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Bangladesh floods not due to Tripura dam: MEA

Protesters in Bangladesh blame India for the deluge; MEA says floods in common rivers a shared problem and the Dumbur dam in Tripura is 'auto releasing' water owing to heavy rain; the dam is built on Gumti river that flows through both countries; Indian envoy meets Yunus, expresses concern over security of High Commission and staff

GS Paper II: India-Bangladesh

Jacob Koshy
Kallol Bhattacharjee
NEW DELHI / DHAKA

The Ministry of External Affairs (MEA) on Thursday denied that floods in eastern districts of Bangladesh were caused due to the opening of the Dumbur dam in Tripura.

The clarification comes after protesters in Bangladesh blamed India for floods in eastern districts, triggering security threats for the Indian High Commission in Dhaka.

Later in the day, Indian High Commissioner to Bangladesh Pranay Verma met Chief Adviser to the interim government of Bangladesh, Mohammad Yunus, in Dhaka and expressed "concern" about the heightened security threats to the Indian mission and personnel based there.

"We have seen concerns

being expressed in Bangladesh that the current situation of flood in districts on the eastern borders of Bangladesh has been caused by opening of the Dumbur dam upstream of the Gumti river in Tripura. This is factually not correct," the MEA said in a statement.

'Auto release'

Western Tripura and parts of Bangladesh have been inundated with rain in the last few days and this was largely responsible for the flooding in downstream Bangladesh. The Dumbur dam, a hydropower project, had been "auto releasing" water as a consequence of the rainfall, the MEA statement noted.

The Dumbur dam is built on the Gumti river which flows through India and Bangladesh.

Tripura has witnessed heavy rain, with 'extremely heavy' rainfall being reported over southern and



Common concern: People wading through floodwaters in Feni, Bangladesh, on Thursday. AFP

western parts from August 19 to 22, the India Meteorological Department said.

"We would like to point out that the catchment areas of Gumti river that flows through India and Bangladesh have witnessed heaviest rains of this year over the last few days. The flood in Bangladesh is primarily due to waters from these large

catchments downstream of the dam," the MEA statement emphasised,

Rainfall has been continuing since August 21 in the whole of Tripura and adjoining districts of Bangladesh.

"In the event of heavy inflow, automatic releases had been observed from the dam," their communication noted.

Automatic releases are a feature of dams that store water for power generation and meant to ensure that water doesn't exceed a certain level to ensure the reservoir's stability.

Amarpur station is part of a bilateral protocol under which India had been transmitting real-time flood data to Bangladesh. Indian authorities had

communicated the rising water level trends to Bangladesh up to 3 p.m. on August 21, 2024. However, a power outage had disrupted this flow of information from 6 p.m. though India had been communicating flood data to Bangladesh "through other means," the MEA said.

Floods on the common rivers between India and Bangladesh were a shared problem inflicting "sufferings to people on both sides", and required close mutual cooperation towards resolving them.

India and Bangladesh shared 54 common cross-border rivers and river water cooperation was an important part of bilateral engagement.

"We remain committed to resolving issues and mutual concerns in water resources and river water management through bilateral consultations and technical discussions," the

communique noted.

In Dhaka, Indian High Commissioner Mr. Verma, during his introductory meeting with Prof. Yunus, expressed "concern" about the heightened security threats to the Indian High Commission and personnel based there, a senior Government of Bangladesh official informed on Wednesday.

Street protests

The information was shared during a press briefing held after the Indian envoy met Prof. Yunus as some of the persisting anti-Hasina protests – both online as well as on the streets – also threatened Indian interests after multiple eastern districts of Bangladesh were swept by a ferocious flood that the agitators blamed upon India.

12 KILLED IN TRIPURA

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Bangladesh floods not due to Tripura dam: MEA (23 August)

Protesters in Bangladesh blame India for the deluge; MEA says floods in common rivers a shared problem and the Dumbur dam in Tripura is 'auto releasing' water owing to heavy rain; the dam is built on Gomti river that flows through both countries; Indian envoy meets Yunus, expresses concern over security of High Commission and staff

- The Ministry of External Affairs (MEA) denied claims that floods in eastern Bangladesh were caused by the opening of the Dumbur dam in Tripura, India.
- Protests in Bangladesh accused India of causing the floods, leading to security concerns for the Indian High Commission in Dhaka.
- **Indian High Commissioner Pranay Verma** met with Bangladesh's Chief Adviser Mohammad Yunus to express concern about the security threats to Indian personnel in Bangladesh.
- The MEA clarified that the **floods in Bangladesh were primarily due to heavy rains in the region, not the opening of the Dumbur dam.**
- The Dumbur dam, located on the **Gumti river**, has been "auto releasing" water due to excessive rainfall.
- Both western Tripura in India and parts of Bangladesh experienced heavy rain, especially between August 19 and 22, contributing to the flooding.
- The MEA emphasized that the floods were mainly caused by **rainwater from large catchment areas downstream of the dam.**
- Rainfall has continued since August 21 in Tripura and nearby districts in Bangladesh, leading to automatic water releases from the dam due to the heavy inflow.
- Automatic water releases from dams help maintain reservoir stability by preventing water from exceeding safe levels, especially in dams used for power generation.
- The **Amarpur station in India is part of a bilateral agreement with Bangladesh, where India shares real-time flood data.**
- India communicated rising water levels to Bangladesh until 3 p.m. on August 21, 2024, but a power outage disrupted the data flow from 6 p.m. India continued sharing flood information through other methods.
- Floods on shared rivers between India and Bangladesh affect people on both sides and require close cooperation to manage.
- **India and Bangladesh share 54 cross-border rivers**, and river water cooperation is a key part of their bilateral relationship.
- India is committed to resolving water-related issues through bilateral consultations and technical discussions.
- In Dhaka, Indian High Commissioner Pranay Verma expressed concern about security threats to the Indian High Commission and its personnel due to ongoing protests.
- Protests in Bangladesh, both online and on the streets, have targeted Indian interests after floods in eastern Bangladesh, which some protesters blamed on India.

India, Poland formulate action plan, upgrade ties to strategic partnership

GS Paper II: India-Poland

India and Poland have agreed to formulate and execute a five-year action plan that will guide bilateral collaboration from 2024 to 2028 across several areas, following talks between Prime Minister Narendra Modi and his Polish counterpart Donald Tusk. The ties between the two countries have been upgraded to the level of a "strategic partnership".

