in the range of their native habitat because of overfishing and habitat loss.
- It also left pirarucu identified as being at risk of imminent extinction, unless trade in the fish is managed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

- However, arapaimahas been introduced to some tropical regions beyond its native range (within South America and elsewhere) in which they are often considered to be to be an invasive species.
- Within Kerala, India, Arapaima was able to escape from aquaculture ponds due to flooding in 2018.

Regeneration from Pirarucu

- The fish has returned to the waters in Medio Jurua.
- The transformation began in mid-90s. With the help of an Dutch Catholic priest, rubber tappers created and led a push to convince that the government of America to establish the Medio Jurua Extractive Reserve.
- The managed fishinghas caused a surge in the number of people in which it is used.
- Within the Sao Raimundo region In the Sao Raimundo region, there in the Sao Raimundo region, there were 135 pirarucus in nearby lakes in 2011, the year that managed fishing was first introduced. In the year before the number was 4092 specimens according to their reports.
- Within the Carauari area,the number of Pirarucus was up by 4,916 in 2011 up to 46,839 10 years later.

The danger to illegal fisheries in Brazil

- Fishing that is illegal is a major problem across Brazil. It's the second most common environmental crime that occurs on protected land following logging, as per an academic study based upon government data.
- Pirarucu fishing takes place only once per year in September, which is the time of most water.
- According to the law, only 30% of the pirarucu in a particular zone can be caught next year.

Current situation for Indian fisheries

- Fisheries are the principal source of income for many communities.
- India is the second largest producer of fish, with exports totalling more than 47,000 crore rupees.

- Fisheries are the largest agricultural export in the country, with a growth rate of between 6 and 10 percent in the past five years.
- Its importance is highlighted by the fact that the rate of growth of the sector of agriculture in the same time frame is approximately 2.5 per cent.
- It has a population of marine fishers of 3.5 million. 10.5 million are involved in fisheries and inland fishing farming.

IUU Fishing as a National Security Threat

- In India there is a lot of illegal, unreported as well as non-regulated (IUU) fishing has typically been seen as an issue of security that is not typically considered to be one which includes economic and food security as well as larger political and social concerns.
- The risk of the presence of foreign vessels for fishing in close proximity to Indian waters.
- These fishing boats from distant waters have been caught illegally fishing across the world.
- In a number of instances the vessels are positioned in the exclusive economic zone of different states, posing grave operational and legal issues.
- Coastal States have had a variety of reactions to these vessels that range from the strengthening of their maritime security structures to taking force and military actions against the vessels.

National laws against IUU fishing

- Two legislative acts in the United States determine the government's response to IUU fishing.
- The first legislation, The Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976,defines India's maritime zones,
- that are in compliance to that are in compliance with the which are in accordance with the 1982 U.N. Convention on the Law of the Sea (UNCLOS) to which India is a member.
- So, India enjoys its sovereign rights as well as fishing rights in designated waters of both the domestic and international maritime law.

- Second, the Second, the Maritime Zones of India (Regulation of Foreign vessels) Act, 1981 is responsible for the regulation of fishing vessels from foreign countries in India's marine zones as well as related issues.
- It allows to the Indian Coast Guard, in the event of need when necessary, when necessary, to to stop and board an fishing boat and seize and lockthe vessel, along with all fishing gear or stores, fishing equipment or cargo that is located onboard or in the vessel's possession and to seize fishing equipment that is left by the vessel.
- These laws establish the national legislation that governs the maritime zones of India and also the nation's maritime security structure to address IIU fisheries that is carried out by vessels of foreign origin.

Topic 18. A THIRD OF WORLD HERITAGE GLACIERS UNDER THREAT, WARNS UNESCO

Important for subject: Environment

A third of glaciers on the UNESCO World Heritage list are in danger despite efforts to reduce temperature rises the study of the UN body has discovered.

- However, the study concluded that it could be possible to save the remaining two-thirds of the population if the increase in global temperatures did not surpass 1.5degCcompared to the preindustrial era.
- The UNESCO study, in collaboration with International Union for Conservation of Nature (IUCN), It was discovered that these glaciers are Resigning after an admission The glaciers comprise a third that make up the UNESCO World Heritage list They are in danger, regardless of efforts to reduce the temperature rise, a research carried out by the UN body has revealed.
- The study also stated that it was still feasible to save the remaining two-thirds of humanity if the rise in global temperatures did not surpass 1.5degCcompared to the pre-industrial period.
- A UNESCO report in collaboration in collaboration with International Union for Conservation of Nature (IUCN), found that the glaciers are receding at an alarming pace since the year 2000 because of the emission of CO2 that are leading to warming temperatures.

- They currently lose an estimated 58 billion tonnes worth of ice each yearwhich is equivalent to the annual water consumption for France in addition to Spain -as well as being responsible for about 5% of the measured global sea increase.

The significance of glaciers

- The majority of people depend in some way or another on glaciers for their source of water for household usage, agricultural and energy generation.
- Glaciers are the foundation of biodiversity, providing food for diverse ecosystems.
- If glaciers melt quickly thousands of individuals are facing water shortages along with the increase in the chance of natural catastrophes like flooding as well as millions of others could be forced to relocate due to the rising sea levels.

The creation of an adequate fund

- More than fifty UNESCO World Heritage sites are the home of glaciers, making up more than 10% of earth's glacier-free area.
- This study demonstrates the urgent necessity to reduce carbon dioxide emissions by investing in the natural world, that can aid in mitigating the effects of climate change.
- Alongside drastically cutting carbon emissions, UNESCO advocates for the creation of an international fund to monitor glaciers and protection.
- This fund could fund research that is comprehensive, create exchange networks among all parties involved and implement earlier warning and disaster mitigation measures.
- A few iconic landscapes that are found on World Heritage sites are-
- Los Glaciares National Park located in Argentinacontains one of the biggest glaciers on Earth and is under threat by massive loss of ice around 60 percent of the present volume in 2100.
- In Europe the loss of glaciers with small sizes is predicted within the Pyrenees -The Pyrenees - Mont Perdu World Heritage site in 2040.
- Te Wahipounamu --- South West New Zealand, which contains three-quarters of New Zealand's glaciers is expected to shed 25 to the 80 percentage of its current volume of ice in the course of the next century.

World Heritage List

- The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the recognition, protection and conservation of the natural and cultural heritage throughout the world that are believed to be valuable to the human race. It also has a World Heritage List for the same.
- It is contained in a treaty international titled the Convention concerning the Protection of the World Cultural and Natural Heritage which was adopted by UNESCO in 1972.

International Union for Conservation of Nature (IUCN)

- IUCN IUCN is an international membership Union made up of both civil society groups.
- In 1948, IUCN has grown to become the world's largest and diverse network of environmental networks.
- Its headquarters are in Switzerland.
- The IUCN Red List of threatened species is the largest list of the conservation status of plants and animals.
- The IUCN World Heritage Outlook offers conservation outlook assessments on all nature World Heritage sites.
- Lerated rate since 2000 due to CO2 emissions These are the causes of warming temperatures.
- They currently lose the equivalent of 58 billion tonnes of ice each yearwhich is equivalent to the annual water consumption by France in addition to Spain -and they are the cause of almost 5% of measured global sea increase.

The significance of glaciers

- Half of the world's population is dependent either directly or indirectly upon glaciers for their water source for household usage, agricultural and energy generation.
- Glaciers are the foundation of biodiversity, supplying numerous ecosystems.
- In the event that glaciers melt quickly and people are left without water, millions have to contend with water shortages as well as the increase in the chance of natural catastrophes like floods, as well as millions of others might be forced out by the resultant rise in sea levels.

Funding of an e-fund

- A staggering fifty UNESCO World Heritage sites are the home of glaciers, making up more than 10% of earth's glacier-free area.
- This study emphasizes the urgent necessity to reduce emissions of greenhouse gases as well as invest more in the natural world, that can aid in mitigating the impact of climate change.
- Alongside significantly reducing carbon emissions UNESCO is urging the creation of an international fund to monitor glaciers and conservation.
- A fund like this would help aid in research and development, encourage exchange networks among all parties involved and implement earlier warning and mitigation measures.

A few iconic landscapes that are found on World Heritage sites are-

- Los Glaciares National Park located in Argentinacontains one of the biggest glaciers on Earth and is in danger of massive loss of ice approximately 60 percent of its current volume in 2100.
- In Europe The disappearance of small glaciers is anticipated to occur in the Pyrenees - The Pyrenees - Mont Perdu World Heritage site in 2040.
- Te Wahipounamu -Te Wahipounamu - South West New Zealand, which contains three-quarters of New Zealand's glaciers is expected to be wiped out of 25 to the 80 percentage of the present volume of ice over the course of the next century.

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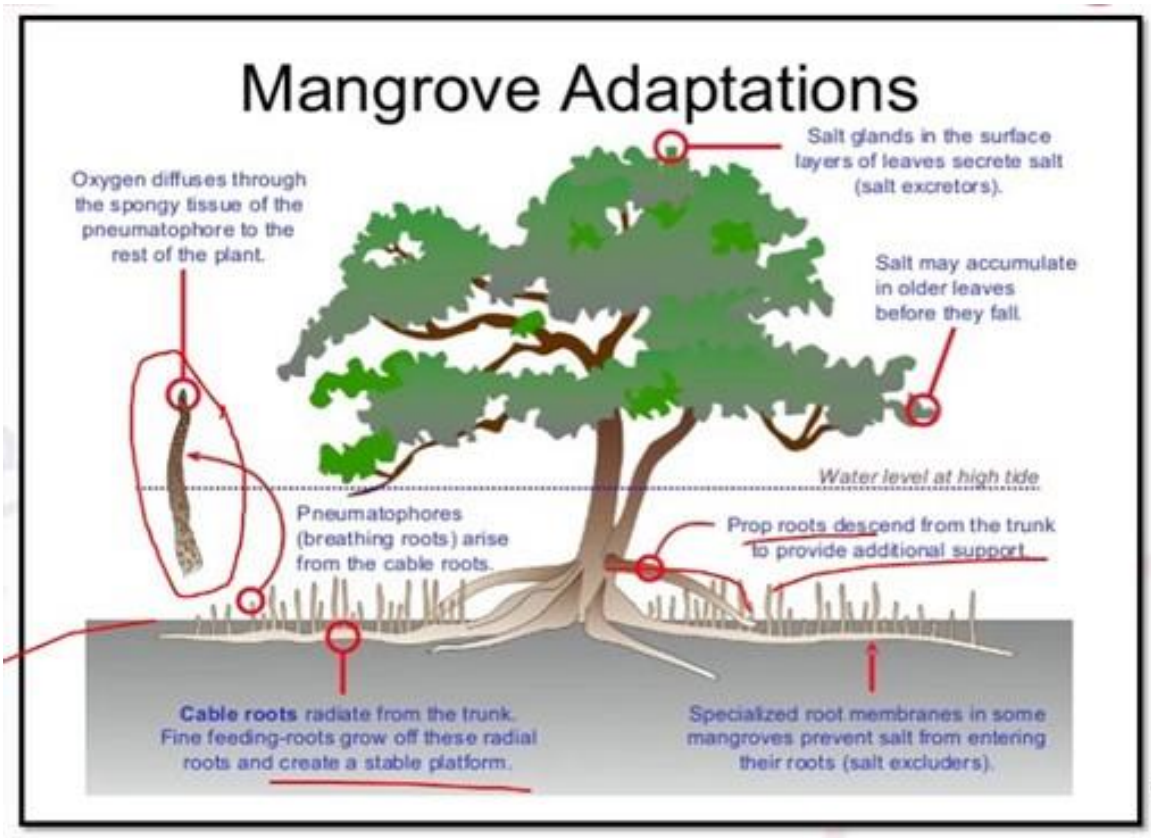
- In 1948, IUCN has grown into the world's biggest and most multi-faceted environmental network.
- Its headquarters are in Switzerland.
- The IUCN Red List of threatened species is the most complete listing of the global conservation status of plants and animals.
- The IUCN World Heritage Outlook offers assessments of the conservation outlook of all the natural World Heritage sites.

