

GOVERNANCE**PRITHvi Vigyan (PRITHVI) Scheme****Why in News?**

- The Union Cabinet has approved an initiative - PRITHvi VIgyan (PRITHVI).
- This initiative will give the government flexibility to pursue research and use funds allocated to 5 different sub-schemes related to earth sciences over a 5-year period.

What is the PRITHvi VIgyan (PRITHVI) Scheme?

- It is an overarching scheme of the Ministry of Earth Sciences (MoES), for implementation during the period from 2021-26 at an overall cost of Rs. 4,797 crores.
- The major objectives of the Scheme are:
 - Augmentation and sustenance of long-term observations of the atmosphere, ocean, geosphere, cryosphere and solid earth to record the vital signs of the Earth System and change.
 - Development of modelling systems for understanding and predicting weather, ocean and climate hazards and understanding the science of climate change.
 - Exploration of polar and high seas regions of the Earth towards discovery of new phenomena and resources.
 - Development of technology for exploration and sustainable harnessing of oceanic resources for societal applications.
 - Translation of knowledge and insights from Earth systems science into services for societal, environmental and economic benefit.
- The Scheme encompasses 5 ongoing sub-schemes namely -
 - Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS),
 - Ocean Services, Modelling Application, Resources and Technology (O-SMART),
 - Polar Science and Cryosphere Research (PACER),
 - Seismology and Geosciences (SAGE) and
 - Research, Education, Training and Outreach (REACHOUT).

Significance of the PRITHVI Scheme

- Earth System Sciences deal with all the 5 components of the earth system: atmosphere, hydrosphere, geosphere, cryosphere, and biosphere and their complex interactions.
- The overarching scheme of PRITHVI will holistically address all the five components (looking at them as one unit) of the earth system -
 - To improve the understating of the Earth System Sciences and
 - To provide reliable services for the country.
- It will help in taking up cross-disciplinary projects and even use funds allocated for the separate verticals together. Thus, it will also facilitate ease of doing research.
- These integrated R&D efforts will help in addressing the grand challenges of weather and climate, ocean, cryosphere, seismological science and services.
- It will also help in exploring the living and non-living resources for their sustainable harnessing.
- It will allow the Ministry to award research projects to overseas institutes.

Role Played by the MoES in Understanding Earth System Science

- MoES holistically addresses all the aspects relating to the Earth System Science.
- It is mandated -
 - To translate Science to Services for the Society in providing services for weather, climate, ocean and coastal state, hydrology, seismology, and natural hazards;
 - To explore and harness marine living and non-living resources in a sustainable manner for the country and
 - To explore the three poles of the Earth (Arctic, Antarctic and Himalayas).
- These services include -
 - Weather forecasts (both on land and in the Oceans) and
 - Warnings for various natural disasters like tropical cyclones, storm surge, floods, heat waves, thunderstorm and lightning; alerts for Tsunamis and monitoring of earthquakes, etc.
- The services provided by the Ministry are being effectively used by different agencies and state governments for saving human lives and minimising damages to the properties due to natural disasters.

Institutes Associated with MoES and their Role in Implementing PRITHVI Scheme

- The research & development and operational (services) activities of MoES are carried out by 10 Institutes of MoES, viz.
 - India Meteorological Department (IMD),
 - National Centre for Medium Range Weather Forecasting (NCMRWF),
 - Centre for Marine Living Resources and Ecology (CMLRE),
 - National Centre for Coastal Research (NCCR),
 - National Centre for Seismology (NCS),
 - National Institute of Ocean Technology (NIOT),
 - Indian National Centre for Ocean Information Service (INCOIS), Hyderabad,
 - National Centre for Polar and Ocean Research (NCPOR), Goa,
 - Indian Institute of Tropical Meteorology (IITM), Pune and
 - National Centre for Earth Science Studies (NCESS).
- A fleet of oceanographic and coastal research vessels of the Ministry will provide required research support for the scheme.
- Various components of PRITHVI scheme are interdependent and are carried out in an integrated manner through combined efforts of the concerned Institutes under MoES.