The India-Poland action plan identified priority areas for cooperation which include political dialogue and security cooperation, trade and investment, climate, energy, mining, science and technology, transport and connectivity, terrorism, cyber security, health, people-to-people ties and cultural cooperation.

Poland is among the world leaders in food processing, Mr. Modi noted and invited Polish companies to join the mega food parks being built in India. "In India, rapid urbanisation is opening up new opportunities for our cooperation in areas such as water



Narendra Modi had interacted with the Indian diaspora and discussed people-to-people ties in Warsaw. X/@NARENDRAMODI

treatment, solid waste management, urban infrastructure," he said identifying clean coal technology, green hydrogen, renewable energy, artificial intelligence as "common priorities".

Addressing the Indian community on Wednesday evening, Mr. Modi announced the Jam Saheb of Nawanagar youth exchange programme between the two countries under which every year 20 young persons from Poland will be taken on a tour to India.

"We invite Polish companies to join Make in India and make for the

world," the PM said. Towards the welfare of the skilled workforce, workers, and to promote mobility, the two sides agreed on a social security agreement.

Both sides agreed to work on concluding a cooperation agreement to promote the "safe, sustainable, and secure" use of space and commercial space ecosystems. "They also agreed to promote human and robotic exploration," a joint statement said. Poland also recognised India's ambition to join the International Energy Agency. Mr. Modi met Polish President Andrzej Duda at Belweder Palace.

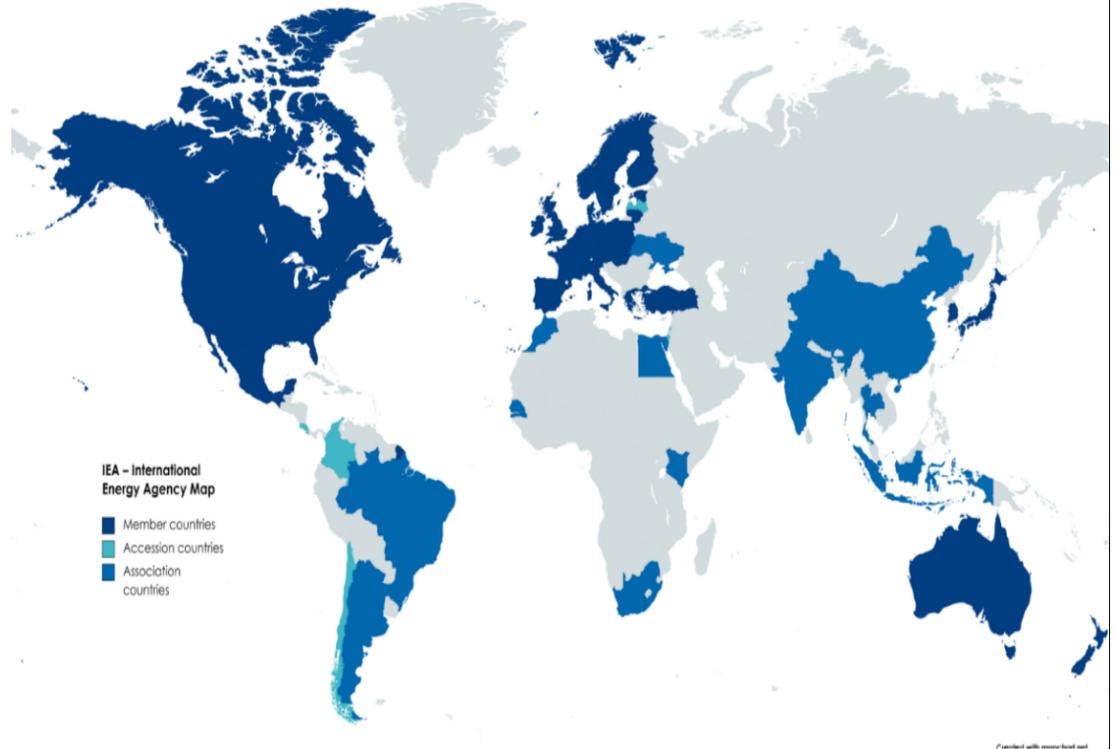
India, Poland formulate action plan, upgrade ties to strategic partnership (23 August)

- India and Poland have agreed to create and implement a **five-year action plan (2024-2028)** for collaboration in various areas.
- The agreement was made during talks between Prime Minister Narendra Modi and Polish Prime Minister **Donald Tusk**.
- The relationship between India and Poland has been elevated to a "**strategic partnership**."
- The action plan focuses on several priority areas for cooperation, including:
 - Political dialogue and security
 - Trade and investment
 - Climate and energy
 - Mining
 - Science and technology
 - Transport and connectivity
 - Counterterrorism and cybersecurity
 - Health
 - People-to-people ties and cultural exchanges

- **Poland is a global leader in food processing**, and Prime Minister Modi invited Polish companies to participate in India's mega food parks.
- Modi highlighted opportunities for collaboration in areas like **water treatment, waste management, and urban infrastructure** due to India's rapid urbanization.
- **Clean coal technology, green hydrogen, renewable energy, and artificial intelligence** were identified as common priorities for both countries.
- Prime Minister Modi announced the **Jam Saheb of Nawanagar youth exchange program**, which will bring 20 young people from Poland to India each year.
- Modi invited Polish companies to participate in India's "Make in India" initiative.
- India and Poland agreed on a social security agreement to benefit skilled workers and promote mobility.
- Both countries will work on a cooperation agreement to promote the safe and sustainable use of space and commercial space activities, including human and robotic exploration.
- Poland acknowledged **India's goal to join the International Energy Agency**.
- Modi also met with Polish President Andrzej Duda at **Belweder Palace**.