Topic 19. COP14 ON WETLANDS BEGINS; DRAFT RESOLUTION FOR INTERNATIONAL MANGROVE CENTRE IN CHINA ON AGENDA

Important for subject: Environment



The 14th meeting of the Conference of the Contracting Partys (COP14), to the Ramsar Convention on Wetlands started November 5, 2022. to discuss the global state of wetlands.

- From November 5-13, the event will be held at two venues: Wuhan, China and Geneva, Switzerland.

- The agenda includes waterbird estimates, Ramsar Convention criteria and lists of wetlands that are of international importance and conservation for small wetlands. There is also a draft resolution from China to host an International Mangrove Centre.
- China has submitted a draft resolution to establish the International Mangrove Center. It is supported by Cambodia and Madagascar.

The COP Objectives and aims:

- The Conference of the Contracting Parties invites Parties to this international mangrove cooperation scheme for technical and educational exchanges, collaboration research, education, training, and pilot projects in conservation and restoration.
- This is to help protect and enhance mangrove ecosystem services, climate resilience, and mangrove biodiversity.

What is Ramsar Recognition?

- Ramsar sites are wetlands of international significance under the Ramsar Convention. Also known as the 'Convention on Wetlands,' the Ramsar Convention was established in 1971 by UNESCO and is named after Ramsar, Iran.
- Ramsar recognition identifies wetlands in the world.
- They are especially important if they provide habitat for waterfowl (about 180 species).
- International cooperation is encouraged in conservation of these wetlands and their judicious and sustainable use.
- India's Ramsar Wetlands cover 11,000 km, or around 10% of India's total wetland surface. They are distributed across 18 States.
- Despite the fact that no other South Asian country boasts as many sites, this is due to India's geographic breadth and tropical diversity.
- **Criteria:** To be considered for the Ramsar Site, one of the nine criteria must be met.
- **Criteria 1:** It must contain a unique, representative, rare or exceptional example of a near-natural or natural wetland type that is found in the relevant bio-geographic area.
- **Criteria 2:** If it is vulnerable, endangered, critically endangered or threatened species.
- **Criteria 3:** If it supports species of plants and/or animals that are important to maintaining the biological diversity in a specific bio-geographic area.

- **Criteria 4:** If it provides support for plant or animal species at an important stage of their lives, or offers refuge from adverse conditions.
- **Criterion 5** If it supports at least 20,000 waterbirds per year.
- **Criterion 6** - If it supports at least 1% of individuals of a particular species or subspecies, of waterbirds.
- **Criteria 7:** If the habitat supports significant numbers of native fish species, families, life-history stages and species interactions, and/or populations that contribute to global biological diversity.
- **Criteria 8:** If it's an important food source for fishes, spawning grounds, nursery, and/or migration route on which fish stocks, whether within the wetland, or elsewhere, are dependent.
- **Criteria 9:** If it supports at least 1% of the population of one non-avian species of wetland-dependent animal species.
- Significance:
- Ramsar Tag assists in the development and maintenance of an international network of wetlands which are essential for the conservation global biological diversity as well as for human life by maintaining their ecosystem components, benefits and processes.
- The convention has strict guidelines for protecting sites.

Status mangroves in China:

- China's mangrove forests are growing at the northern end of the global distribution of mangroves.
- China is limited by the low temperatures and has fewer mangroves than other Southeast Asian countries.
- These countries are the center of global mangrove distribution.
- China's mangroves were found in the provinces Hainan and Guangdong, Guangxi and Fujian, and Hong Kong and Macao, respectively (which the People's Republic considers its province).
- These areas are found in the country's extreme tropical south.
- China's government and three partners released the Report on China Mangrove Conservation and Restoration Strategy Research Project 2020.
- This document was China's first comprehensive research report on the state of mangroves.

- It can be found on the Global Mangrove Alliance's website.
- It was also reported that the mangroves in China have declined since the 90s.
- fell sharply to 22,000 ha in 2000, just 45 percent of the area of the 1950s.
- India's position on China's proposal for an International mangrove center Mangroves. It is more tropical than temperate.
- There is a lot of experience in tropical countries like India and.
- Indonesia and Bangladesh have the highest conservation, restoration, and quality standards.
- Socio-economic aspects mangroves.
- A more international centre would be better served if hosted by these countries than a country in the middle of the ocean, where mangrove issues and diversity are much greater than those of a tropical one.

What are the Wetlands?

- Wetlands ecosystems that are permanently or seasonally flooded with water.
- These include mangroves as well as marshes, rivers and lakes, as well as floodplains and flooded forest, river-banks, rivers, deltas and flooded waters, and rice-fields.
- Although they only cover 6% the Earth's surface, 40 all animal and plant species are found in wetlands.

Wetland

- About Mangrove:
- Mangroves are small trees or shrubs that grow along coasts and take root in salty sediments.
- The term "mangrove" can refer to either the whole habitat or the trees and shrubs within the mangrove swamp.
- Mangroves are flowering trees that belong to the Rhizophoraceae and Acanthaceae families Lythraceae Lythraceae Lythraceae Combretaceae and Arecaceae.

Mangrove Features:

- **Saline environment:** They can live in extremely hostile environments like high salt and low oxygen. Mangroves have special roots called pneumatophores or breathing roots.
- These roots are equipped with many pores that allow oxygen to enter the underground tissues.
- **Survival under Extreme Conditions:** Mangrove trees thrive in extreme conditions, where their roots are submerged in water. This allows them to survive in hot, muddy and salty environments that would kill most other plants.
- **Succulent leaves:** Mangroves are similar to desert plants in that they store fresh water in thick, succulent leaves.
- The leaves have a waxy coating that seals the water in and reduces evaporation.
- Viviparous The seeds of these seedlings germinate while they are still attached to their parent tree.
- The seedling becomes a propagule once it is germinated.
- The mature propagule drops into the water, and is then transported to another spot. Eventually it takes root in solid ground.

Geographical Position:

- Because they can't withstand freezing temperatures, mangroves should be found along tropical or subtropical coastlines.
- They have the unique ability to grow within the reach of salty tides.
- Area Covered
- Global Mangrove Cover
- The world's total mangrove area is approximately 1,50,000 km2.
- Asia is home to the most mangroves in the world.
- South Asia covers 8% the world's mangrove forest.
- India contributes 8% to South Asia's mangrove coverage.
- Mangroves of India

Coverage:

- According to the India State of Forest Report 2019, India's mangrove coverage is 4,975 square kilometers, which is 15 of India's total geographic area.

- India's mangrove coverage is 45% in West Bengal, Gujarat at 23.66% and A&N Islands at 12.39%.

Largest Mangrove Forest in the World:

- Sundarbans, West Bengalare one of the most extensive mangrove forest areas in the world. It is a UNESCO World Heritage Site.
- The Royal Bengal Tiger, Gangetic dolphins, and Estuarine Crocodiles call the forest home.
- Bhitarkanika Mangroves - Bhitarkanika, Odisha's second largest mangrove forest, is Bhitarkanika created by the river deltas River Brahmani & Baitarani.
- It is one the most important.
- India's Ramsar Wetlands.
- **Godavari** -Krishna Mangroves in Andhra Pradesh: From Odisha to Tamil Nadu, the **Godavari** -Krishna mangroves are located.
- Mangrove forests can be found in the Ganges and Cavery rivers.
- Mangrove forests are abundant in Kerala's backwaters.
- Pichavaram, Tamil Nadu is a large expanse of water that has been covered with mangrove trees. Many aquatic bird species call it home.
- **Mangroves :** Threats to
- Commercialisation Of Coastal Areas.
- Aquaculture and coastal development are quickly replacing salt-tolerant trees as well as the ecosystems that they support.
- In the past 40 years, mangrove coverage has declined by half.
- Mangroves make up less than 1% of the tropical forests.
- **Shrimp farms:** Shrimp farms have caused at most 35% the overall loss in mangrove forests.
- **Temperature-Related Problems:** A temperature fluctuation of ten° within a short time period is enough stress for the plant to damage it. Some mangrove species can also be killed by freezing temperatures, even for a few hours.
- **Soil-Related Problems:** The soil in which mangroves are planted poses a problem for plants because it is very low in oxygen.
- **Excessive Human Interference:** Mangroves used to be able to move farther inland during past sea level changes.

- However, in many areas, human development has created a barrier that restricts the distance a mangrove forest is able migrate.
- Oil spillages can also be a problem for mangroves.

Conservation of Mangroves:

- UNESCO Designated Sites The inclusion of mangroves into World Heritage sites, Global Geoparks helps to improve the management, conservation, and knowledge of mangrove ecosystems around the globe.
- International Society for Mangrove Ecosystems (ISME) The ISME was established in 1990 with the goal of encouraging the study and management of mangroves.
- Blue Carbon Initiative The International Blue Carbon Initiative focuses on mitigating the effects of climate change through restoration and conservation of marine and coastal ecosystems.
- It is coordinated by Conservation International, IUCN and the Intergovernmental Oceanographic Commission UNESCO (IOC UNESCO).
- International Day for the Conservation of the Mangrove Ecsystem: UNESCO celebrates this day on July 26, with the goal of increasing awareness and promoting sustainable management of mangrove ecosystems.
- **Mangroves for the Future Initiative:** UNDP and IUCN created a unique initiative called "Mangroves for the Future" to encourage investment in coastal ecosystem conservation.
- These member countries include Bangladesh, Cambodia and India as well as Maldives, Myanmar (Malaysia), Pakistan, Seychelles (Sri Lanka), Thailand, Vietnam, and Sri Lanka.
- National Mangrove Committee In 1976 , the Government of India established a National Mangrove Committee that advises the government on the conservation and development of mangroves.

Topic 20. SMOG

Important for subject: Environment

Delhi's smog is on the rise

- Smoke and fog are the two main ingredients of the word "smog".

- This is the most prevalent form of air pollution found in cities around the globe.