DEFENCE & SECURITY**Indian Navy thwarts hijacking attempt in Arabian Sea****Why in news?**

- Indian warship INS Chennai and its marine commandos thwarted the attempted hijack of a Liberia-flagged merchant vessel.
- It safely rescued its 21 crew members, including 15 Indians, in north Arabian Sea.

Maritime Piracy

- As per the UN Convention on the Law of the Sea (UNCLOS), maritime piracy is when people on a private boat or ship commit crimes like kidnapping, violence, or robbery for personal gain.
 - UNCLOS is an international treaty which was adopted and signed in 1982 in Montego Bay, Jamaica
 - It lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources.
- This happens on the open sea and is targeted at another vessel or its people and property.

Threats posed by maritime piracy

- Physical Harm, Kidnapping and Associated Humanitarian Concerns:
 - Pirates can physically harm crew members and passengers, and they often kidnap individuals for ransom.
 - Crew members and passengers may experience trauma and psychological distress as a result of piracy incidents
- Disruption of Trade
 - Piracy can disrupt maritime trade routes, causing delays in the delivery of goods and impacting global trade.
- Economic Losses
 - Businesses may suffer financial losses due to stolen cargo, ransom payments, increased insurance premiums, and the cost of implementing anti-piracy measures.
- Impact on Fishing Industry
 - Pirates sometimes target fishing vessels, affecting the livelihoods of fishermen and the availability of seafood.
- Environmental Risks
 - Pirates may engage in illegal activities, such as oil theft or dumping pollutants, posing environmental threats to marine ecosystems.
- Security Concerns
 - The presence of piracy raises security concerns for coastal regions and international waters, requiring increased naval and maritime security efforts.
- Global Security
 - Piracy can be linked to broader security issues, such as terrorism and organized crime, creating challenges for international security.

Steps taken by India

- Operational steps
 - Indian govt has deployed naval ships with armed helicopters to patrol the piracy prone areas.
 - The Indian Navy commenced anti-piracy patrols in the Gulf of Aden from October 2008.
 - In recent years, task Groups comprising destroyers and frigates have been deployed to undertake maritime security operations and render assistance to merchant vessels in case of any incident.
 - Also, aerial surveillance by long-range maritime patrol aircraft and Unmanned Aerial Vehicles has been enhanced to have a complete maritime domain awareness.
- India participates in the various multilateral fora set up to combat piracy
 - The Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) is a government-to-government agreement that aims to enhance multilateral cooperation among 16 regional countries.
 - The Regional Maritime Security Initiative (RMSI) is a partnership between regional nations with varying capabilities and capacities.
- Institutions created by India
 - The Navy’s Information Management and Analysis Centre (IMAC) and Information Fusion Centre for Indian Ocean Region (IFC-IOR) are institutions involved in maintaining maritime security.
 - Besides, Indian Navy also coordinates with Coast Guard to maintain enhanced surveillance within the Exclusive Economic Zone (EEZ).
- Legislative steps
 - India enacted the Maritime Anti-Piracy Act, 2022 to give effect to arrest and prosecute pirates and strengthen the fight against piracy.
 - Also, the government’s SAGAR (Security and Growth For All in the Region) Doctrine provides a framework for maritime co-operation in the Indian Ocean region.

Key highlights

- The ship, Lila Norfolk, sent a message via the UK Maritime Trade Operations portal when it was about 460 nautical miles off the coast of Eyl, Somalia.
- The message reported a possible boarding by five to six unknown armed individuals.
- In response, the Indian Navy diverted the INS Chennai, a destroyer on anti-piracy patrol nearby.
- Additionally, a Maritime Patrol Aircraft (MPA) flew over the ship in the morning and made contact, ensuring the safety of the crew.