International Energy Agency (IEA)

- **Establishment:**
 - Founded in **1974**.
 - Based in **Paris, France**.
 - Established under the framework of the **Organisation for Economic Co-operation and Development (OECD)**.
- **Purpose:**
 - Created in response to the **1973 oil crisis**.
 - Addresses physical disruptions in global oil supplies.
 - Provides data and statistics about the global oil market and broader energy sector.
 - Promotes energy savings, conservation, and international technical collaboration.
- **Membership:**
 - **31 member countries** and **13 association countries**.
 - Represents **75% of global energy demand**.
- **Scope of Work:**
 - Initially focused on traditional fuels (oil, gas, and coal).
 - Expanded to include **cleaner and fast-growing energy sources**:
 - Renewable energy (solar, wind, biofuels).
 - Nuclear energy.
 - Hydrogen.
 - Critical minerals necessary for these technologies.
- **Core Activities:**
 - Provides **policy advice** to member states and associated countries.
 - Supports **energy security** and transition to clean energy.
 - Focuses on accelerating clean energy transition and mitigating climate change.
 - Committed to achieving **net zero emissions** and limiting global warming to **1.5 °C** in line with the **Paris Agreement**.
- **Leadership:**
 - Current Executive Director: **Fatih Birol** (in office since late 2015).
- **Publications:**
 - Produces various reports, including:
 - **World Energy Outlook** (annual flagship publication).
 - **Net Zero by 2050** report.



Modi's Ukraine visit likely to explore deeper ties in defence manufacturing

India operates a large inventory of military equipment of Ukrainian origin; the Prime Minister, who will be in Kyiv at the invitation of Volodymyr Zelenskyy, will discuss partnerships in defence trade, which has been affected by the ongoing war

GS Paper II: India-Ukraine

Dinakar Peri
KYIV

The symbolism and balancing act aside, Prime Minister Narendra Modi's visit to Ukraine on Friday, the first by an Indian Prime Minister, will focus on cooperation in defence, with India operating a large inventory of military equipment of both Russian and Ukrainian origin.

In the three years since the war in Ukraine, India has seen supplies and spares held up for some time and has attempted to diversify and reduce dependence by turning to domestic companies as well as seeking alternate vendor base in other countries.

The situation has improved since and spares, components and supplies have started coming, though not to the pre-war levels, according to official sources. Both Russia and Ukraine have assured that they would ensure timely deliveries, though earlier schedules have not been met, the sources said.

Sources said Ukraine



Narendra Modi and Volodymyr Zelenskyy hold a bilateral meeting during the G-7 Summit in Italy in June. FILE PHOTO

has several cutting-edge systems and technologies many of which are battle-tested. It has expressed interest in forming joint ventures with Indian companies.

The war in Ukraine in February 2022 impacted all three services of the Indian military that have huge inventories both from Russia and Ukraine. Immediately after the war began, the Indian Army terminated several contracts relat-

ed to air defence, armour and artillery as it faced escalation in prices from other countries since spares and supplies became scarce and were diverted, officials said. Further, quality claim resolutions became time consuming.

Domestic vendors

The Army turned to indigenous defence manufacturers for smaller components and sub-assemblies. This was also done by the

Navy and Indian Air Force (IAF). "The Army has reached out to domestic vendors, tried to minimise imports of spares, assemblies and so on to the extent possible and diversified the vendor base where domestic options were not available to about seven to eight countries notably Poland, Estonia, Bulgaria, Czech Republic among others," a source said. The indigenous push was particularly in small components and ammunitions, officials said.

With Russia, there has been an added element of payments as Russia was shunted out of the global SWIFT system and the rupee-rouble trade couldn't cater to large payments.

The impact of such tensions is not entirely new as in the past, tensions between Russia and Ukraine had considerably delayed the modernisation of the IAF's AN-32 transport fleet. Ukraine upgraded over 100 AN-32 transport aircraft of the IAF under a deal finalised in 2009. While upgrade of 45 AN-32s in Ukraine was completed in 2015, remain-

ing aircraft were to be upgraded by the IAF Base Repair Depot, Kanpur which got considerably delayed.

For the Indian Navy, probably the impact is as acute, if not more, as over 30 frontline warships are powered by engines from Zorya Nashproekt of Ukraine. Indian Navy drew a roadmap to achieve a certain level of servicing locally in the next few years. In addition, Zorya is tying up with an Indian company to carry out certain level of engine maintenance reducing the need to ship engines to Ukraine, sources stated.

Defence trade between India and Ukraine continued till just before 2022. For instance, after the Balakot air strike in 2019, the IAF made emergency procurement of R-27 air to air missiles for its SU-30MKI fighters. At Aero India in February 2021, Ukraine signed four agreements worth \$70 million which includes sale of new weapons and maintenance and upgrades of existing ones in service with the Indian military, as reported by *The Hindu* earlier.

Modi's Ukraine visit likely to explore deeper ties in defence manufacturing (23 August)

India operates a large inventory of military equipment of Ukrainian origin; the Prime Minister, who will be in Kyiv at the invitation of Volodymyr Zelenskyy, will discuss partnerships in defence trade, which has been afflicted by the ongoing war

- Prime Minister Narendra Modi's visit to Ukraine is focused on defense cooperation, given India's large inventory of military equipment from both Russia and Ukraine.
- Since the war in Ukraine began, India has faced delays in getting supplies and spare parts, leading to efforts to reduce dependence by turning to domestic companies and other countries for alternatives.
- The situation has improved, with supplies and components starting to arrive, though not at pre-war levels. Both Russia and Ukraine have assured timely deliveries, but earlier schedules haven't been met.
- Ukraine has advanced, battle-tested systems and technologies and is interested in forming joint ventures with Indian companies.
- The war in Ukraine, which began in February 2022, affected all three branches of the Indian military, as they rely heavily on equipment from Russia and Ukraine.
- The Indian Army canceled several contracts related to air defense, armor, and artillery due to price increases and scarcity of supplies, which were diverted because of the war.
- Resolving quality claims for military supplies has also become more time-consuming due to the war.

Domestic vendors

- The Indian Army, Navy, and Air Force (IAF) have turned to local defense manufacturers for smaller components and sub-assemblies due to supply issues caused by the Ukraine war.
- The Army has minimized imports and diversified its vendor base by sourcing from countries like Poland, Estonia, Bulgaria, and the Czech Republic, focusing on small components and ammunition.

- Payments to Russia have been complicated due to **Russia being excluded from the global SWIFT system**, and the **rupee-rouble trade not accommodating large payments**.
- **Tensions between Russia and Ukraine have previously delayed the modernization of the IAF's AN-32 transport fleet, with upgrades of these aircraft being significantly delayed.**
- The Indian Navy is also affected, as over 30 of its frontline warships are powered by engines from Ukraine's Zorya Nashproekt. The Navy is working to develop local servicing capabilities for these engines, and Zorya is partnering with an Indian company for maintenance.
- Defense trade between India and Ukraine continued until just before 2022. After the Balakot air strike in 2019, the IAF procured **R-27 air-to-air missiles from Ukraine for its SU-30MKI fighters**.
- In February 2021, at Aero India, Ukraine signed four agreements worth \$70 million with India for the sale of new weapons and the maintenance and upgrade of existing ones in service with the Indian military.