There are two types:

- Classical smog is found in cooler, humid climates.
- It's a combination of smoke, fog, and sulphur dioxide.
- It is chemically a reducing mixture, so it is sometimes called reducing smog.
- In warm, dry, and sunny climates, photochemical smog is common.
- Photochemical smog is mainly caused by the sunlight's action on unsaturated hydrocarbons, and nitrogen oxides that are produced by factories and automobiles.
- Photochemical smog is characterized by a high concentration of oxidising agent and is therefore known as oxidising fog.
- Formation photochemical smog
- A variety of pollutants are released into the atmosphere when fossil fuels are burned.
- Hydrocarbons (unburnt fossil fuels) are two of the pollutants that can be emitted.
- These pollutants can build up to sufficient levels and cause a chain reaction with sunlight.
- NO is then converted into nitrogen dioxide (NO2) when it comes in contact with the sun.
- This NO2 absorbs sunlight energy and is broken down into nitric oxide or free oxygen.
- Oxygen atoms, which are highly reactive, combine with O2 in the air to create ozone.
- To regenerate NO2, the ozone created in the reaction (ii), reacts quickly with the NO(g), formed in reaction (i).
- The brown gas NO2 can cause haze if it is present in sufficient quantities.
- Ozone is a poisonous gas.
- Both NO2 and O3 can react with unburnt hydrocarbons to create chemicals like formaldehyde (PAN), acrolein, and peroxyacetyl-nitrate (PAN).
- Photochemical smog
- Photochemical smog is composed of ozone (PAN), nitric oxide (Nitric oxide), acrolein and formaldehyde. Photochemical smog can cause serious health problems.
- Ozone and PAN are both powerful eye irritants.
- High concentrations of nitric oxide and ozone can irritate the nose, throat, and cause headaches, dryness, difficulty breathing, chest pain, dryness, dry throat, and cough.
- Photochemical smog can cause cracking and severe damage to plants.

- It can also cause corrosion of metals and stones, building materials, rubber, and painted surfaces.

How can you control photochemical smog?

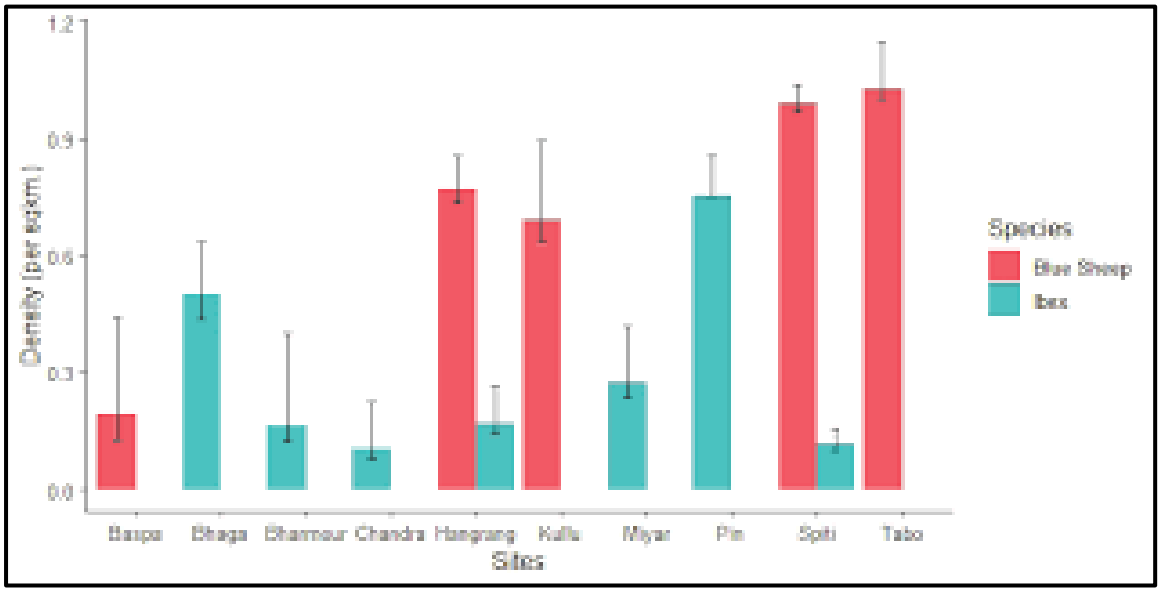
- There are many ways to reduce or control the formation of photochemicals smog.
- The photochemical smog can be controlled by controlling the primary precursors like NO2 and hydrocarbons.
- Secondary precursors like ozone or PAN can also be controlled.
- Catalytic converters, which are found in automobiles, prevent the release or hydrocarbons from the atmosphere. Certain plants e.g., Pinus, Juniparus, Quercus

Why is there more smog in winter?

- Low temperatures
- Slow wind
- Stubble Burning

Topic 21. THE SNOW LEOPARD POPULATION ASSESSMENT OF INDIA (SPAI)

Important for subject: Environment



It was the first ever recorded snow leopard in Baltal-Zojila, reviving hopes of finding the mysterious predator at higher altitudes in Jammu and Kashmir and Ladakh.

- Researchers from Nature Conservation Foundation (India) used camera traps to capture rare and endangered species.
- They partnered with J&K's Department of Wildlife Protection.
- The Snow Leopard Population Assessment of India has been completed in Himachal Pradesh as well as Uttarakhand.
- These two States have a population estimate of 50 and 100 great cats, respectively.
- Because they are the most dominant predator in the food web, the Snow Leopard is an indicator of the health of the mountain ecosystem where they live.
- The Snow Leopard is found at high elevations in steep mountains of Central Asia and Southern Asia, as well as in extremely cold temperatures.
- They live in the high Himalayan and trans-Himalayan areas of the states/union territories Jammu and Kashmir (Uttarakhand, Himachal Pradesh), Uttarakhand, Sikkim and Arunachal Pradesh).
- India is one of the few countries that has 5 big cats including Snow.
- **Leopard.** The remaining 4 are Lion, Tiger and Common Leopard.
- Snow Leopard capital in the world is Hemis, Ladakh.
- Hemis National Park, India's largest national park, is home to Snow Leopard.
- **Threat:** The factors that contributed to the decline of snow leopard populations are illegal poaching, reduced prey numbers, increased human infiltration into the species habitat, and illegal trade in wildlife parts and products.
- Protection:

IUCN Red List- Vulnerable

- Convention on International Trade in Endangered Species. (CITES). Appendix I Convention on Migratory Species.
- Appendix 1 includes threatened species.
- Indian Wildlife (Protection) Act 1973- Schedule I
- Schedule I offers absolute protection, and the most severe penalties are for offences.

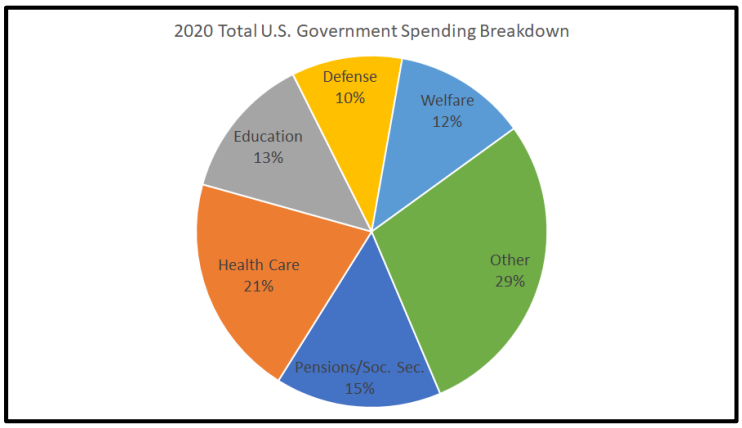
India Launches Conservation Efforts:

- **Himal Singhak:** This community volunteer program, which protects snow leopards, was launched 23 October 2020.

- In 2019, First National Protocol, also launched Snow Leopard Population Assessment. This has been extremely useful in monitoring the populations.
- **SECURE Himalaya -** Global Environment Facility (GEF),United Nations
- The project was funded by the Development Programme (UNDP).
- It focuses on conserving high-altitude biodiversity and decreasing the dependence of local communities on it.
- The project is currently operational in four states that border the snow leopard range, which are Jammu and Kashmir (Himachal Pradesh), Uttarakhand, Sikkim, and Uttarakhand.
- **Project Snow Leopard:** This project was created in 2009 to encourage an inclusive and participative approach to conserving snow leopards and their habitat.
- The Ministry of Environment Forest & Climate Change has included Snow Leopard in its list of 21 critically endangered animals.
- Snow Leopard conservation is underway at Padmaja Naidu Himalayan Zoological Park Darjeeling (West Bengal).

Topic 22. GOVERNMENT SPENDING

Important for subject: Economy



Increase in incremental spending-Govt looks at a bigger fiscal problem. The challenges in achieving the fiscal deficit goal-fiscal deficit goal of 6.4 percent of GDP in 2022-23.

Additional sources of spending:

- Rozgar Mela -- a recruiting drive to hire 10 lakh employees in 38 departments and ministries.
- The increase in allocations is for administrative and security preparations to prepare for preparations for the G20 summit.

- Increased subsidy for fuel, food and fertilisers due to an overinflated bill for subsidies and an expansion of the scheme of free foodgrains.
- Space is reduced to reduce spending by different ministries because of the higher cost of transport due to the high cost of fuel.

Other Concerns:

- There is a chance of another rate increase from Federal Reserve Federal Reserve- cause capital outflows, and the twin deficit issue.

Positives: Can the fiscal target be met?

- Tax revenues that are higher.
- Nominal GDP is due to inflation that is high. Reduce the fiscal deficit to the GDP ratio.

Twin Deficit Issue:

- Current account deficit and fiscal Deficit (also called "budget deficit" is a situation where the nation's expenditure surpasses its revenues) are referred to as twin deficits. They frequently reinforce one another, i.e. an increase in the fiscal deficit can lead to a higher CAD, and vice in reverse.
- A fiscal deficit is the difference between total government's expenditure and the total revenues (excluding taking loans).
- Fiscal deficit, in layman's language refers to the debts and obligations of the government.
- According to the definition of technical terms Fiscal Deficit is defined as Budgetary Deficit minus Borrowings as well as Other obligations of the government.
- The term "deficit" is different from "debt," which is the accumulation of annual deficits.
- The main components in the financial deficit include capital expenditure and revenue deficit.
- The revenue deficit is the difference between government's revenue expenditure and the total revenue earned.