Recent hijacking incident in the region

Ships in distress

In the last month of 2023, India responded to three distress calls from ships in trouble



<p>Dec 14: Malta-flagged vessel m.v. <i>Ruen</i>, with an 18-member crew, sent a mayday message indicating boarding by about six unknown persons around 700 nautical miles from the Indian coast</p> <hr/> <p>Dec 23: m.v. <i>Chem Pluto</i>, with 21 Indian and 1 Vietnamese crew members, reported a projectile attack around 217</p>	<p>nautical miles southwest of Porbandar. Initial investigation by the Navy indicated a drone attack</p> <hr/> <p>Dec 23: A Gabon-flagged crude oil tanker m.v. <i>Sai Baba</i> with an all-Indian crew heading to India was hit by a one-way attack drone in the Southern Red Sea; no injuries were reported</p>
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Safe and secure: The cargo ship Lila Norfolk, after the rescue, prepares to move to the next port of call. PTI

- There have also been a series of attacks on merchant ships by Houthi rebels in Yemen in the Red Sea as well as the Arabian Sea.

PRELIM FACTS**1. Rejupave Technology**

- Recently, the Border Roads Organisation (BRO) has utilised road construction technology i.e Rejupave technology to build high-altitude bituminous road sections at the Sela tunnel and LGG-Damteng-Yangste (LDY) road near the India-China border in Arunachal Pradesh.

About Rejupave Technology:

- It is developed by India's oldest and premier road research organisation, CSIR-Central Road Research Institute (CSIR-CRRI).
- It is beneficial in constructing high-altitude bituminous roads at low and sub-zero temperature conditions.
- This technology brings down the production and rolling temperature of bituminous mixes by 30 degrees Celsius to 400 degrees Celsius with negligible heat loss in the bituminous mix during transit, despite long haulage time amid snowfall.
- This technology's asphalt modifier is a bio oil-based product, which significantly lowers the heating requirement of bituminous mixes besides preserving the bituminous mix temperature during transit.
- Significance
 - Rejupave' asphalt modifier in cold climatic regions will have improved long-term durability and better resistance to thermal cracking under low-temperature conditions.
 - It also brings down the greenhouse gas emissions in the pristine eco-sensitive mountainous environment of Arunachal Pradesh.

Key facts about CSIR-Central Road Research Institute (CRRI):

- It is a premier national laboratory established in 1952, a constituent of Council of Scientific and Industrial Research (CSIR).
- The major R&D programmes of CRRI related to the research and development projects on design, construction and maintenance of roads and runways, traffic and transportation planning of mega and medium cities, management of roads in different terrains, improvement of marginal materials, utilization of industrial waste in road construction and landslide control etc.
- The institute provides technical and consultancy services to various user organizations in India and abroad.
- For capacity building of human resources in the area of highway engineering to undertake and execute roads and runway projects.

2. Thanjavur doll

- Thanjavur dolls are facing stiff competition from electronic toys and e-commerce platforms, besides a severe labour crunch and shortage of clay.

About Thanjavur doll:

- The craft was brought to Thanjavur by Maratha ruler Raja Serfoji in the early 19th Century.
- In Tamil language, it is called Thanjavurthalayattibomma.
- Thanjavur dolls are primarily of two kinds, one is the bobble-head version, and the other is the tilting doll version.
- Material used:
 - Doll-makers use papier-mâché, plaster of Paris and other materials for the body.
 - A mixture of vandamann (fine silt deposited by rushing streams of water), kalimann (clayey riverbed mud), and manal (loose aggregate) is required to make the dolls' pedestals.
 - Copper sulphate powder is added as a fungicide.
- Process:
 - All the dolls have a lightweight body made of tapioca flour, papier-mache and plaster of Paris cooked and kneaded to the consistency of 'roti' dough.
 - Each toy is made in halves, by pressing the rolled-out 'doll dough' into cement moulds, with liberal dusting of chalk powder.
 - Dolls pass through at least seven stages from mould to assembly before they are packed for despatch, with each step, such as painting the facial features and costume embellishments, requiring a skilled artisan's attention
- The dancing doll has four sections (including the arms that are individually glued to the torso), each balancing on the other with the help of inner metal loop hooks that create the light bobbing movement.

- It earned the Geographical Indication tag in 2009.

3. Kadamba Inscription

- Recently, an inscription said to be of 10th century A.D. The Kadamba period has been discovered in the Mahadeva temple at Cacoda in southern Goa.