Centre, States discuss new mechanism for gathering crop data

GS Paper III: Agriculture

Ahead of the nationwide implementation of the **Digital General Crop Estimation Survey (DGCES)**, the Centre convened a national conference with the States to discuss the improvement in crop production statistics here on Thursday.

The **new initiative**, according to the Centre, **aims at enhancing accuracy, reliability, and transparency of agricultural statistics**, which will help in policy formulation, trade decisions, and agricultural planning.

Union Agriculture Secretary Devesh Chaturvedi said there is a need for **continuous collaboration between the Union and State governments to achieve the shared goal of enhancing the quality of agricultural statistics**. “The primary focus of the conference was on the enhancement of agricultural production estimates and the integration of technology to strengthen data accuracy,” the Centre said.

The Centre had announced in the Budget the move to hold a **digital crop survey** and said that it will **help in accurate crop-area estimation**. “It will provide **plot-level data with geo-**



DGCES will be used to calculate yield based on scientific crop cutting experiments.

tagged areas of crops and act as a single source of truth,” the Agriculture Ministry said.

“DGCES has been initiated to calculate yield based on scientifically designed crop cutting experiments for all major crops across the country. **These initiatives are expected to provide near real-time and reliable data directly from the field**,” the Ministry added.

The **conference discussed the need for integrating cutting-edge technologies like remote sensing, geospatial analysis, and artificial intelligence** in generating crop production statistics through revamped **FASAL (Forecasting Agricultural output using Space, Agrometeorology, and Land-based observations)**.

Actor Vijay launches flag and song for his party

Tamilaga Vettri Kazhagam

The Hindu Bureau
CHENNAI

As a prelude to entering active politics, actor and Tamilaga Vettri Kazhagam president Vijay launched his party's flag and 'flag song' at its headquarters at Panaiyur on Thursday.

Mr. Vijay introduced the two-coloured flag with red on the top and bottom; yellow in the middle; and a flower resembling *Vaagai* surrounded by 28 stars at the centre, with two trumpeting tuskers facing each other on either side. **Warriors of ancient Tamil kingdoms wore *Vaagai* garlands to symbolise victory.**

Mr. Vijay also hoisted the flag at the party headquarters and launched its song, *Thamizhan Kodi Parakuthu*.

Addressing party workers, Mr. Vijay said, "I take pride in launching the party's flag, a symbol of victory for our future generation. So far, we have worked for ourselves. From now on, we will work together as a party for the welfare of the people of Tamil Nadu." He said that the party's ideology, princi-



New beginning: Vijay unveils the flag and symbol of his party Tamizhaga Vetri Kazhagam in Chennai on Thursday. ANI

ples, and action plan, and the history behind its flag will be explained during the party's first State-level conference (the date for which would be announced later). He urged party workers to get permission from the authorities and hoist the flag.

The party members also took an oath hailing the sacrifices of freedom fighters from Tamil Nadu and language martyrs, and pledging to uphold unity, equality, fraternity, religious harmony and social justice by affirming the principle of *Pirappokkum Ella Uyirkum*, (all beings are equal by birth).

Mr. Vijay had in February announced the forma-

tion of the Tamilaga Vettri Kazhagam and declared that the party would enter the electoral fray in the 2026 Assembly election. The party stayed away from the 2024 Lok Sabha election and did not extend support to any other party.

Meanwhile, Bahujan Samaj Party State president Anand objected to the use of the elephant logo in the Tamilaga Vettri Kazhagam's flag. According to him, the Election Commission had allotted the elephant symbol to the BSP for use across India, except a couple of States. Hence, he demanded the removal of the elephant logo from the TVK flag.

NDMA to monitor 189 high-risk glacial lakes to prevent disasters

Lake-lowering measures among proposed steps; National Glacial Lake Outburst Floods Risk Mitigation Programme was approved on July 25

GS Paper III: Disaster Management, Environment

Joseph Keshu

GS Paper I: Geography

Following disasters inflicted by overflowing glacial lakes in the Himalayas, the National Disaster Management Authority (NDMA) has finalised a list of 189 “high-risk” glacial lakes for mitigation measures to reduce the risk emanating from them.

Some of the proposed steps include constituting teams to investigate these lakes and attempt “lake-lowering measures”, which are done to buffer against any overflow, and mitigating potential damage in downstream States.

Last October, the South Lhonak Lake in Sikkim, a glacier-formed lake, overflowed and inundated several parts of the Northeastern State killing at least 40 people and destroying the Chungthang dam.

The National Glacial Lake Outburst Floods Risk Mitigation Programme was approved by the Centre on July 25.

There are nearly 7,500 glacial lakes in the Hima-



Satellite views of Lhonak Lake before (top) and after it burst its banks on October 3, 2023. MAXAR TECHNOLOGIES

layan mountain ranges located in India and some of them are being monitored through remote sensing. However, fully assessing their impact is only possible with site visits, which is difficult owing to inhospitable terrain. There are only a few months in a year – July to September – when expeditions can be mounted to access them.

This week, for instance, the Arunachal Pradesh State Disaster Management Authority has sent two teams to six high-risk glacial lakes in the Tawang and Dibang Valley districts

to study them. The Central Water Commission in an October 2023 report stated that 902 glacial lakes and waterbodies are being monitored via satellite.

The programme aims at detailed technical hazard assessments, installing automated weather and water level monitoring stations, and early warning systems at the lakes and in downstream areas.

So far, 15 expeditions have been conducted, including six in Sikkim, six in Ladakh, one in Himachal Pradesh and two in Jammu and Kashmir.