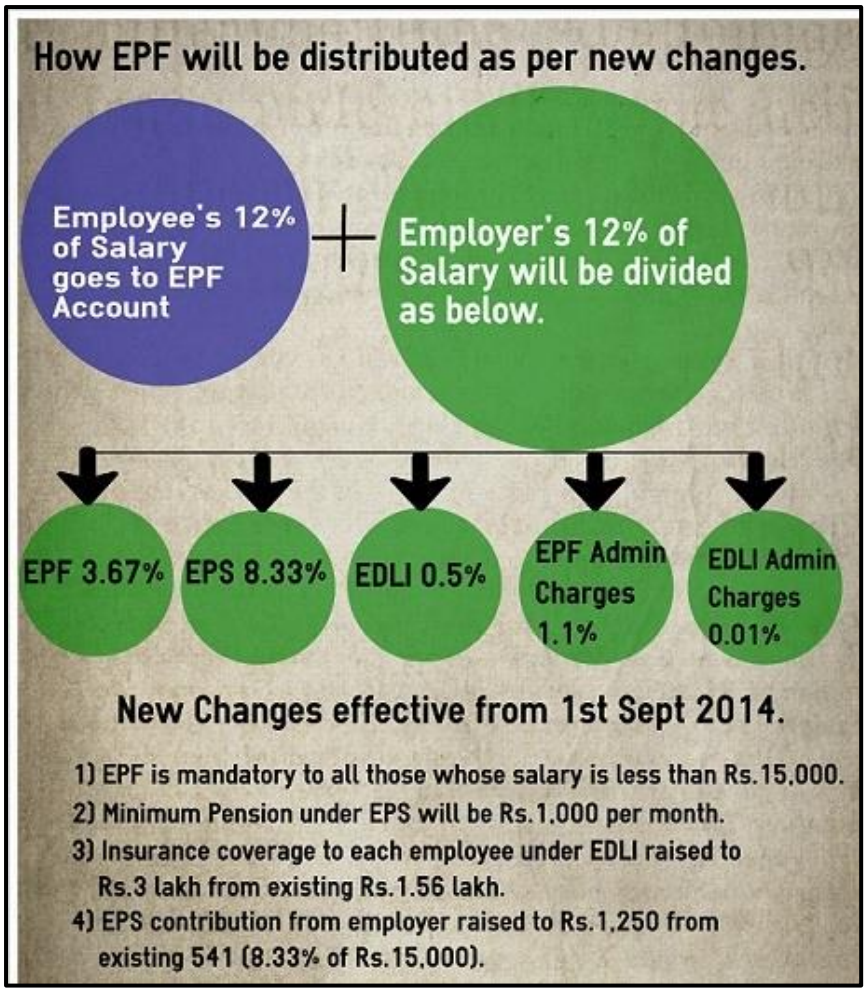
- The current deficit in the account is the measure of the trade of a nation's economy when the value of goods as well as services they import is greater than the value of goods and services it exports.
- The Current Account is trading balance (exports plus imports of imports of services and goods) and the net income of factors (such as dividends and interest) plus net transfers (such as aid to foreign countries).

How do the two deficits are connected-the double deficit hypotheses:

- In macroeconomics the twin deficits hypothesis (also known as the twin deficits phenomena) refers to the idea that, theoretically there is a significant causal connection between a nation's budget balance as well as its current balance in its account.
- Y=C+I+G+(X-M)
- This equation is used to represent GDP as every aspect of production in an economy (the left-hand part of this equation) is referred to as consumption (C) (C), investment (I) as well as government spending (G) and other products that are exported to the outside in excess of the imports (NX).
- Another equation that defines GDP--- C+S+Y(Y-C-T=S)
- The national income also is the same as output.
- Every individual's income goes either to finance consumption (C) or in order to cover taxes (T) or it is kept (S).
- Form first and second equation we get-S=G-T+NX+I or (S-I)+(T-G)=(NX)-shows the twin deficit relation
- (T-G) has a negative value, there is an budget deficit.If the deficit in the budget increases while saving stays the same, this equation suggests the investments (I) must decrease (see the crowding out) and net exports (NX) must decrease and cause an increase in trade deficit. Thus, a budget deficit could lead to an increase in trade deficits, which can result in an unintended deficit.

Topic 23. EPFO NORMS

Important for subject: Economy



EPFO reduces the with drawal requirements for subscribers to EPS-95.

- Specifics-various modifications that were approved
- It was a way to withdraw accumulations of Employees' Pension Scheme 1995 for subscribers with not more than six months remaining.
- In the past, subscribers who had under six months service left could draw the money from their employee's pension account.
- However, they could only withdraw the funds.
- A redemption policy is in place for investment within Exchange traded fund (ETF) units.
- Audited Annual Account with regard to the EPF Scheme 1952, EPS Scheme 1995 and Employees' Deposit Linked Insurance (EDLI) Scheme 1976.
- 11 proposals for surrender/cancellation of exemption from EPF Scheme.

- Information Security Policy of the EPFO.

Employees' Provident Funds (EPF) scheme

- EPF is a savings requirement scheme that is governed by the Employees Provident Funds as well as Miscellaneous Provisions Act of 1952.
- It is administered by the Employees' Provident Fond Organisation (EPFO).
- It includes every establishment where at least 20 people are employed (and certain other establishments that are notified by Central Government even if they employ less than 20 people each).
- EPF scheme is compulsory for those who earn the basic salary of Rs. 15,000 per month.
- The employee must contribute a specific amount towards the fund for provident which is then paid to the employer on an annual basis.
- At the time of retirement or in the course of the service (under certain conditions) the employee receives the lump sum sum, including the interest earned on PF that was accumulated, which is credited to the
- The Central Board of Trustee, which is the primary organ of decision making for EPFO and EPFO, makes a decision regarding the rates of interest to be paid on reserve fund every year.
- EPFO has the interest rate after it has been approved by the government's finance ministry.

Employees' Provident Fund Organisation (EPFO)

- It is a government-owned institution that oversees the provident fund and pension accounts for member employees.
- It also implements legislation such as the Employees' Provident Fund and Miscellaneous Provisions Act, 1952.
- The Employees' Provisional Fund Act and Miscellaneous Provisions Act of 1952, allows for the establishment of funds to provide for employees working in factories as well as other establishments.
- It is run under The Ministry of Labour & Employment, Government of India.
- The EPFO's apex body for decision-making Central Board of Trustees (CBT) is headed by Union Labour Minister Employees Pension Scheme (EPS-1995):

- It is a scheme for social security which was introduced in 1995.
- The program, run by EPFO provides pensions for employees of the industry after retirement age of 58.
- Employees who belong to EPF immediately become employees of EPS.
- Both the employer and employee pay 12% of an employee's per-month salary (basic wages and an allowance for dearness) towards the Employees Provident Fund (EPF) scheme.
- Of the employer's portion of 12 percent, 8.33 % is diverted to the EPS. Central Govt. also contributes 1.16 percent of monthly salaries of employees.

Topic 24. FAR BONDS

Important for subject: Economy

Investors from abroad have sold Indian government bonds worth more than 500 million dollars in the last two weeks, with the FAR bonds taking the majority of the selling.

Causes:

- Market participants attributed the sudden shift to the Fed's policy decision to be announced on Wednesday.
- Sad in the fact that Indian government bonds won't be included in international bond indexes.

Securities from FAR:

- To draw capital flow to bonds, Budget 2020 announced a program that permits foreign investors to purchase unlimited amounts of government bonds through the completely available method (FAR).
- It was a major change in policy that saw the government planted the seeds for India's inclusion on the world index.
- It has created a distinct channel dubbed Fully Accessible Route (FAR) that allows non-residents to invest in certain Government of India dated securities .
- "Specified Securities" refers to Government Securities as periodically notified by the Reserve Bank for investment under the FAR route.
- The RBI has announced that any new government securities (G-secs) that have 5-year, 10 year, and 30-year tenors will be able to be invested as specific securities.

- So, non-resident investors can invest in government securities, without being considered required to meet any investment limit.

Existing routes other than FAR:

- The medium Term Framework (MTF) for Foreign Portfolio Investment (FPI) in Central Government Securities (G-secs) and State Government Securities (SDLs) was announced in October 2015.
- A Voluntary Retention Route (VRR)encourages Foreign Portfolio Investors to make longer-term investment in Indian credit markets.
- The total investment limit will be Rs 40,000 crores in the case of VRR-Govt and 35,000 crores in VRR-Corp.
- The minimum retention period must not exceed three years.
- For this period FPIs are required to keep a minimum of 75 percent of the allocation in India.
- Limits for investment will be accessible for investment and will be allocated by the Clearing Corporation of India Ltd. (CCIL) on a first come first served basis.

Emerging Markets Bond Index (EMBI):

- Emerging markets Bond Index (EMBI) is an index used to measure the return performance of corporate and international government bond issued by the emerging market nations that meet certain needs for liquidity and structural requirements.
- The index for emerging markets bond (EMBI) is a measure of the performance of bonds that are issued in emerging markets.
- It was first released by the investment lender JP Morgan.
- Emerging market securities are credit instruments issued by developing countries.
- They generally have higher yields than government bonds or corporate bonds issued by developed countries.
- The majority of the benchmark EMBI index is based on the emerging debt of sovereigns, while the remainder of it being local corporate bonds.

Need

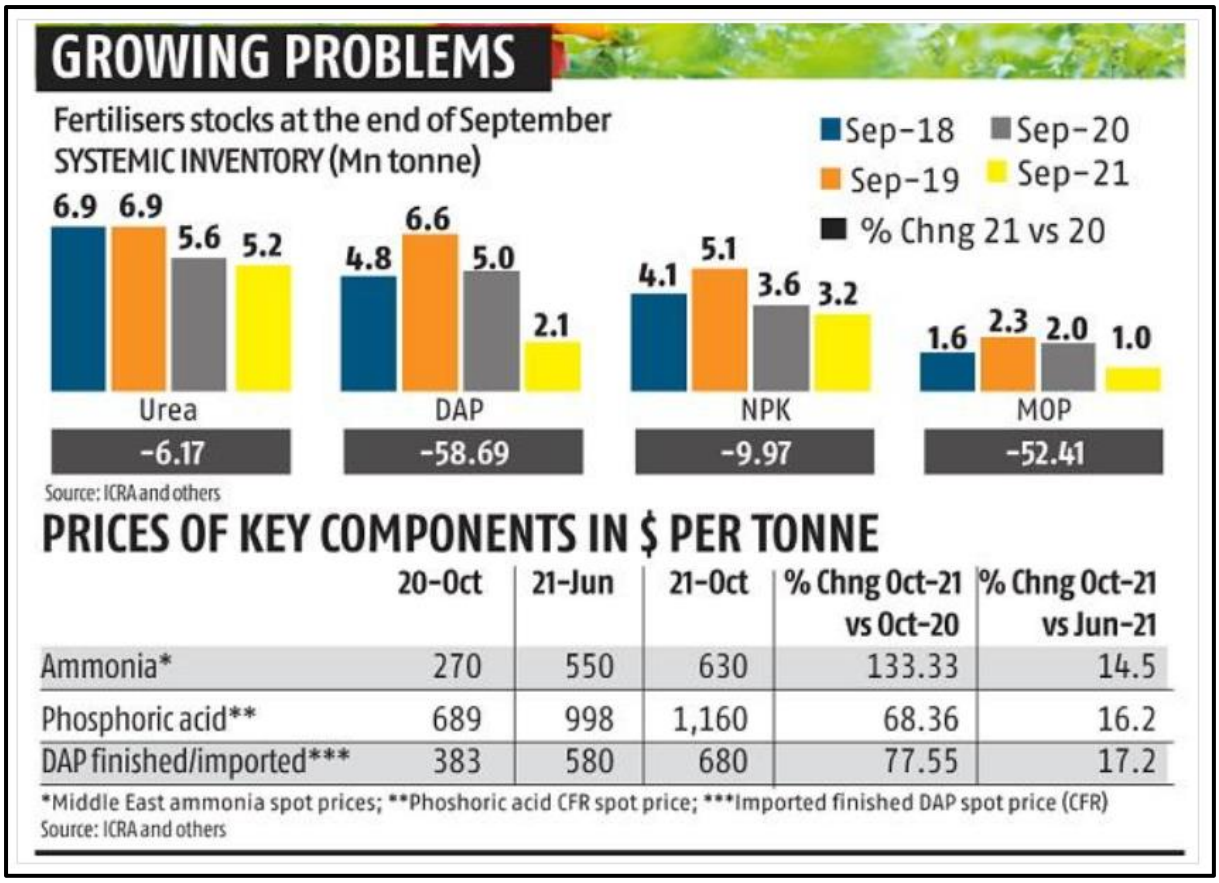
- Despite their higher risk in comparison to developed markets emerging market bonds have many benefits, such as diversification of portfolios since their returns aren't closely with the traditional assets classes.
- In other words, global bond indexes assist investors to track the changes of bonds across different jurisdictions and help in comparing them.

