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MINISTRY OF SCIENCE AND TECHNOLOGY

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INDIAN EXPRESS

Page 1

TRUST VOTE AND FLOOR TEST

(Syllabus: GS Paper 2 - Polity & Governance)

As Jharkhand MLAs return, trust vote buzz grows

ABHISHEK ANGAD
RANCHI, SEPTEMBER 4

THE GROUP of over 30 MLAs from the ruling JMM-led UPA alliance in Jharkhand, which had landed in neighbouring Chhattisgarh five days ago amid allegations of a poaching bid by the Opposition BJP, returned to Ranchi on Sunday, a day ahead of the expected trust vote to be called by Chief Minister Hemant Soren's government in a special Assembly session.

The MLAs will spend the night together at the Circuit House with JMM sources saying that a trust vote may be held Monday to "show the solidarity of the alliance" even as Governor Ramesh Bais is yet to officially convey the Election Commission's view on the disqualification of Soren as MLA over a mining lease he had granted himself last year.

Speaking to reporters, Soren said, "Whether there will be a

CONTINUED ON PAGE 4

Context: MLAs from the ruling JMM-led UPA alliance in Jharkhand expected trust vote to be called by Chief Minister Hemant Soren's government in a special Assembly session

Trust vote

- A 'trust vote' or confidence motion has to be moved by an MLA or an MP, and the objective is to find out whether or not the Chief Minister has the 'trust' or 'confidence' of the House.
- A trust vote can be registered in two ways, with no electronic voting system in place in the Vidhana Soudha.
- In a voice vote, the Speaker will ask those in favour the motion to say 'Aye', and those against the motion to say 'No'.
- The Speaker then decides whether the 'Ayes have it' or the 'Noes have it.'
- The Speaker can also ask the MLAs to physically stand up for those in favour and against the motion and decide by a manual counting of heads.
- He can also employ the roll call method. The Assembly Secretary can do a roll call of members, block by block, recording each vote.
- The Secretary also records those MLAs who choose to remain neutral.

Floor test

- Floor test is a term used for the test of the majority.
- If there are doubts against the chief minister, the governor can ask him to prove his majority in the House. In case of a coalition government, the chief minister may be asked to move a vote of confidence and win a majority.
- In the absence of a clear majority, when there is more than one individual staking claim to form the government, the governor may call for a special session to see who has the majority to form the government.
- Some legislators may be absent or choose not to vote.
- The numbers are then considered based only on those MLAs who were present to vote.

INDIAN EXPRESS

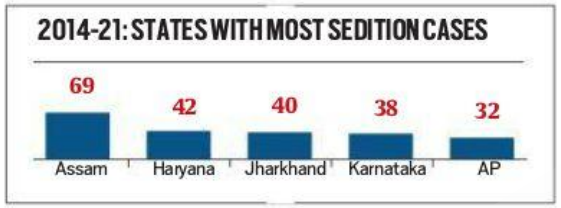
Page 9

SEDITION LAW

(Syllabus: GS Paper 2 - Polity & Governance)

Most number of sedition cases in last 8 years came from Assam: NCRB data

HARIKISHAN SHARMA
NEW DELHI, SEPTEMBER 4



ASSAM RECORDED the most number of sedition cases in the country in the last eight years, according to an analysis of official data.

The data from National Crime Records Bureau (NCRB) reports showed that out of 475 sedition cases registered in the country between 2014 and 2021, Assam accounted for 69 cases — 14.52 per cent. This means that around one in six sedition cases registered in the country in the last eight years came from Assam.

The NCRB compiles and publishes crime statistics as reported by states and Union Territories, and data on sedition cases (registered under Section 124A of the IPC) is available since 2014.

The latest edition of the NCRB's Crime in India report showed that 76 sedition cases were registered across the country in 2021, a marginal increase from the 73 registered in 2020. The number of these cases stood at 93 in 2019, 70 in 2018, 51 in 2017, 35 in 2016, 30 in 2015 and 47 in 2014.

A state-wise analysis of sedition cases shows that after Assam, the most number of such cases were reported from Haryana (42 cases), followed by Jharkhand (40), Karnataka (38), Andhra Pradesh (32) and Jammu and Kashmir (29). These six states accounted for 250 cases — more than half the number of total sedition cases recorded in the country — in the eight-year period.

Of Assam's 69 sedition cases registered in that period, three were from 2021, 12 from 2020, 17 from 2019, 17 again from 2018, 19 from 2017 and one from 2014. No sedition case was registered in the state in 2015 and 2016.