About Kadamba inscription:

- It is written in Kannada and Sanskrit.
- The inscription opens with an auspicious word be it well (Swasthi Shri).
- It records that when TalaraNevayya was administering the mandala, his son Gundayya having taken a vow to fulfil his father's desire of capturing a gopura of the port of Goa, fought and died after fulfilling his father's wish.
- Very interestingly, the record is composed as a vocal statement on the death of his son from the mouth of a lamenting father.
- It is in the literary style of the Talangre inscription of Jayasimha I of the same period.

Key facts about Kadambas of Goa:

- The Kadambas of Goa were the subordinates of Chalukyas of Kalyana.
- Chalukya emperor Tailapa II appointed KadambaShasthadeva as mahamandaleshwara of Goa for his help in overthrowing the Rashtrakutas.
- KadambaShasthadeva conquered the city of Chandavara from the Shilaharas in 960 A.D.
- Later, he conquered the port of Gopakapattana (present Goa).
- Gundayya, the son of TalaraNevayya, may have participated in this battle, and won the port at the cost of his life.

4. Plasma Waves

- Scientists have detected the existence of high-frequency plasma waves in the Martian Upper Atmosphere with novel narrowband and broadband features that can help to understand plasma processes in the Martian plasma environment.

About Plasma waves:

- These waves are often observed in the Earth's magnetosphere, a magnetic field cavity around the Earth.
- In general, plasma waves are identified as the short-time scale fluctuations in the electric and magnetic field observations.
- These plasma waves play an important role in the energization and transport of the charged particles in the Earth's magnetosphere.
- Some of the plasma waves like electromagnetic ion cyclotron waves act as a cleaning agent for the Earth's radiation belt, which is hazardous to our satellites.
- Knowing this scenario, researchers are curious to understand the existence of various plasma waves in the vicinity of unmagnetized planets like Mars.
- The planet Mars does not have any intrinsic magnetic field therefore the high-speed solar wind coming from the Sun interacts directly with the Mars atmosphere, like an obstacle in the flow.

Key observations:

- Scientists have examined the existence of high-frequency plasma waves in the Martian plasma environment by making use of the high-resolution electric field data from the Mars Atmosphere and Volatile Evolution Mission (MAVEN) spacecraft of NASA.
- These waves could be either electron oscillations that propagate parallel to the background magnetic field (Langmuir waves) or electron oscillations that propagate perpendicular to the background magnetic field (upper-hybrid type waves) in the magnetosheath region of Mars.
- They observed two distinct wave modes with frequency below and above the electron plasma frequency in the Martian magnetosphere.
- These waves are either broadband- or narrowband-type with distinguishable features in the frequency domain.
- The broadband waves were consistently found to have periodic patchy structures with a periodicity of 8–14 milliseconds.
- Significance
 - Such waves provide a tool to explore how electrons gain or dissipate energy in the Martian plasma environment.

5. Fuel Cell

- ISRO recently said it has successfully tested a futuristic fuel cell-based power system.

About Fuel Cell:

- A fuel cell is a device that generates electricity by a chemical reaction.
- Fuel cells can be used in a wide range of applications, providing power for applications across multiple sectors, including transportation, industrial/commercial/residential buildings, and long-term energy storage for the grid in reversible systems.
- Working:
 - A fuel cell consists of two electrodes—a negative electrode (or anode) and a positive electrode (or cathode).
 - Both electrodes must be immersed in and separated by an electrolyte, which may be a liquid or a solid but must, in either case, conduct ions between the electrodes in order to complete the chemistry of the system.
 - A fuel, such as hydrogen, is supplied to the anode, where it is oxidized, producing hydrogen ions and electrons.
 - An oxidizer, such as oxygen, is supplied to the cathode, where the hydrogen ions from the anode absorb electrons from the latter and react with the oxygen to produce water.
 - The difference between the respective energy levels at the electrodes (electromotive force) is the voltage per unit cell.
 - The amount of electric current available to the external circuit depends on the chemical activity and amount of the substances supplied as fuel.
 - A single fuel cell generates a tiny amount of direct-current (DC) electricity. In practice, many fuel cells are usually assembled into a stack.
- Advantages of Fuel Cells:
 - Fuel cells have lower or zero emissions compared to combustion engines. Hydrogen fuel cells emit only water, addressing critical climate challenges as there are no carbon dioxide emissions.
 - There are also no air pollutants that create smog and cause health problems during the operation of a fuel cell.
 - They are quiet during operation as they have few moving parts.
 - They can operate at higher efficiencies than combustion engines.
 - A fuel cell resembles a battery in many respects, but it can supply electrical energy over a much longer period of time.
 - This is because a fuel cell is continuously supplied with fuel and air (or oxygen) from an external source, whereas a battery contains only a limited amount of fuel material and oxidant that are depleted with use.