What are the essential criteria for inclusion in indexes?

- The countries must comply with the parameters regarding safety, liquidity, and returns. The most important parameters are
- Market size
- The rating of the country
- Accessibility
- Criteria for index inclusion at the country level includes
- The absence of any restrictive laws regarding the movement of capital
- Forex is readily available
- A proper hedge mechanism
- Tax laws
- Settlement of trade
- Examples-The JPMorgan Emerging Market Bond Index (EMBI) are a collection of three indexes for bonds that identify the bonds of emerging markets, which are managed through J P Morgan.
- The three indices are: comprised of the Emerging Markets Bond Index plus and the Emerging Markets Bond Index Global and the Emerging Markets Bond Global Diversified Index.
- A version for external debt of the index, it is called EMBI+ is the JPMorgan Global Index of the EMBI.

Topic 25. FERTILIZER SUBSIDY

Important for subject: Economy



PRICES OF KEY COMPONENTS IN $ PER TONNE

	20-Oct	21-Jun	21-Oct	% Chng Oct-21 vs Oct-20	% Chng Oct-21 vs Jun-21
Ammonia*	270	550	630	133.33	14.5
Phosphoric acid**	689	998	1,160	68.36	16.2
DAP finished/imported***	383	580	680	77.55	17.2

*Middle East ammonia spot prices; **Phoshoric acid CFR spot price; ***Imported finished DAP spot price (CFR)
Source: ICRA and others

The Cabinet Committee on Economic Affairs has approved a subsidy of Rs51,875 crore for potassic and phosphatic fertilizers during the rabi season.

- It is in line with the commitment to guarantee accessibility of P&K (phosphatic and potassium) fertilizers to farmers at reasonable prices as well as fluctuations in international prices for fertilizers.
- The subsidy for P&K fertilizers, including assistance for indigenous fertilizers via transportation subsidy will be offered in accordance with the nutrient-based subsidies (NBS) rates that have been approved from the CCEA.

Different types that fertilizers can be:

- Primarily used fertilizers include Nitrogen, Phosphorus, Potassium
- Nitrogenous - Urea
- Phosphatic - Di-ammonium Phosphate
- Potassic the Muriate of Potash (MoP) fertilizers.

- Secondary fertilizers comprise Calcium Sulphur, Magnesium, and Calcium.
- Some micronutrients include - Zinc, Iron, Boron, Chloride etc.

Subsidy

- Subsidy on Urea Subsidy on Urea Centre offers a subsidy on fertilizer producers based on the basis of the cost for production in each facility and the producers must sell fertilizer at a government-set Max Retail Price (MRP).
- The farmers pay a set price in the amount of 242 rupees for each bag (45 kg) that covers 20% of the cost of production.
- The remaining amount is paid to the state as a subsidy for fertilizer plants.
- **Subsidy on non-urea fertilizers:** The retail prices of Potassic and phosphatic (P&K) fertilizers which includes DAP as well as Mop were deregulated (that is, fixed by companies) in the year 2010 following an introduction of a fixed-subsidy program as part of the NBS mechanism.
- The Nutrient-Based Subsidy (NBS) Program for fertilizers was launched in the year 2010.
- In the scheme it is it is a set amount of subsidy determined annually is given to every grade of subsidized Phosphatic as well as Potassic (P&K)
- fertilisers,except the one for Urea, that are based on the nutrients that they contain.
- In addition fertilizers that are supplemented with micro and secondary nutrients like molybdenum (Mo) and zinc are also subsidized.
- The scheme is managed under the Department of Fertilizers under the Ministry of Chemicals & Fertilizers.
- The subsidies on Phosphatic as well as Potassic (P&K) fertilizers has been declared by the Government annually for each nutrient, on an individual basis per kilogram.
- The rates are calculated in accordance with the prices in the world and at home for P&K fertilizers, exchange rates and inventory levels in the country, etc.
- NBS policy is to increase the use of P&K fertilizers to ensure that the optimal equilibrium (N:P:Kequals 4:2:1)of NPK fertilization is reached.
- **Current regime of fertilizer subsidy: Partial DBT (Since April , 2018)**
  The subsidy is given to fertilizer companies, but its primary recipient is the farmer, who is responsible for paying MRPs lower than market-determined rates.

- The producers of fertilisers (urea) get 100% the subsidy following fertilizer is handed over directly to farmers and also the farmer's identity is verified. Aadhaar is recognized at the points of sale (PoS) machine located at the shop of the dealer.
- The makers sell urea for the price of maximum retail (MRP) set by the Centre and is maintained at a minimum.
- They also receive subsidies on a per unit base under the newly introduced pricing system (NPS).
- Prices for MRPs in fertilizers that are not urea-basedare determined by the firms.
- The Centre offers an flat-per-tonne subsidy for these nutrients in order to ensure thatthey have a price that is at "reasonable amounts (based on Nutrient Based Subsidy Scheme)
- The government has implemented an Direct Benefit Transfer (DBT) system for Fertilizers beginning in October 2016, as well as it is expected that the Pan-India Roll out has been completed by March of this year.
- In the fertilizer DBT system, 100% subsidy for various fertilizer grades is paid to fertilizer manufacturers on the basis of the actual sales made by retailers to recipients.
- Sale of all fertilizers that are subsidized to buyers and farmers is carried out via the Point of Sale (PoS) devices that are installed in each shop of the retailer and the beneficiary is identified using Aadhaar Card, KCC, Voter Identity Card and so on.

Topic 26. SOVEREIGN GREEN BONDS

Important for subject: Economy

It is believed that the Indian government is set to launch in the market of green bonds in the near future as outlined in the Union Budget.

- The Finance Minister, in the speech she gave in her Budget 2022 speech said she will issue green bonds that are sovereign.
- Indian firms have been making use of the international green bond market with other segments, besides green bonds, including sustainability-linked bonds (SLBs).

What is the Significance of Sovereign Guarantee to Green Bonds?

- Sovereign green is an strong signal of intention regarding sustainable development and climate action to regulators and governments.

- It will stimulate growth in the domestic market and provide an incentive for institutional investors.
- Thus the country will attract an entirely new class of investors into the market for debt in India.
- It will offer benchmark prices as well as liquidity and an opportunity to demonstrate the effect of the local market, helping in the development of local markets.
- Sovereign green bond can help in the growth of electric buses and related charging infrastructures in India by offering cost-effective financing options.
- This will help you can raise capital for the green transformation of India.
- Corporates have issued Green Bonds in India however the country's global percentage was only 1 percent in the first quarter of 2022.
- It is a kind of fixed-income instrument specifically designed to raise funds for environmental and climate-related projects.
- First green bonds was released on the 1st of 2007, by European Investment Bank, the EU's lending arm.
- The same year, it was followed after by the World Bank. Since then, numerous corporate and government agencies have joined the market to finance green initiatives.
- They are usually tied to assets and are secured by the balance sheet So they generally have similar credit ratings of their counterparts' other debt obligations.
- These bonds are designated to promote sustainability and help fund climate-related or other kinds of special environmental initiatives.

Aims and Objectives:

- They aim at environmental efficiency, pollution reduction sustainable agriculture, sustainable forest and fisheries as well as protecting ecosystems of terrestrial and aquatic life and clean transportation, clear water as well as sustainable management of water.
- They also support the development of green technologies as well as the reduction of climate changes.

Countries which have issued green bonds issued by sovereign governments:

- Belgium, Chile, Denmark, Egypt, Fiji, France, Germany, Hong Kong, Hungary, Indonesia, Ireland, Italy, Lithuania, Mexico, Netherlands, Nigeria, Philippines, Poland, Serbia, Seychelles, South Korea, Spain, Sweden and UK

A Sustainability-linked bond (SLB)

- It is a fixed-income instrument (Bond) with its financial or structural attributes are tied to predetermined sustainability/ESG goals.
- The objectives are evaluated using defined Key Performance Indicators (KPIs) and compared against the pre-defined Sustainability Performance Targets (SPTs).
- SLBs are able to finance every corporate endeavor and the proceeds are not required to be allotted specifically to projects.
- However, the issuer is committed to achieving high-level, scientifically-based, and quantifiable Sustainable Performance Targets (SPTs)around pre-determined KPIs and has them reviewed by an outside entity.
- Bonds which use the profits to fund or refinance social or green projects, or a mixture of both are referred to as Green bonds, sustainability and social bonds.
- They cannot be confused with SLBs.
- SLBs are bonds that the proceeds of the issuance cannot be restricted to green or sustainable reasons (unlike "use of proceeds" green bonds or sustainable bonds) and are used for general corporate use or for other purposes.

Topic 27. CAPTIVE MINES

Important for subject: Economy

Mining companies that are captive and producing important minerals could soon be able to sell only a fraction of their output on the market.

Captive Mines

- These are mines owned by corporations.
- The coal or minerals extracted by these mines is sole use by the company that owns the mines.
- The company is not able to sell its coal or mineral products to anyone else.
- Certain companies that produce electricity had captive mines.
- Example Apart from coal mines, captive mines can produce minerals like Bauxite or iron copper, limestone potash, lead, and zinc.

- Mines and Minerals (Development and Regulation) Act, 1957empowered central to reserve a mine to be used for a specific purpose. These were the mines that were captive.
- The government modified the MMDR Act in 2021, allowing the sale on the open market 50 percent of the annual produced from mining captives, subject to limitations, and only after paying an additional money to state governments in the form of royalty
- Presently captive mine operators can sell 50 percent of their annual output of the mines they operate, however, only after they have met all the requirements of the plant that will be used that a block of minerals was initially allotted to the federal government.

Non-Captive Mines

- Non-captive Mines are mining operations that produce coals of minerals can be utilized to consume it for personal use in addition, for the sale of it for sale.

Topic 28. INDIA INFRASTRUCTURE PROJECT DEVELOPMENT FUND SCHEME

Important for subject: Economy

A plan to provide assistance in the development costs for Public Private Partnership (PPP) infrastructure projects.