Glacial Lakes (23 August)

- The National Disaster Management Authority (NDMA) has identified 189 “high-risk” glacial lakes in the Himalayas for mitigation measures.
- The proposed measures include forming teams to investigate these lakes and implementing “lake-lowering measures” to prevent overflow and reduce potential damage downstream.
- Last October, **South Lhonak Lake in Sikkim overflowed**, causing significant damage and fatalities.
- The **National Glacial Lake Outburst Floods Risk Mitigation Programme** was approved by the Centre on July 25.
- There are about **7,500 glacial lakes in the Himalayan ranges, and some are monitored via remote sensing**.
- Accurate impact assessment requires site visits, which are challenging due to difficult terrain and limited access periods (July to September).
- Recently, the Arunachal Pradesh State Disaster Management Authority sent teams to study six high-risk lakes in **Tawang and Dibang Valley districts**.
- The **Central Water Commission** is monitoring 902 glacial lakes and water bodies via satellite.
- The programme focuses on technical hazard assessments, installing automated weather and water level monitoring stations, and setting up early warning systems.
- So far, 15 expeditions have been conducted in various regions including Sikkim, Ladakh, Himachal Pradesh, and Jammu and Kashmir.

IIA finds a novel way to explore the sun's secrets by studying solar magnetic fields

GS Paper III: S&T

The Hindu Bureau
BENGALURU

Astronomers at the Indian Institute of Astrophysics (IIA) have found a new way to probe deeper into the sun's secrets by studying the magnetic fields at different layers of the solar atmosphere. The astronomers have done this using data from IIA's Kodaikanal Tower Tunnel Telescope.

According to the Department of Science and Technology, the solar atmosphere is composed of various layers interconnected through magnetic fields. The magnetic field acts as a conduit to transfer energy and mass from the inner layers to the outer layers, commonly known



The solar atmosphere is composed of various layers interconnected through magnetic fields. FILE PHOTO

as the coronal heating problem and is also the prime driver of solar wind. To understand the physical mechanisms behind these processes, measurements of magnetic fields at different heights of the solar at-

mosphere are important.

IIA astronomers have examined an active region (sunspot) with complex features, including multiple umbrae and a penumbra, through simultaneous observations in the Hydro-

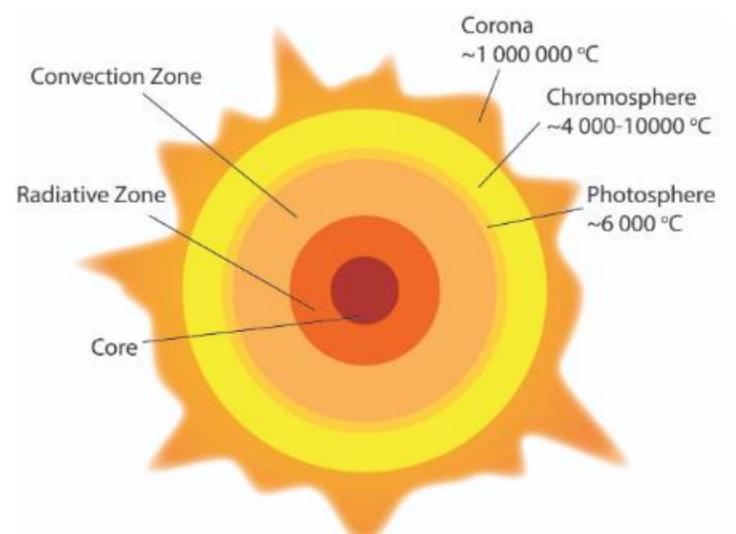
gen-alpha and Calcium II 8662 Å lines from the Kodaikanal Tower Tunnel telescope.

The study used data from multiple spectral lines acquired simultaneously, especially the Hydrogen-alpha line, at 6562.8 Angstroms (Å), to infer the magnetic field's stratification at various heights of the solar atmosphere, taken from the Tunnel Telescope at the Kodaikanal Solar Observatory, which IIA operates.

The primary mirror (M1) of the 3-mirror setup at the Tunnel Telescope tracks the Sun, the secondary mirror (M2) redirects sunlight downwards, and the tertiary mirror (M3) makes the beam horizontal.

IIA finds a novel way to explore the sun's secrets by studying solar magnetic fields (23 August)

- Astronomers at the **Indian Institute of Astrophysics (IIA)** have developed a new method to study the sun's magnetic fields in different layers of its atmosphere.
- They used data from the **Kodaikanal Tower Tunnel Telescope** to conduct this study.
- The **solar atmosphere consists of various layers connected by magnetic fields, which transfer energy and mass from the inner layers to the outer layers, a process related to the coronal heating problem and solar wind.**
- To understand these processes, it's important to measure magnetic fields at different heights in the solar atmosphere.
- IIA astronomers focused on an active region (sunspot) with complex features, using simultaneous observations in the **Hydrogen-alpha and Calcium II 8662 Å lines from the telescope.**
- They used data from multiple spectral lines, especially the Hydrogen-alpha line at 6562.8 Å, to study the magnetic field's stratification at different heights in the solar atmosphere.
- The Kodaikanal Tunnel Telescope at the Kodaikanal Solar Observatory, operated by IIA, was key in this study.
- The telescope uses a three-mirror setup where the primary mirror (M1) tracks the Sun, the secondary mirror (M2) directs sunlight downwards, and the tertiary mirror (M3) makes the beam horizontal for observation.



Building on favourable change in the 2024 waqf Bill

The Waqf Bill 2024, or the Waqf (Amendment) Bill, has been referred to a Joint Parliamentary Committee (JPC) as the Narendra Modi government's own allies were not keen to get it passed immediately. Opposition parties were also critical of the Bill.

The rationale of the family waqf

Some of their concerns are genuine as changes such as abolition of waqf by a user, and the granting of excess powers to the District Magistrate would lower the protection to waqf properties. Though there is hardly anything worthwhile in the Bill to effectively deal with the problem of the illegal encroachment of waqf properties, there are still some positive features such as a digitisation of waqfs and the inclusion of women and non-Muslims in waqf boards. Similarly, on the contentious issue of family waqf, the proposed reforms should be welcomed. Let us try to understand the rationale of the family waqf, how the colonial judiciary had responded to this unique kind of waqf, and the changes that have been made in the Muslim world.

Though the *Koran* does not specifically use the term waqf, there are some 20 verses that encourage people to do charity. Waqf is Islam's unique contribution to charity and is aimed at helping the poor and the underprivileged. Once a property becomes waqf, its corpus cannot be alienated, gifted or sold but its usufruct/use alone can be utilised. There are various types of charities in Islam such as *sadaqah* (voluntary giving of cash); *zakat* (mandatory 2.5%) and waqf (voluntary and general though not confined to immovable properties). Waqfs are of three types: waqf khari (public waqf) totally devoted to welfare of humanity; *waqf al-ahli* or *waqf alal-aulad* (family waqf) for the benefit of his family and *al-waqf al-mushtarak* (public and family waqf) for the combined benefit of both family and the larger society.