Nine other states and UTs registered sedition cases in double digits in the last eight years — Manipur (28), Uttar Pradesh (27), Bihar (25), Kerala (25), Nagaland (17), Delhi (13), Himachal Pradesh (12), Rajasthan (12) and West Bengal (12).

Three states — Odisha, Tamil Nadu and Telangana — reported eight sedition cases each in the 2014-21 period, while Chhattisgarh and Madhya Pradesh registered six cases and Goa four.

Maharashtra, Punjab, Uttarakhand and Lakshadweep registered just one sedition case each. Sikkim and Tripura recorded two sedition cases, and Arunachal Pradesh and Gujarat registered three each.

States and UTs that did not register even one sedition case in that period were Meghalaya, Mizoram, Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli and Daman and Diu, and Puducherry.

In the NCRB reports, data on sedition cases is given under the headline 'Offences Against State'. While cases registered under the Section 124A of the IPC have been mentioned under the sub-head 'Sedition', the cases registered under Section 121, 121A, 122 and 123 IPC have been given under the second sub-head 'Others'. In all, 149 offences against the state were registered in the country during 2021, of which 76 were sedition cases and 73 were under the 'other' subhead. The total number of offences against the state stood at 172 in 2020 and 163 in 2019.

Context: The latest edition of the NCRB's Crime in India report showed that 76 sedition cases were registered across the country in 2021, a marginal increase from the 73 registered in 2020.

Sedition law

- Section 124A defines sedition as: "Whoever, by words, either spoken or written, or by signs, or by visible representation, or otherwise, brings or attempts to bring into hatred or contempt, or excites or attempts to excite disaffection towards, the Government established by law shall be punished with imprisonment for life, to which fine may be added…"
- The provision also contains three explanations:
    - 1- The expression "disaffection" includes disloyalty and all feelings of enmity;
    - 2- Comments expressing disapprobation of the measures of the Government with a view to obtain their alteration by lawful means, without exciting or attempting to excite hatred, contempt or disaffection, do not constitute an offence under this section;
    - 3- Comments expressing disapprobation of the administrative or other action of the Government without exciting or attempting to excite hatred, contempt or disaffection, do not constitute an offence under this section.

Punishment for the Offence of Sedition:

- As per section 124A, sedition is a non-bailable offence, punishable with imprisonment from three years up to life, along with a fine.
- The person charged under this law is also barred from a government job and their passport is seized by the government.

LIVEMINT Page 2

PRODUCTION LINKED INCENTIVE (PLI) SCHEME

(Syllabus: GS Paper 3 - Economy)

Govt considers PLI for furniture sector

PTI
feedback@livemint.com
NEW DELHI

The government is considering a production linked incentive (PLI) scheme for certain types of furniture to boost domestic manufacturing, and exports and create jobs in the sector, an official said.

The proposal is at the discussion stage, the official added.

The government has already rolled out the scheme with an outlay of about ₹2 trillion for as many as 14 sectors, including automobiles and auto components, white goods, pharma, textiles, advance chemistry cell and speciality steel. The objective of the scheme is to make domestic manufacturing globally competitive and to create global champions in manufacturing. Discussions are on for the PLI scheme for moulded furniture and toys, the official said.

The government has already rolled out the scheme with an outlay of about ₹2 trillion for as many as 14 sectors

The toy industry has demanded an extension of the scheme for the sector as it would promote local manufacturing and create jobs.

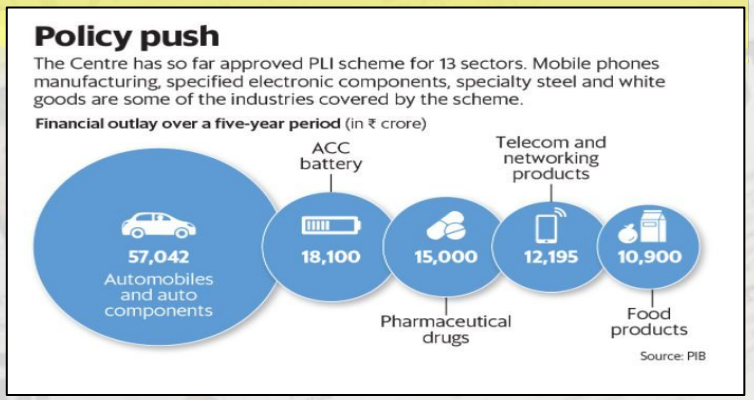
Manu Gupta, promotor of Playgro Toys India, said the government's initiatives are helping the industry, but a National Toy Policy and PLI scheme would further support the growth of the sector. Talking about the furniture sector, Trade Promotion Council of India Chairman Mohit Singla said there is already established competitiveness in the moulded furniture sector, and the PLI scheme would be a thoughtful step in that direction.