India Infrastructure Project Development Fund Scheme

- It is a plan to provide financial Support for Project Development Expenses of PPP Projects.
- It is aimed at increasing the speed and quality of infrastructure development across the country through increasing private sector participation in the construction sector.
- It is an Central Sector Scheme that will assist in the in the development of high-quality PPP initiatives by providing financing support to authorities responsible for the project's sponsorship as well as both the central as well as State Governments, to create an array of bankable and feasible PPP projects to achieve the goal that modernized infrastructure is needed for our nation.
- As part of the scheme called the "India Infrastructure Development Fund' (IIPDF), Project Sponsoring Authorities (PSA) will receive assistance of up to Rs 5 crore.
- The funds will be used for covering project development costs and expenses.
- Costs incurred by PSA with respect to feasibility studies, environmental impacts studies, financial structure legal reviews, and preparation of project documents such as concession agreements commercial assessment studies project grading, etc.

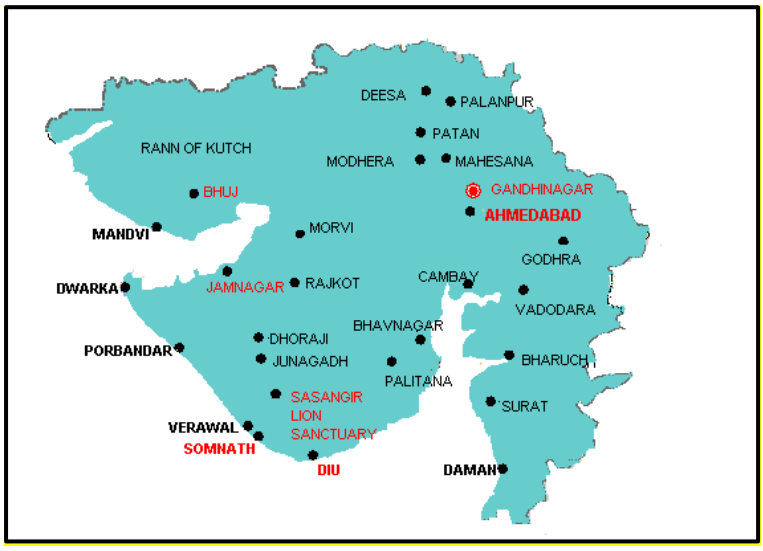
- The government could utilize funds from the IIPDF Scheme to employ consultants/TAs on specific assignments of professional services, which includes aiding States/UTs.
- This does not include the costs that PSA employees.
- PSA on its staff, but could be used to pay for consultants and advisors to transactions.
- The funding under the IIPDF Scheme is an addition to the operational Scheme to Provide Financial Assistance to PPPs for the field of Infrastructure (VGF Scheme).
- Funding received under the IIPDF Scheme will not be recouped.

VGF Scheme

- Infrastructure projects implemented through the PPP model that are financially justified, however, they are not commercially viable and therefore financially viable, are.
- In this plan, PPP in areas like wastewater treatment and solid waste management, health, water supply , and education could be eligible for 30 percent of the project costs by the Centre.
- In addition the pilot projects in education and health, which have at minimum 50% cost recovery from operations could receive as high 40 percent of total project's cost through the government central office.
- The Centre and States will jointly bear 80percent of the capital costs of the project, and 50% of the operation and maintenance costs for these projects for the initial five years.

Topic 29. THE FIRST FULLY SOLAR VILLAGE

Important for subject: Geography



Modhera is a village in Modhera in Western India's Gujarat the state is declared as the first solar-powered village that is completely solar.

- Modhera was the very first town in India to be an energy producer that is net renewable.
- The village covers a total geographical area of about 2,436 hectares .
- It is situated on the banks of Pushpavati river within the state of. It is the nation's first solar-powered village.
- The village is home to a solar power plant that is mounted on the ground as well as more than 1,300 solar panels on rooftops with 1kW power have been installed on homes for the purpose of producing electricity.
- The solar panels are connected to the battery energy storage technology (BESS).
- In the daytime solar panels will supply power to the village at night, BESS, India's first grid-connected megawatt-hour scale battery power storage technology, will supply electric power to the houses.
- The project, which is located in Modhera is funded by the state and federal government with a total of 10 million dollars.
- The project consisted of putting up more than 1,300 rooftop solar panels in the government and residential buildings.
- They were connected to the power plant.
- The government purchases excess energy from the residents who do not make use of all the capacity allotted to households.

Topic 30. WHERE MAUNA LOA, HAWAII'S BIGGEST VOLCANO, WILL ERUPT FROM

Important for subject: Geography

The earth is shaking and expanding in Mauna Loa, the largest active volcano in the world, indicating that it is likely to be erupting. Scientists don't anticipate to see it happen immediately however, people of Hawaii's Big Island of Hawaii are instructing residents to be prepared for the possibility of eruption in the near future.

About Mauna Loa

- The volcano is active. volcano that has fairly gentle slopes.
- It has the volume being estimated at 18,000 cubic miles (75,000 km3), however, its highest point is 130 feet (38 m) higher than Mauna Kea, its neighbor. Mauna Kea.
- Lava eruptions that originate from Mauna Loa are silica-poor and extremely fluid.
- They are generally non-explosive.

What is shield volcanoes?

- Shield volcano is a shield volcano is a form of volcano that has been named due to its low profile, which resembles an armored shield worn by warriors that is buried in the ground.
- It is created by it's eruption from extremely flowing (low viscosity) lavas, that travels further and creates less dense flows than more viscous lava which erupted from the ashes of **stratovolcano.**
- The repeated eruptions cause the continuous accumulation of large sheets of lava that make the distinctive shield volcano appearance.
- Shield volcanic eruptions can be found anywhere the lava of low-silica fluids reaches an area of planet with a rock.
- But, they are typical of the ocean island volcanism that is linked to hot spots or continental volcanism associated with rifts.
- They include the biggest volcanoes on the planet like Tamu Massif or Mauna Loa.
- Massive shield volcanoes can be found on the other planets of the Solar System, including Olympus Mons on Mars and Sapas Mons on Venus.

What are other kinds of volcanoes?

1. Volcanoes can be classified into four kinds:
2. Cinder cones

3. Composite volcanoes
4. Shield volcanoes
5. Lava volcanoes

Cinder Cones

- Cinder cones comprise oval or circular cones composed of tiny fragments of lava originating from one vent that have been compressed.
- Cinder cones arise from the eruption consisting of mostly tiny pieces composed of scoria and the pyroclastics that accumulate around the vent.
- The majority of cinder cones explode only once.
- Cinder cones can be formed as vents in the flanks of larger volcanoes, or they may form independently.
- Mauna Kea, an active volcano located situated on Hawaii, an American island called Hawaii and Mount Etna, one of the volcanoes located on Sicily, an Italian island called Sicily Both are covered by hundreds of cones of cinder.

Composite Volcano

- Composite volcanoes, also referred to as stratovolcano can be described as volcanic peaks with steep sides composed of a variety of volcanic rocks, typically constructed from the highest-viscosity lava and the as hand rocks, and other debris..
- These kinds that are volcanoes can be described as high conical mountains made up of lava flows as well as other ejectas in layers that alternate and strata, which are the basis for the name.
- Composite volcanoes are composed from ash, cinders and the lava.
- Cinders and ash accumulate on over each other Lava flows over the top of the ash which cools and then hardens. The process is repeated.
- Mount Rainier in Washington is one of the active volcanoes that form a composite range that comprises Mount St. Helens.

Lava Domes

- Lava domes form in the event that eruptions of lava are not thick enough to move and creates the appearance of a mountain with a steep slope when the lava builds upwards near the volcano vent.
- They are created by slow eruptions of viscous lavas.
- They may be formed within the crater of a volcanic eruption.
- As with a composite volcano they may create explosive, violent eruptions however, their lava typically is not flowing far from the source vent.
- A typical example of an dome of lava is Obsidian Dome located near Mono Lake in southern California.

Types of Volcanic Eruptions

- The types of eruptions that occur in volcanic rock depend on many variables like the magma's chemistry temperature, viscosity, temperature the volume, the presence of groundwater and gas and water levels.
- Here are the various kinds of eruptions that occur in volcanic rock:

Hydrothermal eruptions:

- These eruptions include the ash, but not magma. They are caused by the heat produced by hydrothermal systems.
- Phreatic eruption The cause is by the heat generated by the magma is absorbed by the water. The eruptions that occur are not a result of magma, but only ash.

Phreatomagmatic eruption

- This type of eruption occurs during the interaction between newly formed magma as well as water.

Strombolian eruption and Hawaiian eruptions:

- Hawaiian eruption has fire fountains, while the Strombolian eruption is characterized by explosions caused by fragments of lava.

Vulcanian eruption

- These events last only a brief period time time and can rise the height of 20 kilometers.

Subplinian as well as Phinian explosions

- Subplinian eruptions extend up to 20 km high The height of Phinian eruptions is 20 km, while Plinian eruptions can reach 20-35 kilometers.

Topic 31. A NEW DROUGHT MONITORING TOOL GIVES HOPE OF BETTER PREPARATION AND MITIGATION AT THE FARMER LEVEL

Important for subject: Geography

A new tool for monitoring drought using satellites will be able to detect the existence of drought as well as the severity of the drought giving authorities the most effective time time to implement mitigation strategies across India as well as all across South Asia.

About the South Asia Drought Monitoring System (SADMS)-

- In India in India, there is the South Asia Drought Monitoring System (SADMS)was developed by the International Water Management Institute (IWMI) and the Indian Council of Agricultural Research (ICAR), the nation's top agricultural research institute.
- It has been test-driven it in India, Pakistan, Bangladesh, Sri Lanka, Nepal, Maldives, Afghanistan and Bhutan.
- The system will not only keep track of drought conditions, but will also make use that is real time weather information as well as satellite data that is open to access, and give extension staff along with water and agriculture authorities with all the data needed to predict, monitor and control the drought on a weekly basis.
- IWMI is testing the SADMS, testing SADMS at district levels.
- The data that is input to the platform via the India Meteorological Department (IMD) as well as The Indian Institute of Tropical Meteorology (IITM).
- This covers soil moisture as well as temperature, precipitation as well as wind speed and cloud ratio. Scientists will also take in the historical droughts as well as their conditions.

What will it do for farmers?

- It will aid farmers decide on which crops to plant.