Family waqf is not only based on the English dictum of 'charity begins at home' but has theological sanction as family members must be given priority in charity. The *Koran* explicitly encourages the spending money on parents and relatives (2:215). The Prophet also said that, 'A dinar you spend in the path of Allah; a dinar you spend on a poor person; a dinar you spend on your family; greatest of them in reward is what you had spent on your family.'

Abu Talah 'Obid Allah was the first who created the family waqf with the concurrence of Prophet when after the revelation of the *Koranic* verse – 'By no means shall ye attain righteousness unless ye give (freely) of that which ye love' (3:92), he endowed his garden called Biruha. The Prophet's wives such as 'Aisha,



Faizan Mustafa

the Vice-Chancellor of Chanakya National Law University, Patna

Some of the concerns expressed need to be acknowledged by the Joint Parliamentary Committee, but the positive features are what should be welcomed

Hafsah, Umm Salamah, Umm Habibah' created waqf for the benefit of their family members, and Safiyah created a family waqf for the benefit of her brother who was a Jew. Similarly, almost all the companions who had properties, created waqfs. Some like the first Caliph Abu Bakr, endowed his house to his children; the second Caliph 'Omar endowed his land at Thamgh to his children; Sa'd ibn Abu Waqqas too endowed his house in Egypt and Madina to his kith.

Family waqfs were used in addition to pious reasons to protect property, particularly agrarian, from fragmentation. It was supposed to lead to the growth of fixed assets and protect property from the prodigal children and eventually be used for public welfare.

Scholars such as Murat Cizakca, Jeffrey A. Schoenblum, Gregory C. Kozlowski, AAA Fayee, and Ronald K. Wilson were critical of family waqfs. Their argument was that the family waqf was developed as an institution to defeat the women's right to inheritance and for "the aggrandisement of a family". There may be some truth in this conclusion, but the waqf has been historically used to overcome other problems of Islamic law of inheritance such as the exclusion of orphaned grandchildren. Family waqf gave this opportunity to [the] grandfather to make a waqf of one third of his property in favour of orphaned grandchildren. It also helped the founder or *waqif* to provide for the special care of his aged parents, and minor and disabled children. In many cases, including in this writer's family, daughters were made primary beneficiaries. Of course, in some cases, males were made beneficiaries and daughters just had the right to residence and subsistence allowance. In many cases, women were excluded as well.

Waqfs across the world

But under the Maliki law of the Sunni school, such endowments were null and void. Under the Shafi'i and Maliki schools, the creator of waqf cannot reserve any benefit for himself. But the Hanafi and Hanbali schools considered them valid as a provision for reserving a part of the benefits for himself, which may encourage people to create waqfs.

The Privy Council in *Abdul Fata* (1894) invalidated the family waqf as it considered the benefit to the general public to be too remote. But in 1913, this decision was overturned by the British government. Scholars such as J.N. Anderson and J. Hamilton had criticised this judgment as "wholly mistaken interpretation of Islamic law". Under the influence of colonialism, which preferred free transfer of ownership, several Muslim countries even abolished family waqfs. Egypt, in 1946, first restricted it to two generations and finally abolished it in 1951. Syria

abolished it in 1949. Kuwait restricted it to two generations in 1951. Iraq permitted liquidation of the family waqf in 1954. Tunisia, Libya and the United Arab Emirates abolished the family waqf in 1954, 1973 and 1980, respectively. In countries such as India, Bangladesh, Malaysia, Singapore and Indonesia, family waqfs, though permitted, were not given privileges of waqf properties. Thus, in India, as family waqfs were not treated as charitable, they have not been included in waqf surveys. There is no effective statutory supervision of family waqfs. Unlike charitable trusts, family waqfs are not entitled to exemptions or tax reliefs from capital gain tax, stamp duty and inheritance tax.

Though the *Income-Tax Act, 1961* exempts religious and charitable waqfs, under *Section 13*, income-tax is payable by the family waqf even in cases where income is to be used for family as well as religious or charitable purposes. Similarly, estate duty is applicable on the passing of property from one beneficiary to another though passing of property is alien to waqf jurisprudence. Many agrarian family waqfs were acquired by the government on nominal payments under land reform laws.

Section 2(1)(r) of the *Waqf Act 1995* does include family waqfs within the definition of waqf. It says that when the line of succession fails, the income of such a waqf shall be spent on education, development and welfare.

A new section and impact

The newly proposed *Section 3A(2)* of 2024 Bill proposes a reform – that the family waqf shall not result in a denial of inheritance rights of heirs, including women heirs. The effect of this reform, which is welcome, is that a Muslim can now create a family waqf only in respect of a third of his property if he is excluding all his heirs; and, he cannot any more altogether exclude female heirs. But the problem with this provision is that if he gives even a token benefit to female heirs, i.e., much less than they are otherwise entitled to under Muslim law of inheritance, such a family waqf would remain valid.

The other problem is this: can we place similar restrictions on the testamentary powers of non-Muslims? A Hindu, for instance, under the *Hindu Succession Act, 1956*, can give away his entire property to a son to the exclusion of other heirs including female heirs. Hindu women's ownership of properties is nowhere near their legal entitlement under the 1956 Act.

Let the JPC improve this provision and bring in uniformity so that a Uniform Civil Code or Secular Civil Code, as and when it is enacted, incorporates it.

The views expressed are personal

Building on favourable change in the 2024 waqf Bill (23 August)

- The Waqf (Amendment) Bill, 2024, has been referred to a Joint Parliamentary Committee (JPC) because even the allies of the Narendra Modi government were hesitant to pass it immediately.
- Opposition parties have also expressed concerns about the Bill.
- One of the main concerns is that the Bill could reduce the protection of waqf properties by abolishing waqfs created by users and giving excessive powers to the District Magistrate.
- The Bill does not effectively address the issue of illegal encroachment of waqf properties, but it does have some positive aspects.
- Some of the positive features include the digitisation of waqfs and the inclusion of women and non-Muslims in waqf boards.
- The proposed reforms regarding family waqf are seen as a positive step and should be welcomed.
- Family waqf has a rationale based on Islamic teachings and the concept of prioritizing charity within one's own family.
- The Quran encourages charity, including spending money on parents and relatives.
- The concept of waqf is Islam's unique contribution to charity, where the property becomes inalienable and can only be used for its intended purpose.
- There are three types of waqfs: public waqf, family waqf, and a combination of both.