"Like we have industrial parks for the pharma sector, a similar move to develop a furniture cluster will give a fillip to the sector," Singla said. As per estimates, furniture export, at present, is about $400 million per year. Global furniture exports currently stand at 264 billion, and half of the market share is dominated by five countries - China, Germany, Poland, Italy and Vietnam.

Context: The government is considering a production linked incentive (PLI) scheme for certain types of furniture to boost domestic manufacturing, and exports and create jobs in the sector.

Production linked incentive (PLI) scheme

- In order to boost domestic manufacturing and cut down on import bills, the central government introduced a scheme that aims to give companies incentives on incremental sales from products manufactured in domestic units.
- Apart from inviting foreign companies to set shop in India, the scheme also aims to encourage local companies to set up or expand existing manufacturing units.
- The objective is really to make India more compliant with our WTO (World Trade Organisation) commitments and also make it non-discriminatory and neutral with respect to domestic sales and exports.
- The PLI scheme, launched in March 2020, initially targeted three industries- mobile and allied component manufacturing, electrical component manufacturing, and medical devices.
- The incentives, calculated on the basis of incremental sales, range from as low as 1 per cent for the electronics and technology products to as high as 20 per cent for the manufacturing of critical key starting drugs and certain drug intermediaries.
- In some sectors such as advanced chemistry cell batteries, textile products and the drone industry, the incentive to be given will be calculated on the basis of sales, performance and local value addition done over the period of five years.



THE HINDU Page 14

NANO UREA

(Syllabus: GS Paper 3 - Agriculture & Sci & Tech

Scientists remain sceptical about how nano urea benefits crops

While the inventor says farmers are benefiting from it, several experts have questioned the science underlying its efficacy

JACOB KOSHY
NEW DELHI

Nano urea, a fertilizer patented and sold by the Indian Farmers Fertiliser Cooperative Ltd. (IFFCO), has been approved by the government for commercial use because of its potential to substantially reduce the import bill, but several experts have questioned the science underlying its efficacy.

Prime Minister Narendra Modi, while inaugurating a nano urea production plant at Kalol in Gujarat on May 28, said, "... A small bottle (500 ml) of nano urea is equivalent to one 50-kg bag of granular urea currently used by farmers."

IFFCO's nano urea contains nitrogen, an element critical for plant development, in the form of granules that are a hundred thousand times finer than a sheet of paper. At this nano scale, which is about a billionth of a metre, materials behave differently than in the visible realm.

Ramesh Raliya, 34, who is credited as the inventor of nano urea and is now a consultant with IFFCO, told *The Hindu* that his process used "organic polymers" that kept the nano particles of nitrogen stable and in a form that could be sprayed on plants.

Chemically packaged urea is 46% nitrogen, which means a 45-kg sack contains about 20 kg of nitrogen.

Contrastingly, nano urea sold in 500-ml bottles has only 4% nitrogen (or around 20 g). How this can compensate for the kilograms of nitrogen normally required puzzles scientists.

Plants need nitrogen to make protein and they source almost all of it from soil bacteria which live in a plant's roots and have the ability to break down atmospheric nitrogen, or that from chemicals such as urea into a form usable by plants.

To produce one tonne of wheat grain, a plant needs 25 kg of nitrogen. For rice, it is 20 kg of nitrogen, and for maize, it is 30 kg of nitrogen. Not all the urea cast on the soil, or sprayed on leaves in the case of nano urea, can be utilised by the plant. If 60% of the available nitrogen was used, it would yield 496 kg of wheat grain. Even if 100% of 20 g of nano urea, which is what is effectively available, is utilised by the plant, it will yield only 368 g of grain, said



Key element: Nano urea contains nitrogen granules that are a hundred thousand times finer than a sheet of paper. ▪ VIJAY SONEJI

N.K. Tomar, retired Professor of Soil Science at Chaudhary Charan Singh Haryana Agricultural University, Hissar, Haryana.

"Therefore, total attempt is futile and causing sheer wastage of money. This claim of IFFCO is unfounded and will be disastrous for farmers," he notes in a letter to the NITI Aayog as well as the National Academy for Agricultural Sciences. Dr. Tomar told *The Hindu* that they had not yet responded to his letter.

Dr. Tomar's views are seconded by I.P. Abrol, former Deputy Director-General, Indian Council of Agricultural Research (ICAR).