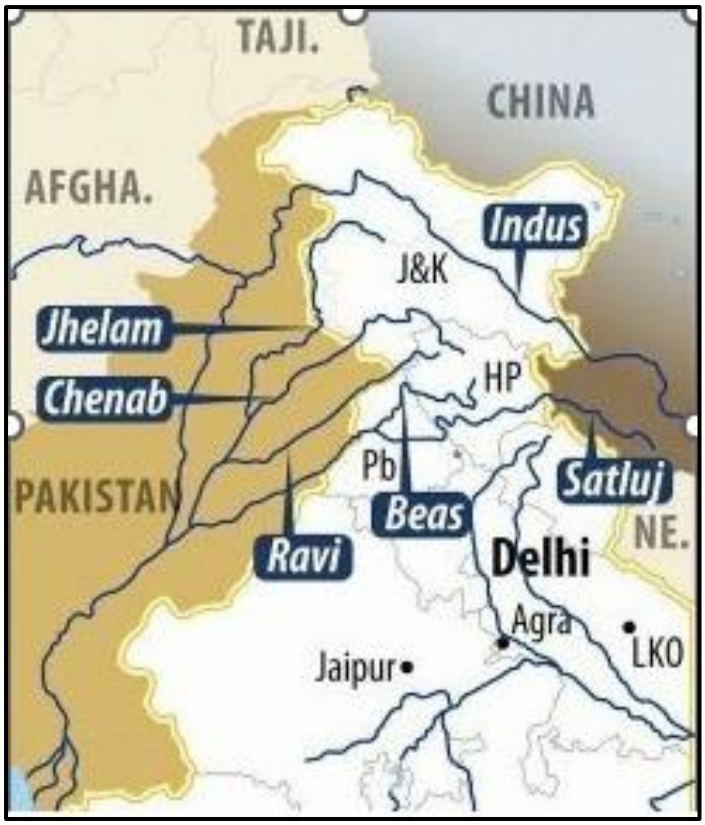
- In times of drought when they are experiencing drought, farmers can cultivate drought-tolerant crops such as millet, instead of water-intensive plants like rice.
- The platform is currently operating within the State of Telangana.
- Since 2017 onwards, ICAR implemented the SADMS system to deploy real-time emergency measures.
- It has helped farmers from three districts in Andhra Pradesh and Maharashtra to acquire drought-resistant seeds, design an irrigation system that is supplementary and also apply potassium Nitrate (which aids seedlings in coping better in dry conditions).
- The result was that soybean yields increased by 7 to 8 quintals (700-800 kilograms) per 0.4 ha, pigeonpea by 5-6 quintals per an acre and cotton increased by 12-14 quintals per an acre.

Dry conditions are prevalent in India and the South Asia region

- India was named in the list of most severely affected countries by drought according to the United In the United Nations' most recent assessment of drought that was released on May 11, 2022.
- More than two-thirds of the United States experienced drought from 2020 to 2022.
- The severe droughts have slowed Indian gross domestic products by 2-5 percentover the past 20 years, from 1998 to 2017.
- Not just India but also the rest area of South Asia also faced several droughts over the last few decades. 50 major droughts have been recorded since 1990, impacting more than 750,000 people, with economic losses that are estimated to be $7 billion.
- There was no integrated end-to end surveillance and control system for drought that was available to South Asia.
- The information from the drought monitoring device is readily available on grid level and is visualized at the taluk-level.

Topic 32. VERINAG: A SPRING IN KASHMIR

Important for subject: Geography



Verinag is the huge pond where the great Jhelum River begins it's long journey through the Valley and Pakistan to finally reach the Arabian Sea.

- Location -Anantnag District of the UT Jammu and Kashmir.
- An octagonal, stone basin is located at Verinag Spring. It surrounds an arcade that was built in 1620 A.D. by Jahangir, a Mughal emperor.
- Shah Jahan, his son, later created a beautiful garden right next to the spring.
- This spring is well-known for its ability to never run dry or overflow.
- Verinag Spring is also the main source of river Jhelum.
- The Archaeological Survey of India officially recognizes Verinag Spring as well as the Mughal Arcade around it, as Monuments of National Importance.

Jhelum river-

- It originates at Verinag and flows through the Indian-administered territory of Jammu and Kashmir, to the Pakistani-administered territory of Kashmir, and then into the Pakistani province of Punjab.

- It flows through the Kashmir Valley and is the most western of the five rivers in the Punjab region.
- It is a tributary to the Chenab River, and its total length is approximately 725 km.
- Ancient Greeks called the river Jhelum Hydaspes.

Monuments of National Importance:

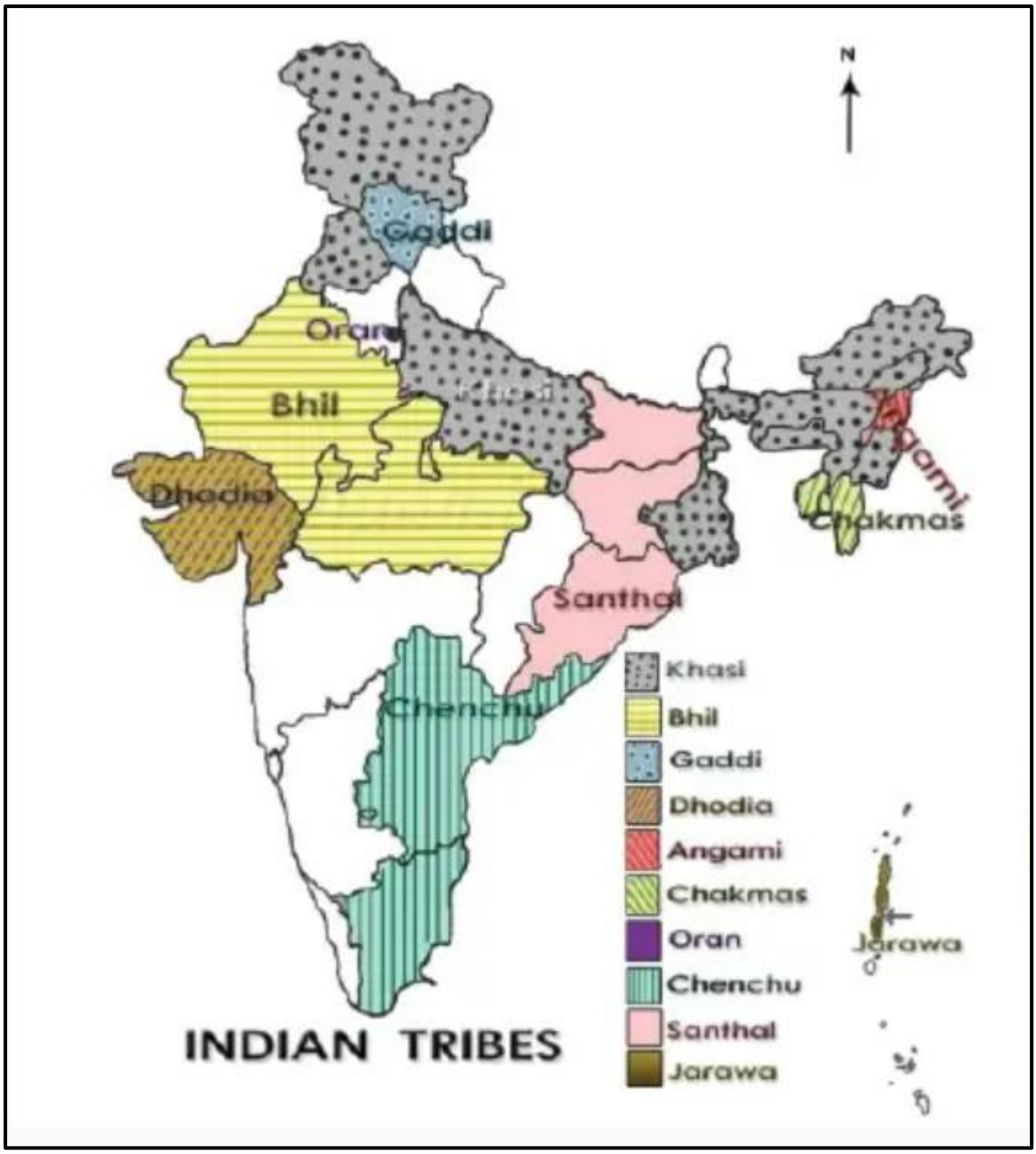
- Nodal Authority Monuments Of National Importance Are Dedicated by the
- Archaeological Survey of India

What is an Ancient Monument?

- The Ancient Monument and Archaeological Sites and Remains Act (1958) defines 'Ancient Monument'.
- The Act defines Ancient Monument any structure, monument, cave, rock sculpture, or inscription that is historical or archaeologically significant.
- Additionally, Ancient Monument must be in existence for at least 100 years.
- Maintained By:
- The Central Government has been authorized to preserve, promote and protect Monuments of National Importance.
- **Sites:** The Archaeological Survey of India (ASI) currently protects 3,691 monuments across India.
- They were most numerous in Uttar Pradesh (745), followed by Karnataka (506), and Tamil Nadu (413).

Topic 33. PVTGS

Important for subjects: Geography



Anthropological Survey of India creates tribal hut replicas in order to promote unique heritage

Jarawa tribe

- The Jarawas are an Indian indigenous people living in the Andaman islands of India.
- They are found in South Andaman, Middle Andaman Island and are currently estimated to number between 250-400.

- They are largely averse to outsiders and have little understanding of many aspects of their culture, society, and traditions.
- They are still susceptible to diseases that they do not have immunity to.
- Particularly Vulnerable Tribal groups (PVTGs),
- In order to identify the most at-risk groups that were located at the lowest development levels, a Sub-category was established within Scheduled tribes during the Fourth 5 Year Plan.
- Based on the Dhebar Commission Report, a criteria for identifying Particularly Vulnerable Groups of Tribal People was created.
- Technology at a pre-agricultural level, low literacy, economic backwardness, a declining or stagnant populace
- The PVTGs were once known as primitive tribal groups.

What are the most vulnerable tribes?

- According to Census 2011, there are 75 PVTGs in total out of 705 Scheduled Tribes. They are spread across 17 states and one Union Territory.
- The Ministry of Home Affairs categorizes the matter , but not by Ministry of Tribal affairs HTML1.

As per census 2001:

- There are 12 PVTGs with a population of more than 50,000.
- The population of the remaining groups is less than 1000.
- The highest population is found in the PVTG of Sahariyas, at 4,502,217
- The population of the Sentinelese PVTGs and Andamanese PVTGs is very small at 39 and 43, respectively.
- Odisha is home to the most PVTGs in India, while Haryana and Punjab have no PVTGs.
- The Andaman and Nicobar Islands- Great Andamanese. Jarawas, Onges. Sentinelese. Shorn Pens/ Shompen.
- Tribal culture, traditions, the Jarawa hut is known as a Chadda .
- A paste made from pandamus fruit is kept in the Shompen hut. It is used to make food when there is a shortage.

- Dorla tribehome of the Dorla tribal community in Chhattisgarh. - Dorla also known as Dora are a tribe community that is mainly located in central India. They can be found in the present-day Chhattisgarh state's Dantewada or Bijapur districts.
- They are usually involved in agricultural activities. They live in forested regions. They worship the native gods and goddesses Muttalamma (Gangamma), Gaman, Kiror, etc. follows Hindu tradition.
- They speak Dorli, or Dorla, which is a Dravidian language and a dialect of Koya.

Betta Kuruba tribal community -

- The Betta Kuruba tribe (Betta meaning "Hill", Kuruba meaning "shepherd") lives in the hilly areas of Karnataka. It is one of few indigenous communities of Nilgiris.
- Kurumbas is the least civilized of the district's population. They live in the hillsslopes, and in feverish areas. (Alu Kurumba, Jenu Kurumba, Betta Kurumba, Urali Kurumba and Mullu Kurumba).
- These are believed to be descendants of the Pallavas. Their power was at its greatest in the 7th century A.D., when it fell to the Kongus or the Chalukyas. The Pallavas were eventually driven out by the Chola king.
- They settled in scattered settlements in Mysore, Wayanad and Nilgiris.
- We say "The Kurumas" to the Nilgiris.
- Many ethnographic accounts of the tribe show that the number of members ranges from three to seven.