ANSWER WRITTING

Anti-defection law is defeating the purpose of what it was meant to achieve. Critically analyse.

Anti-defection Law in India was enacted in 1985 through the 52nd Amendment Act of 1985 as part of the Tenth Schedule of the Constitution of India. Anti-defection laws aim to prevent or discourage defection by imposing penalties on politicians who switch parties or otherwise violate party discipline.

Provisions of the anti-defection law of India:

- Disqualification: A member of a House belonging to any political party becomes disqualified for being a member of the House,
 - if he voluntarily gives up his membership of such a political party; or
 - if he votes or abstains from voting in such House contrary to any direction issued by his political party without obtaining prior permission of such party and such act has not been condoned by the party within 15 days.
- Independent Members: An independent member of a House becomes disqualified from remaining a member of the House if he joins any political party after such an election.
- Nominated Members: A nominated member of a House becomes disqualified for being a member of the House if he joins any political party after the expiry of six months from the date he takes his seat in the House.
- Exceptions: The above disqualification on the ground of defection does not apply in the following two cases:

- Merger: If a member goes out of his party due to a merger of the party with another party. A merger takes place when two-thirds of the members of the party have agreed to such a merger.
- Presiding Officer: If a member, after being elected as the presiding officer of the House, voluntarily gives up the membership of his party or rejoins it after he ceases to hold that office. This exemption has been provided in view of the dignity and impartiality of this office.
- Deciding Authority: The Speaker of the House or the Chairman of the Legislative Council, as the case may be, has the authority to decide on questions relating to defection, and his or her decision is final and cannot be challenged in any court.

Purpose of Anti-defection law:

- Stability of the Government: The law intends to promote stability by preventing frequent and arbitrary changes in the composition of legislatures.
- Prevention of Horse-trading: The law discourages the practice of "horse-trading" or the buying and selling of legislators, where political parties attempt to induce members to switch sides in exchange for various incentives.
 - For example, Operation Kamala: It refers to "poaching" or "bribing" of MLAs and MPs of other parties by one major party to form a government in states where they do not have the majority.
- Preservation of the Mandate: Elected representatives are expected to uphold the mandate given to them by the voters. The Anti-Defection Law aims to ensure that members do not betray the trust of their constituents by switching parties without a valid reason.
- Promotion of Party Discipline: It discourages members from defying the party line. Members are expected to vote in accordance with the decisions of the party leadership.
- Enhancement of Accountability: It enhances the accountability of elected representatives to the electorate and the political party that nominated them. It restricts their ability to change affiliations without facing consequences.

Issues with the Anti-defection law:

- Curbing dissent: The law infringes on the freedom of legislators to follow their conscience and stand up for their beliefs or represent the interests of their constituents.
- Lack of Intra-Party Democracy: By punishing defectors, the law gives parties a strong incentive to exert control over their members and to discipline those who step out of line. This may discourage legislators from speaking out against party leaders.
- Fragmentation of Parties: To avoid being disqualified under the law, politicians may form their own parties or join existing small parties which can lead to fragmentation of the party system.
- Undermining representative democracy: Political parties have been known to use the threat of defection to discipline their members or to coerce them into supporting certain policies or candidates.
- Controversial role of the speaker: The decision of the Speaker or the Chairman on questions of defection is final and cannot be challenged in court. This lack of transparency and judicial oversight has led to concerns about the fairness and impartiality of the process.