"Urea is highly water soluble and already reaches the lowest form of concentration when absorbed. How nanoparticles can increase the effectiveness of nitrogen uptake by being still smaller is unclear to me. That foliar spraying (spraying on leaves) improves fertilizer uptake is known for over half a century. So what's new here?" Dr. Abrol asked.

Unlike the coarse particles that farmers throw onto the soil during sowing, the nano particle form of nano urea, when applied on to the leaves, stimulates enzymes such as nitrase and nitrite reductase, which help plants metabolise nitrogen, Dr. Ramesh Raliya said.

Different parts of the plant contain nitrogen in varying proportions and because nano particles are so small and numerous, they have a lot more surface area relative to their volume, compared with the millimetre-size grains of urea that plants are exposed to nearly 10,000 times more in nitrogen.

Context: Nano urea, a fertilizer patented and sold by the Indian Farmers Fertiliser Cooperative Ltd. (IFFCO), has been approved by the government for commercial use because of its potential to substantially reduce the import bill, but several experts have questioned the science underlying its efficacy.



About nano urea

- It is essentially urea in the form of a nanoparticle. Urea is a chemical nitrogen fertiliser, white in colour, which artificially provides nitrogen, a major nutrient required by plants.
- While conventional urea has an efficiency of about 25 per cent, the efficiency of liquid nano urea can be as high as 85-90 per cent.
- Conventional urea fails to have the desired impact on crops as it is often applied incorrectly, and the nitrogen in it is vaporised or lost as gas. A lot of nitrogen is also washed away during irrigation.
- Liquid nano urea is sprayed directly on the leaves and gets absorbed by the plant.
- Fertilisers in nano form provide a targeted supply of nutrients to crops, as they are absorbed by the stomata, pores found on the epidermis of leaves.
- Liquid nano urea has a shelf life of a year. Liquid nano urea contains 4 percent total nitrogen (w/v) evenly dispersed in water. The size of a nano nitrogen particle varies from 20-50 nm. (A nanometre is equal to a billionth of a metre.)

THE HINDU Page 14

DARK SKY RESERVE
(Syllabus: GS Paper 3 -Sci & Tech)

'Dark sky reserve' to come up in Ladakh

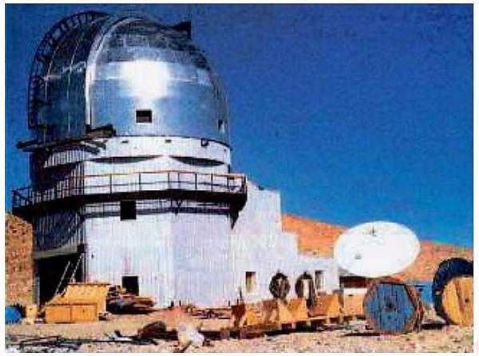
Hanle, situated 4,500 m above sea level, is one of the world's most optimal sites for astronomical studies

JACOB KOSHY
NEW DELHI

In a first-of-its-kind initiative, the Department of Science & Technology (DST) has announced the setting up of India's first dark sky reserve at Hanle in Ladakh in the next three months.

Hanle, which is about 4,500 metres above sea level, hosts telescopes and is regarded as one of the world's most optimal sites for astronomical observations. However, ensuring that the site remains well-suited for astronomy implies keeping the night sky pristine, or ensuring minimal interference to the telescopes from artificial light sources such as electric lights and vehicular lights from the ground.

A dark sky reserve is a designation given to a place that has policies in place to ensure that a tract of land or region has minimal artificial light interference. The International Dark Sky Association is a U.S.-based non-profit that designates sites as international dark sky places, parks, sanctuaries and reserves, depending on the criteria they meet. Several such reserves exist around the world but none so far in India.



Reaching the stars: The Himalayan Chandra Telescope at Hanle in Ladakh. • FILE PHOTO

In June, a three-way Memorandum of Understanding (MOU) was signed among the Union Territory administration, the Ladakh Autonomous Hill Development Council (LAHDC), Leh, and the Indian Institute of Astrophysics (IIA), Bengaluru, which uses and maintains the telescopes, for launching the dark space reserve. Science Minister Jitendra Singh, on Saturday, following a meeting with R.K. Mathur, Lieutenant-Governor, Ladakh, said that the site "will have activities to help in boosting local tourism and economy through interventions of science and technology".

Annapurni Subramaniam, director, Indian Institute of Astrophysics, said that to promote astro-tourism, villages around Hanle would be encouraged to promote homestays equipped with telescopes that visitors can use to view the night sky.

Villagers would also be trained to help visitors with astronomical observations.