- Family waqf has a theological basis, with early examples seen among the Prophet Muhammad's companions and wives.
- Several prominent figures in Islamic history created family waqfs, emphasizing the importance of supporting one's family through charity.
- Family waqfs were used not only for pious reasons but also to protect property, especially agricultural land, from being fragmented.
- They helped in the growth of fixed assets and protected property from being wasted by irresponsible children, eventually benefiting public welfare.
- Some scholars, like Murat Cizakca and Jeffrey A. Schoenblum, criticized family waqfs, arguing **that they were used to undermine women's inheritance rights and to benefit a single family.**
- However, family waqfs were also used to address issues in **Islamic inheritance law**, such as the exclusion of orphaned grandchildren.
- Through family waqfs, a grandfather could dedicate a third of his property to orphaned grandchildren, aged parents, or minor and disabled children.
- In some cases, daughters were made the primary beneficiaries, while in others, males were favored, and daughters only had rights to residence and subsistence.
- In many instances, women were excluded from being beneficiaries.
- Under the **Maliki law of the Sunni school**, such family waqfs were considered invalid.
- The Shafi'i and Maliki schools did not allow the creator of a waqf to reserve any benefits for themselves, but the Hanafi and Hanbali schools considered it valid if part of the benefits was reserved for the creator.
- The **Privy Council in Abdul Fata (1894)** invalidated family waqfs because the public benefit was seen as too remote, but this decision was overturned by the British government in 1913.
- Scholars criticized the Privy Council's judgment as a misunderstanding of Islamic law.
- Due to colonial influence, which preferred the free transfer of ownership, several Muslim countries abolished family waqfs.
- Egypt restricted family waqfs to two generations in 1946 and abolished them in 1951. Syria abolished them in 1949, Kuwait restricted them to two generations in 1951, and Iraq allowed the liquidation of family waqfs in 1954.
- Tunisia, Libya, and the United Arab Emirates abolished family waqfs in 1954, 1973, and 1980, respectively.
- In countries like India, Bangladesh, Malaysia, Singapore, and Indonesia, family waqfs are allowed but do not receive the same privileges as public waqf properties
- In India, family waqfs are not considered charitable, so they are not included in waqf surveys and do not have effective statutory supervision.
- Unlike charitable trusts, family waqfs do not qualify for tax exemptions or reliefs, such as capital gains tax, stamp duty, and inheritance tax.
- Under the **Income-Tax Act, 1961, religious and charitable waqfs are exempt from tax, but family waqfs must pay income tax, even if some income is used for religious or charitable purposes.**
- Estate duty is also applicable when property passes from one beneficiary to another, even though this concept is not aligned with waqf jurisprudence.
- Many family waqfs, especially agricultural ones, were acquired by the government with minimal compensation under land reform laws.
- The **Waqf Act 1995 includes family waqfs in its definition of waqf** and states that if the line of succession fails, the income from the waqf should be used for education, development, and welfare.
- The proposed **Section 3A (2) of the 2024 Bill introduces a reform that a family waqf cannot deny inheritance rights to heirs, including women.**
- This reform is positive because it allows a Muslim to create a family waqf with only a third of their property if they exclude heirs, and it ensures that female heirs cannot be completely excluded.
- However, if a Muslim gives a minimal benefit to female heirs, even less than their rightful share under Muslim inheritance law, the family waqf would still be valid.
- There is a concern about whether similar restrictions should be applied to non-Muslims. For example, a Hindu can give all his property to one son, excluding other heirs, including female heirs, under the **Hindu Succession Act, 1956.**
- **Hindu women's actual ownership of properties is often far less than their legal entitlement under the 1956 Act.**
- The Joint Parliamentary Committee (JPC) is encouraged to improve this provision and work towards uniformity, which could eventually be incorporated into a **Uniform Civil Code or Secular Civil Code** when it is enacted.

Death at work (23 August)

A safety audit is essential to prevent industrial accidents

- A blast at Escientia's plant in the Atchutapuram SEZ, Anakapalli district, Andhra Pradesh, resulted in 17 worker deaths and many injuries.
- On the same day, 10 workers were injured in a fire accident at another chemical factory in the same SEZ.
- Last year, another explosion occurred in the same SEZ, causing deaths and injuries, highlighting recurring safety issues.
- The Atchutapuram SEZ is one of Andhra Pradesh's largest SEZs, with over 100 companies operating there.
- These accidents bring back memories of a deadly incident on May 7, 2020, when 12 people died from a styrene monomer vapour leak near Visakhapatnam.
- These incidents raise serious concerns about industrial safety in Andhra Pradesh, especially in SEZs.

- The State Home Minister mentioned that the Escientia accident happened when workers tried to stop a solvent (MTBE) leak, which led to a fire and explosion after the chemical came into contact with an electrical panel.
- MTBE is highly flammable, and its vapour can cause skin and eye irritation. Safety guidelines for handling MTBE were likely not followed.
- Trade unions and activists are demanding strict punishment for negligent management and better safety standards.
- There are calls for an immediate safety audit of all units in SEZs and across Andhra Pradesh.
- A 2016 government order allowed SEZ units to be exempt from inspections, relying on online inspections, which also applies to high-risk industries like pharma and chemicals.
- Medium-risk industries can self-certify compliance based on third-party audits, which critics argue might compromise safety.
- The government's intent was to ease business operations by reducing inspections, but recent accidents suggest the need for a broader investigation to address potential safety loopholes.
- Quick and fair punishment for safety violations and the awarding of punitive damages could serve as a deterrent against ignoring safety norms.

What is vaccine-derived polio?

Priyali Prakash

EXPLAINER

The story so far: A two-year-old child in Tikrikilla, Meghalaya, has been infected with vaccine-derived polio. This is not a case of wild poliovirus, but an infection that presents in some people with low immunity, the Union Health Ministry said on Tuesday, August 20.

“The two-year-old child from Tikrikilla was found to have symptoms of poliomyelitis more than a week ago. The child was diagnosed with acute flaccid paralysis at a hospital in Assam’s Goalpara,” Meghalaya Chief Minister Conrad K. Sangma said. Officials in the State’s West Garo Hills district are on high alert following the confirmation of the case.