Suggestions to reform the Anti-defection law in India:

- 2nd ARC: The issue of disqualification of members on the grounds of defection should be decided by the President/Governor on the advice of the Election Commission.
- Reducing the number of defections: The threshold for disqualification should be raised from one-third to two-thirds or three-fourths. This would reduce the number of defections and make it harder for political parties to split.
- Removing the role of the Speaker: The role of the Speaker in deciding cases of disqualification should be removed and replaced with an independent authority such as the Election Commission.
- Allowing independents to join parties: Independent members should be allowed to join political parties without being disqualified.
- Providing for a grace period: Grace period should be provided for members who have defected to allow them to prove their loyalty to their new party.

Conclusion

The Anti-Defection Law in India enacted to curb political defections and maintain stability has played a crucial role in preserving the integrity of the democratic process. The landmark KihotoHollohan case in 1992 solidified the constitutional validity of the law, emphasizing the importance of upholding party discipline and ensuring that elected representatives adhere to their party's ideology thereby reinforcing the foundation of a robust and accountable democratic framework in the country.

MCQs

1. Consider the following statements regarding the National Tiger Conservation Authority (NTCA):
 1. It was established a Statutory Body.
 2. It provides for science-based monitoring of cheetah and their habitat.
 Which of the statements given above is/are correct?
 - (a) 1 only
 - (b) 2 only
 - (c) Both 1 and 2**
 - (d) Neither 1 nor 2
2. The term 'Single screw extruder' has been in the news, it is related to
 - (a) Recycling of thermoplastic**
 - (b) Removing space debris and junk
 - (c) Oil refinery
 - (d) Quantum computing
3. What do you understand by the term Veblen good?
 - (a) Demand increases when prices increase due to a lack of substitutes for them.
 - (b) Their demand increases as the price increases due to their exclusivity.**
 - (c) Refers to heavy consumer durables or large home appliances.
 - (d) These goods are considered harmful to the society.
4. Rejupave technology has been in the news. Which one of the following statements is correct about it?
 - (a) It is a technology for constructing high-altitude bituminous roads under low and sub-zero temperatures.**
 - (b) It is used for harvesting wind energy in coastal areas and on sea surfaces.
 - (c) It is used for the promotion of commercial farming in arid and semi-arid areas.
 - (d) It is a technology used for storing chemical energy in batteries.
5. Consider the following schemes:
 1. Atmosphere and Climate Research-Modelling Observing Systems and Services
 2. Ocean Services, Modelling Application, Resources and Technology
 3. Polar Science and Cryosphere Research
 4. Seismology and Geosciences
 How many of the above are schemes under the Prithvi Vigyan (PRITHVI) initiative?
 - a) Only one
 - b) Only two
 - c) Only three
 - d) All four**
6. Consider the following statements with reference to the Prerana Programme:
 1. It is launched by the Ministry of Education.
 2. It is a weekly residential programme that will host 20 students from across the country on a rotational basis.
 Which of the statements given above are correct?
 - a) 1 Only
 - b) 2 only
 - c) Both 1 and 2**
 - d) Neither 1 nor 2
7. Operation Pawan' carried out by the Marine Commando Force of the Indian Navy is associated with which one of the following countries?
 - a) Sri Lanka**
 - b) Afghanistan
 - c) Ukraine
 - d) Palestine
8. Ratle Hydroelectric Project (RHP) is in the news. It is located on river
 - (a) Zanskar
 - (b) Jhelum
 - (c) Indus
 - (d) Chenab**
9. Open Acreage Licensing Policy (OALP) is sometimes talked about with reference to which one of the following?
 - (a) Giving license to open any new industry under special economic zones (SEZ).
 - (b) Auctioning of Iron ore under Mines and Minerals (Development and Regulation) Amendment Act, 2021.
 - (c) Providing licenses to farmers for organic farming by state governments.
 - (d) Uniform licensing system that will cover all hydrocarbons such as oil, gas and coal bed methane.**
10. Consider the following statements regarding Low-temperature thermal desalination (LTTD) plants:
 1. In it, warm surface seawater is evaporated at low pressure and the vapour is condensed with cold deep seawater.
 2. It is a process of converting seawater into potable water.
 Which of the statements given above is/are correct?
 - (a) 1 only
 - (b) 2 only
 - (c) Both 1 and 2**
 - (d) Neither 1 nor 2