"There would be some restrictions on vehicles and headlights during the evening. There will be delineators on roads like you do outside observatories. People can come, park, observe the sky and stay in homestays," she told *The Hindu*.

Ideal conditions

The Indian Astronomical Observatory, the high-altitude station of the IIA, is situated to the north of Western Himalayas, at an altitude of 4,500 metres above mean sea level. Located atop Mt. Saraswati in the Nilamkhul Plain in the Hanle Valley of Changthang, it is a dry, cold desert with sparse human population.

The cloudless skies and low atmospheric water vapour make it one of the best sites in the world for optical, infrared, sub-millimetre, and millimetre wavelengths.

The Himalayan Chandra Telescope, High Energy Gamma Ray Telescope, Major Atmospheric Cherenkov Experiment Telescope and GROWTH-India are the prominent telescopes located at the Hanle observatory.

Context: In a first-of-its-kind initiative, the Department of Science & Technology (DST) has announced the setting up of India's first dark sky reserve at Hanle in Ladakh in the next three months.

- A part of Changthang Wildlife Sanctuary in Ladakh is going to become a Dark Sky Reserve, which will help promote astronomy-tourism.
- Once this region is declared as the Hanle Dark Sky Reserve, efforts will be undertaken to protect the night sky from superfluous illumination and light pollution.

About dark sky reserve

- A dark-sky Reserve (DSR) is an area, usually surrounding a park or observatory that restricts artificial light pollution.
- The International Dark-Sky Association (IDA) is associated with the International Dark Sky Reserve (IDSR) and International Dark Sky Park (IDSP).
- An International Dark-Sky Association (IDA) was founded in 1988 to reserve public or private land for an exquisite outlook of nocturnal territories and starry night skies.
- In 1993, Michigan became the first state in the United States to designate a tract of land as a "Dark Sky Reserve" at the Lake Hudson State Recreation Area.
- It is generally understood that a dark-sky reserve, should be sufficiently dark to promote astronomy.
- However, this is not always the case. The lighting protocol for a dark-sky reserve is based on the sensitivity of wildlife to artificial light at night.

THE HINDU Page 14

INFLATABLE AERODYNAMIC DECELERATOR

(Syllabus: GS Paper 3 - Sci & Tech)

ISRO tests system to recover spent rocket stages

Inflatable Aerodynamic Decelerator successfully test-flown by VSSC on a Rohini-300 sounding rocket

SPECIAL CORRESPONDENT
THIRUVANANTHAPURAM

The Indian Space Research Organisation (ISRO) has successfully tested a technology that could aid cost-effective recovery of spent rocket stages and safely land payloads on other planets.

The Inflatable Aerodynamic Decelerator (IAD) was designed, developed and successfully test-flown by ISRO's Vikram Sarabhai Space Centre (VSSC) on a Rohini-300 (RH300 Mk II) sounding rocket from the Thumba Equatorial Rocket Launching Station (TERLS) here on Saturday.

"This demonstration opens a gateway for cost-effective spent stage recovery and this technology can also be used in ISRO's future missions to Venus and Mars," ISRO chairman S. Somanath, who was present during the 12.20 p.m. launch, said.

Describing the IAD as a "game changer" with multiple applications for future missions, the VSSC said this was the first time that an IAD had been designed for spent-stage recovery.



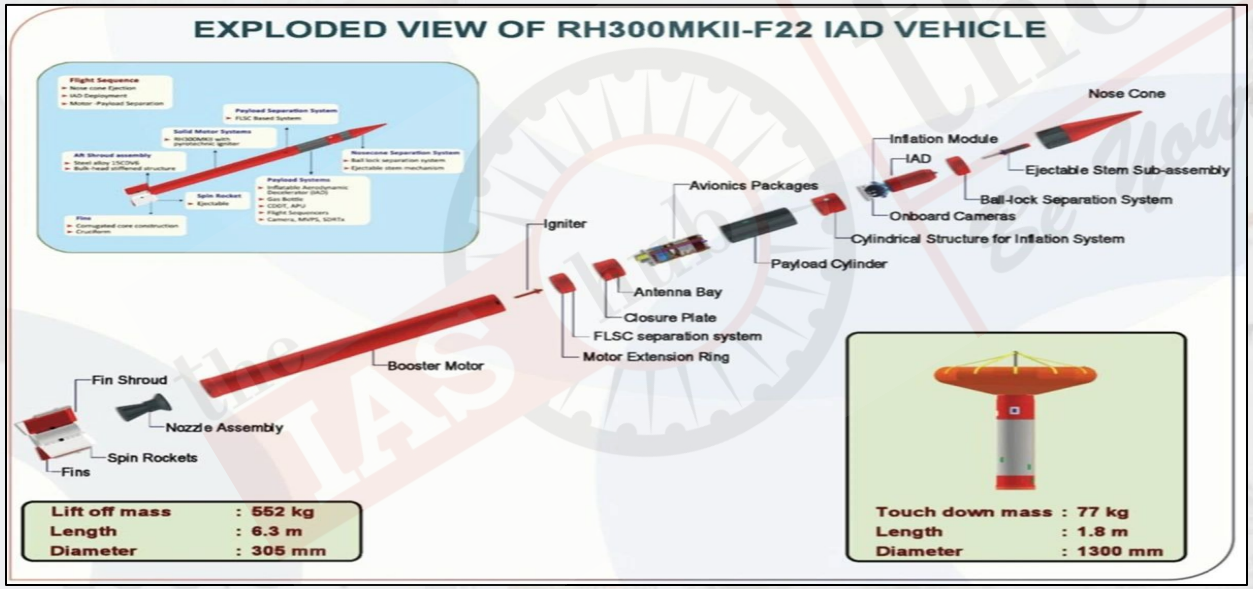
Flight path: The Rohini sounding rocket carrying the IAD lifting off from Thumba in Thiruvananthapuram on Saturday.