Khasi -

- The Khasi People are an Indian ethnic group that is located in north-eastern India's Meghalaya.
- They have a large population in Assam and certain parts of Bangladesh.
- The majority of the eastern Meghalaya population is made up of Khasi people. This state's largest and most populous community is home to approximately 48% of Meghalaya's population.
- They are among the few Austroasiatic-speaking peoples in South Asia.
- The Khasi people have a cultural tradition that they follow Mawbynna' as their matrilineal system.

- A monolithic memorial-stone of the type found in Nartiang; believed to be erected by Khasi ancefathers in order to mark historical-mythical events.
- AnSI, the Anthropological Survey of Indian (Habitual Survey of India) is the highest Indian government organizationinvolved with anthropological studies.
- It also conducts field data analysis for human or cultural aspects.
- They specialize in physical anthropology as well as cultural anthropology.
- Anthropological Research in Indian was established in Varanasi in 1945 and moved to Calcutta in 1948.

Topic 34. UNIFIED DISTRICT INFORMATION SYSTEM FOR EDUCATION PLUS (UDISE) 2021-

Important for subject: Governance

The Ministry of Education has released an extensive report about Unified District Information System for Education Plus (UDISE+) 2021-22, which is a report on the school curriculum in India.

What is UDISE+:

- It is among the most extensive Management Information Systems on school education. It was first introduced in the period 2018-2019 in order to speed up data entry, decrease errors, increase the quality of data and facilitate its verification.
- It's an application that collects school's information regarding the factors that affect schools and the resources they have.
- It's an upgraded and upgraded edition of UDISE that was launched by the Ministry of Education in the year the year 2012-2013by the Ministry of Education.
- It encompasses more than 49 million schools, over 9.5 million teachers, and greater than 265 million kids.
- It is used to to measure the educational parameters that are present in classes 1-12 in private and public schools all over India.
- In the UDISE 2021-22, additional data on key indicators such as digital library peer learning, peer learning, identification of hard spots, the number of books that are available in schools libraries, etc have been collected for the very first time to be in line to the National Education Policy 2020 initiatives.

What UDISE+ School Data Capture:

- UDISE+ has the mandate of collecting data from all schools offering formal education beginning with classes I through XII.
- It is UDISE+ school, schools function as the central point of data collection, while the district is the data distribution unit.
- It gathers information about the school's profile the physical infrastructure, students, enrolments and exam results and other information through the use of an internet-based Data Collection Form (DCF).
- The DCF is split into 11 partsand each section is filled with numerous questions that are designed to reveal various performance indicators for the school.

What's in the most recent report:

- In the study the Gross enrollment ratiohas improved at the primary as well as upper primary and the higher secondary level of schooling 2021-22 compared to 2020-21.
- GER in high school has seen a dramatic improvement by going from around 8 per cent in 2021-21, to 57.6 percentage in 2021-22.
- The year 2021-22 in 2021-22, in 2021-22, the ratio of pupils to teachers was 26 at the primary level school, 19 in upper-primary 18, 18 for secondary and 27 for secondary, with significant improvement from 2018-19.
- In 2021-22, more than 29 million girls are enrolled from the primary and higher secondary schools,showing an growth by 8.19 lakh when compared to enrollment of girls in the years 2020-21.
- More than 220,000 schools were closed across the nation in 2020-21, whilethe amount of educators was also fell by 1.95 percent when compared to the prior year.
- It was noted that only 85 percent of schools have computers while only 34% had internet connectivity.
- However, less than 27% of schools are equipped with special toilets specifically designed for children with special needs , greater than 49% have ramps that have handrails

Topic 35. PERFORMANCE GRADING INDEX (PGI) FOR 2020-21

Important for subject: Governance

The Ministry of Education has recently published The Performance Grading Index for States and Union Territories for 2020-21

What is Performance Grading Index (PGI):

- The Performance Grading Index (PGI) is an unique index that offers an extensive and scientific evaluation of the system of education in schools in India.
- The Department of School Education and Literacy, Ministry of Education is the one to create this index in order to support evidence-based decision-making and emphasize course corrections to ensure a quality education for all.
- It examines the state's academic performance using data gathered from various sources including the -
- Unified District Information System for Education Plus, National Achievement Survey, Mid-Day Meal.
- The Education Ministry released the first PGI in 2019 for the year of reference 2017-18.

The process employed:

- PGI 2020-21 has classified states and UTs into ten grades. States in addition to UTs into ten grades , of which the top grade is Level 1 for states with greater than 950 point of the total of 1000 points.
- A grade that is the lowest level of achievement would be Level 10 which refers to scores below 551.
- Structure of the PGI includes 1000 points over 70 indicators, which are grouped into two

Categories,

- Outcomes,
- Governance Management This category is further broken down into 5 domains which are.,
- Learning Outcomes
- Access
- Infrastructure and Facilities
- Equity
- Governance Process.

About Performance Grading Index (PGI) 2020-2021:

- As per the report neither the state nor the union territory could achieve the most prestigious grade level I with an overall score higher than 950 was needed.
- Punjab was a top contender along with Kerala along with Kerala Maharashtra since the three state have been awarded 928 points out of a total of 1000 points in order to reach the level II(901-950)of the annual Grading Index.
- Alongside the previously mentioned three states, four additional states were added to the index at Level II at the beginning of the time.
- Thesefour states as well as UTs include Gujarat, Chandigarh, Rajasthan and Andhra Pradesh.
- The newly created UT Ladakh has experienced significant improvement in its PGI score between Levels 8 and 4 by 2020-21.
- The group also increased their score 299 points over the course of 2020-21 when compared to 2019-20, resulting in the biggest improvement in one year.
- The educational disparity between states in learning within India has decreasedin the past four years.

Topic 36. TANA BHAGAT MOVEMENT (1914-1920)

Important for subject: History

It was a movement that took place in Chhotanagpur region of British India against policy of against the policies of local British authorities and the exploitative local zamindars' business practices who are mostly controlled by Oraonpeaople.

- The Tana Bhagats protested against the taxation that were imposed through their British colonial administration.
- They also staged an Satyagraha (civil civil disobedience movement) several years prior to Mahatma Gandhi's similar protest against British colonial rule.
- The event was organized By Jatra Bhagat Turia Bhagat and others. Other participants included Tana Bhagats Oraon, Munda

Topic 37. G20 AND ENV.

Important for subject: International Relations

The G20 summit scheduled to take place in September 2023 under the Indian presidency is expected to adopt an official declaration that will ensure the security of supply chain and energy.

- India has been a champion of an international electricity grid plan - One sun One world One grid.
- Energy Transition Working Group (ETWG) was established.
- **G20's environmental initiatives** -The G20 recognises the significance of collective action when it comes to tackling the environmental challenges and climate change while encouraging the transition to more flexible, transparent , and cleaner energy systems.

Climate Sustainability Working Group (CSWG)

- Within the G20 framework In the G20 framework, the Energy Sustainability Working Group (ESWG) was created in 2013 to deal with all issues related to energy.
- In 2017, in light of the fact the fact that climate change concerns are tightly related The Climate Sustainability Working Group (CSWG) was established in the new year as part of the Sustainability Working Group (SWG).
- In the year 2018 Under the Argentine presidency, CSWG was separated from ESWG and was incorporated into the Working Groups within the Sherpa process.

Global Initiative on Reducing Land Degradation and Enhancing Conservation of Terrestrial Habitats

- The year 2020 will be the month that we launch our Global Initiative. during the Riyadh (Virtual) Summit of the G20 leaders In November 2020, the G20 announced their Global Initiative on Reducing Land Degradation and enhancing the conservation of Terrestrial Habitats.
- The aim in the Global Initiative is to prevent from, stop and reverse degradation of the land and decrease the amount of land that is degraded by 50 % by 2040.
- This initiative is carried out through the Initiative Coordination Office under oversight of the UNCCD.

The One Sun One World One Grid Declaration (OSOWOG)

- The document was released jointly in the presence of Prime Minister Narendra Modi as well as UK Premier Secretary Boris Johnson at the COP26 Climate Meet in Glasgow.
- In the inaugural meeting of the International Solar Alliance (ISA) in October of 2018,
- The Prime Minister Narendra Modi floated the idea of the OSOWOG initiative.
- In the UK and India have decided to join forces. British Green Grids Initiative (GGI) and
- GGI's OSOWOG is ISA's OSOWOG and is part of the India-UK Virtual Summit
- Its purpose is to help inn creating a global grid that allows renewable energy can be distributed any time, anywhere (use electricity during the night in one region of the world using solar energy in the opposite part of the world which is day time).
- It is also designed to assist in the reduction of storage requirements and increase the efficiency of solar projects. Its primary goal is to decrease carbon footprints and energy expenses.
- The ISA as well as the World Bankare also helping in the execution of the project.

What will it take to be implemented?

- OSOWOG is broken down into three principal phases.
- In the first stage in the first phase, the Indian grid will be connected to grids from Middle East, South Asia and South-East Asia to develop a common grid.

- The grid could be utilized to distribute solar energy according to requirements, and in addition to other sources of energy that are renewable.
- A second stage will connect the first phase's functionalities to the reservoir of renewable resources in Africa.
- Third phasewould examine the possibility of achieving global interconnection. The goal is to connect the most countries is possible to create a common power grid for renewable energy.
- This will then be accessible by all nations.

Topic 38. ELA BHATT AND THE SEWA MOVEMENT

Important for subject: Polity

Elaben Bhatt The Gandhian, SEWA founder, and women's rights activist, dies.

Who was Ela Bhatt:

- She was referred to by the name of "Gentle Revolutionary" who revolutionized the lives of millions of women by her organization which provided the women the opportunity to borrow microloans for over five decades.
- She established in 1972 the Self-Employed Women's Association (SEWA) in 1972.
- She also was the head of the women's section of Majoor Mahajan Sangh, the Textile Labour Association founded by Anasuya and Mahatma Gandhi.
- She was chairman of the Sabarmati Ashram Memorial and Preservation Trust She also was co-founder of The Women's World Banking, a global microfinance network, of which she was the chairperson from 1984 until 1988.
- She was nominally nominated for Rajya Sabha, and was also a participant in the Planning Commission.
- She also served as an advisor to organizations like The World Bank.
- In 2007 she was a member of in 2007 the Elders in 2007, the group comprised of world leaders established by Nelson Mandela to promote human rights and peace.
- She was a prolific writer who wrote in Anasuya Our Gujarati newspaper which was a play about the street vendors.One of her most famous books was titled We are Poor, but We are Numerous.
- She was an winner from the Padma Bhushan, Ramon Magsaysay Award and the Indira Gandhi International Prize for Peace in addition to many other honors.

What is SEWA:

- The official name that is SEWA refers to that of the Self Employed Women's Association.
- It was started by Ela Bhatt in the year 1972 as an ranch owned by the ranch for the Textile Labour Associationa labour union created by Gandhi in 1918.
- It is a trade union that is based within Ahmedabad India, that promotes the rights of those with low incomes female workers who are self-employed and is the largest organizations of workers who are not formalized in the world.