As its name suggests, the IAD serves to decelerate an object plunging down through the atmosphere.

For Saturday's demonstration, the IAD, made of Kevlar fabric coated with polychloroprene, was packed into the payload bay of the rocket.

After the nose-cone of the rocket separated, the IAD inflated, balloon-like, at a height of 84 km using compressed nitrogen stored in a gas bottle. The IAD systematically reduced the velocity of the payload through aerodynamic drag, the VSSC said.

Once the IAD fell into the sea, it deflated by firing a deflation pyro valve. The pneumatic system used for inflating the IAD was developed by the Liquid Propulsion Systems Centre (LPSC), Valiyamala.



Context: The Indian Space Research Organisation (ISRO) has successfully tested a technology that could aid cost-effective recovery of spent rocket stages and safely land payloads on other planets.

About Inflatable Aerodynamic Decelerator

- Inflatable Aerodynamic Decelerator or IAD in short is a technique used for an atmospheric entry payload.
- An inflatable envelope and an inflatant (anything that inflates the envelope, like air or helium) make up the inflatable aerodynamic decelerator.
- IAD is designed to increase drag upon entering the atmosphere of any planetary body, like Earth, Mars, or even Moon.
- Its shape is maintained by a closed, gas-pressured body and the inflatant gas is also generated internally. Some versions also use ram air or both.
- ISRO's latest IAD has been designed and developed at Vikram Sarabhai Space Centre.
- The IAD will help ISRO in performing many space tasks effectively including recovery of spent stages of rockets, for landing payloads on missions to other planetary bodies.

TIMES OF INDIA

Page 19

FOREIGN PORTFOLIO INVESTMENT (FPI)

(Syllabus: GS Paper 3 - Economy)

FPI inflows hit 20-mth high of ₹51k cr in Aug

Sharp Selloff In Stocks By Foreign Funds Eases, But Flows May Be Volatile: Brokers

TIMES NEWS NETWORK

Mumbai: The Rs 51,204-crore net buying of Indian stocks by foreign funds in August, a 20-month high figure, has convincingly reversed a nine-month continuous selling by these institutions. But flow-related volatility could continue for a while, brokers said.

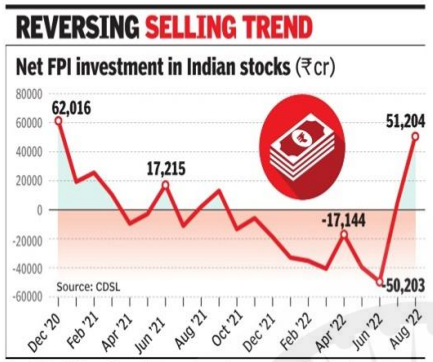
A report by ICICI Securities pointed out that the US was still in a 'quantitative tightening' cycle that began in 2021 and the same was responsible for the huge net outflow by foreign portfolio investors (FPIs) between October 2021 and June 2022. During that phase, FPIs had taken out around $33 billion from the Indian market, one of the sharpest in the country's history.

Analysts at ICICI Securities believe that the record outflow was mainly in anticipation of an extreme quantitative tightening. However, a similar outflow may not occur again. "We continue to be in a quantitative tightening cycle which will result in bouts of volatility from FPIs, although the phase of 'unprecedented relentless selling' seems to be behind us," the report said. "The trajectory of inflation going ahead in the US will be a key determinant of FPI flows in general towards emerging markets, including India," it added.

The short-term view among brokers, relating to the direction of FPI flows, however, is a bit confusing. On the one hand, the strength of the dollar against other currencies could prompt foreign fund managers to take money out of emerging markets. On the other, the view is that inflation in the US has peaked and, as this starts moderating, FPIs would buy Indian assets (stocks, bonds and hybrid products) again.

"The trend on this is not yet clear," said V K Vijayakumar, chief investment strategist, Geojit Financial Services. "FPIs are likely to continue investing. They have learned that exit is easy but entry is expensive," he said. Between October last and this June, while FPIs net sold Indian assets worth around $33 billion, domestic institutions, led by mutual funds, bought assets worth about $30 billion.

Overall net investment by FPIs in August was Rs 56,521 crore including debt and hybrid products, among others. The overall net selloff in Indian equities this year by FPIs is about Rs 1.6 lakh crore, according to CDSL data.



Context: The Rs 51,204-crore net buying of Indian stocks by foreign funds in August, a 20-month high figure, has convincingly reversed a nine month continuous selling by these institutions.

Foreign portfolio investment (FPI)

- FPI is a common way to invest in overseas economies. It includes securities and financial assets held by investors in another country.
- Securities (in FPI) include stocks or American Depositary Receipts (ADRs) of companies in nations other than the investor's nation.
- It also includes bonds or other debt issued by these companies or foreign governments, mutual funds, or exchange-traded funds (ETFs) that invest in assets abroad or overseas.
- On a macro-level, foreign portfolio investment is part of a country's capital account and shown on its balance of payments (BOP).
- FPI is often referred to as "hot money" because of its tendency to flee at the first signs of trouble in an economy. FPI is more liquid, volatile and therefore riskier than FDI.
- Individual investors interested in opportunities outside their own country invest via FPI. It does not give investors direct ownership of a company's assets.



DOWN TO EARTH

Sept 5

GEOTHERMAL FLUID

(Syllabus: GS Paper 1 - Geography)

POLLUTION

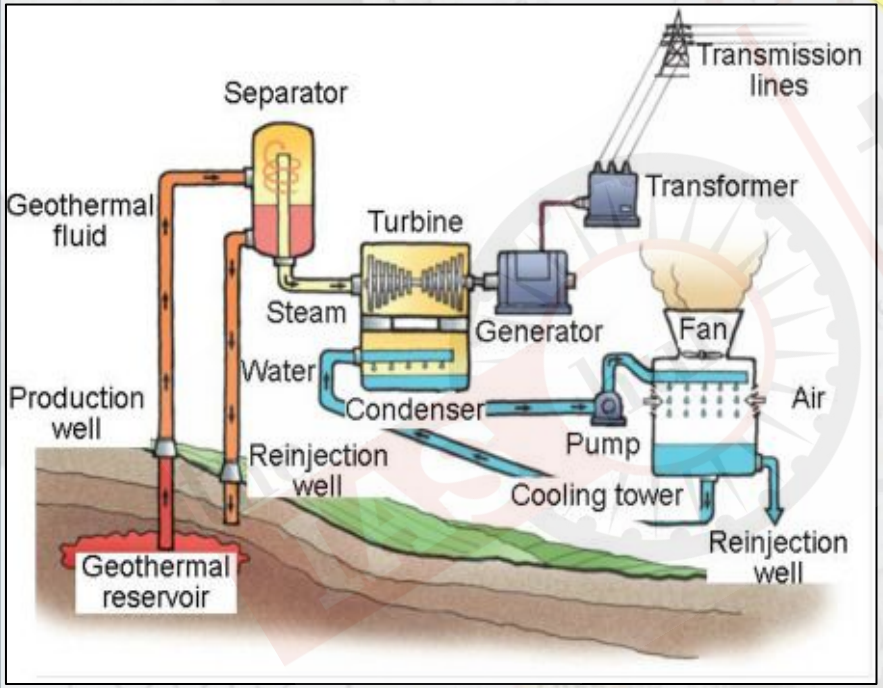
'Freak incident': ONGC, ISOR downplay geothermal fluid discharge into Ladakh's Puga nullah

Both agencies also said the water discharged from the borehole after a blowout August 16 was benign

NEXT NEWS >

By Narendra Patil
Published: Friday 02 September 2022





Context: The Oil and Natural Gas Corporation Energy Centre (OECT) and the Iceland Geosurvey (ISOR), that have signed a memorandum of understanding (MoU) for developing a geothermal plant in Puga, Ladakh, have termed a recent accident at the site as a 'freak incident'.

- The geothermal fluid that leaked from the ground and flowed into the Puga nullah, a tributary of the Indus, was benign.
- The plant posed several environmental risks and was flouting green norms.
  - Puga is an important staging site for migratory birds in the Central Asian Flyway.
  - Many birds, including the black-necked crane, feed along the grassy banks of the stream flowing through the Puga valley.

Geothermal fluid

- In geothermal power generation, geothermal fluid, a mixture of steam and hot water heated by subterranean heat, is extracted through production wells dug deep into the Earth (up to 3–4 km).
- The thermal energy of the geothermal fluid is then used to generate electricity.
- The used geothermal fluid is returned to the Earth via a reinjection well.
- Geothermal power generation is a power generation system that utilizes the Earth instead of a boiler.
- Generally, steam turbines play an important role as the prime movers to generate electricity, just like in fossil and nuclear power plants.

PIB

Sept 5

Manipur's pineapples

(Syllabus: GS Paper 3 - Economy)

Centre in collaboration with Government of Manipur organizes in-store export promotion show in Dubai for pineapples

Organic certified pineapples sourced from farmers of Thayong Organic Producer Company, Manipur

Manipur's pineapples

- Manipur Organic Mission Agency (MOMA) has supported the sourcing of organic certified Kwe variety of pineapples directly from the farmers of Manipur.
- The Manipur pineapple is fibre-rich sweetener from North Eastern Region (NER).
- Northeast pineapple is one of the most important tropical fruits grown in the NER and the fibre-rich fruit is cultivated in almost all the region.
- Manipur ranks sixth in pineapple production having a share of 7.46 per cent in total production in India.
- India shares 8.2% of the world's total pineapple production
- The top ten importing countries of Indian pineapples are UAE, Nepal, Qatar, Maldives, USA, Bhutan, Belgium, Iran, Bahrain and Oman.
- Tripura was the first North Eastern state to export its 'queen' variety of pineapple to Dubai and Doha in 2018.
- Tripura's pineapple was also exported to Bangladesh in 2020. Assam also made a debut in pineapple export to Dubai in 2019.

Varieties of Pineapple in India

- Assam and other Northeast states : Kew, queen, Mauritius
- West Bengal: Giant kew, Queen
- Kerala: Mauritius, kew, queen
- Assam : Jaldhup, Lakhat

DST

Sept 5

NEURODEGENERATIVE DISEASE

(Syllabus: GS Paper 3 - Sci & Tech)

Hydration of proteins could act as a potential marker for an early detection of neuro-degenerative diseases

Hydration dynamics of proteins plays a pivotal role in the aggregation of several proteins which is a preliminary step towards various neuro-degenerative diseases. Thus aggregation process could be spotted early by detecting altering water network dynamics and modulated using inactive substances that serve as the vehicle or medium for a drug or other active substance.

'Liquid liquid phase separation' (LLPS)

- A phenomenon called 'liquid liquid phase separation' (LLPS) underlines the formation of cells organelles like P bodies, nucleolus which are membrane-less compartments in the cytoplasm of cells. LLPS, a self-aggregated system, is an intermediate step during the formation of the stable protein aggregates.
- When multivalent proteins interact they undergo rapid transformation from small complexes to large polymeric assemblies with increase in protein concentration.
- This dense phase often resembles liquid droplets exhibiting higher protein density and weaker molecular motion than the surrounding medium. This process, initiated through liquid liquid phase transfer, plays crucial role in inducing human diseases, especially age-related neurodegenerative diseases like Alzheimer's disease, Parkinson's disease and cataract.
- Therefore, understanding the process of phase separation at a molecular level has become an emergent area of research in molecular biology fraternity.

About Neurodegenerative disease

- A neurodegenerative disease is caused by the progressive loss of structure or function of neurons, in the process known as neurodegeneration. Such neuronal damage may ultimately involve cell death.
- Neurodegeneration can be found in the brain at many different levels of neuronal circuitry, ranging from molecular to systemic.
- Neurological disorders contribute 10% of the total disease burden in India.
- **Non-Communicable Neurological Disorders:** Stroke, Headache disorders, Epilepsy, Cerebral palsy, Alzheimer's disease and other dementias, Brain and central nervous system cancer, Parkinson's disease, Multiple sclerosis, Motor neuron diseases, and other neurological disorders.
- **Communicable Neurological Disorders**: Encephalitis, Meningitis, Tetanus.
- **Injury-related Neurological Disorders:** Traumatic brain injuries, Spinal cord injuries.

THANK YOU!

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