Vaccine-derived polio

Vaccine-derived polio is a rare condition that occurs when the weakened (also called attenuated) strain of poliovirus used in the oral polio vaccine (OPV) mutates and regains the ability to cause paralysis.

OPV contains a live, attenuated virus that is used for immunisation against the disease. This weakened virus triggers an immune response when administered, thus protecting people from the disease. The attenuated virus replicates in the intestines for a limited period and is excreted in the stool. In rare cases, the virus can mutate enough to



Oral polio drops being administered. FILE PHOTO

cause the disease again and circulate in areas where either immunisation is low, where immunocompromised people reside, or where sanitation and hygiene are poor. This is how vaccine-derived poliovirus (VDPV) spreads. According to the World Health Organization (WHO), the virus is classified as “circulating” (cVDPV2) if it is detected in at least two different sources, at least two months apart, that are genetically linked, showing evidence of transmission in the community.

Types of poliovirus

Polioviruses are enteroviruses that are transmitted primarily by the faecal-oral route. Three types – wild poliovirus type 1 (WPV1), wild poliovirus type 2 (WPV2), and wild poliovirus type 3 (WPV3) – have been known to exist. Symptomatically, all these strains are identical.

More about vaccines

The first successful polio vaccine for poliovirus was made by Jonas Salk in the early 1950s. Salk inactiv-

ated the virus using formaldehyde and injected it into the muscles of test subjects. This inactivated polio vaccine (IPV) induced systemic immunity (relating to the blood, brain, and all other organ systems) in the subjects.

After Salk, Albert Sabin developed another vaccine that contained live polio strains weakened by growing them serially in macaque cells, making them unfit for human infection. Since this vaccine contained the live virus, it had to be administered through its natural mode of infection – in this case, oral. This is what we today know as the OPV.

OPV is usually preferred over IPV because of its ease of administration – it does not require syringes or medical training and is inexpensive. However, the weakened virus in OPV can occasionally revert, causing the disease it is meant to prevent. IPV, on the other hand, is a less potent vaccine, but contains inactivated virus particles and hence has no risk of causing vaccine-associated paralytic poliomyelitis (VAPP) – a rare, adverse reaction to OPV. IPV is comparatively tougher to manufacture, too, as it contains a chemically inactivated virus.

On World Polio Day, October 24, 2019, the WHO declared that WPV3 has been eradicated worldwide. The last case was detected in Nigeria in 2012, the WHO said. WPV2 was officially declared eradicated in 2015. However, more than 90% of vaccine-derived polio-

virus outbreaks are due to the type 2 virus present in oral polio vaccines. VAPP constitutes 40% of cases caused by the type 2 oral polio vaccine. Many cases of VAPP from the type 3 virus also occur in countries using OPV.

The Indian government does not count VAPP as polio since these cases are sporadic and pose little or no threat to others, even though the number of VAPP-compatible cases showed a rising trend.

After the global switch from trivalent (containing all three variants) to bivalent (type 1 and type 3) oral polio vaccine in 2016 to prevent any more type 2 vaccine-derived poliovirus, the number of vaccine-derived type 2 poliovirus outbreaks has only increased sharply.

The WHO authorised a genetically modified type 2 novel oral polio vaccine under Emergency Use Listing in November 2020, it was first used in the field in March 2021, and received WHO prequalification in December 2023. The vaccine is less likely to revert to neurovirulence unlike the Sabin vaccine and therefore cause less type 2 VDPV.

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For feedback and suggestions

for ‘Science’, please write to science@thehindu.co.in with the subject ‘Daily page’

Intriguing silence (23 August)

India should switch to inactivated polio vaccine

- A case of acute flaccid paralysis, possibly due to polio, was reported in a child from **Tikrikilla, Meghalaya**, on August 14.
- In April 2022, a vaccine-derived poliovirus was found in an environmental sample from Kolkata, likely linked to an **immune-deficient individual (iVDPV)**.
- The recent Meghalaya case has not yet been confirmed as vaccine-derived or caused by **wild poliovirus (WPV)**.
- Wild poliovirus types 2 and 3 have been eradicated globally, and WPV type 1 has not been found in India for years, making it unlikely that the current case is due to WPV unless imported.
- Afghanistan and Pakistan have reported 14 cases of **WPV type 1** this year.
- If the virus is vaccine-derived, it’s unclear whether it’s circulating in the community (cVDPV) or limited to the child (iVDPV).

- It’s also unknown whether the case involves **type-1, type-2, or type-3 vaccine-derived virus**.
- India switched from trivalent to bivalent oral polio vaccine (OPV) in 2016, which includes only type 1 and type 3 viruses, making it unlikely that the child has type 2 from an OPV given in India.
- However, there is a possibility that cVDPV type 2 could have been imported into India.
- Globally, 68 cases of cVDPV2 and four cases of cVDPV1 have been recorded in 2024.
- The delay in confirming details is puzzling since samples were sent to a WHO-accredited lab in Mumbai.
- Immunodeficient children should not receive OPV, but identifying them in India is challenging, so such cases may continue.
- The Meghalaya case highlights the urgent need for India to stop using OPV and switch exclusively to inactivated polio vaccine (IPV), as most developed countries have done.

VACCINATION

- Vaccination is a process by which a person is made immune or resistant to an infectious disease by using his own immune system to protect against subsequent infections.
- When a body encounters an antigen for the first time, a slow low-intensity response is produced.
- The B-cells however, remain sensitized and immunological memory is created. By use of this memory, the next attack by the same antigen is met by a high-intensity fast production of antibodies. Thus prevent the disease. This is the basic principle used in the production of vaccines.

Types of Vaccines

- **Live Attenuated Vaccines:** The pathogen is alive and can grow but has been weakened so that it cannot cause the disease. Examples are BCG, Oral Polio vaccine, etc.
- **Inactivated Killed Vaccine:** The Pathogen is killed but the proteins or other components in its structure can still cause the antigen effect. Examples are Rabies, Injectable Polio vaccine, Covaccine, etc.
- **Subunit Vaccines:** Use of specific parts like proteins. Examples are vaccines for whooping cough, tetanus, etc.
- **Conjugate Vaccine:** Combining two antigens like one protein and one polysaccharide in the vaccine. Examples are the vaccine of Pneumococcal vaccine.
- **Nucleic Acids or DNA/RNA Vaccines:** Example of DNA Hep B and for RNA Vaccine Moderna Covid 19 vaccine.
- **Active Immunity:** The antibodies are produced in the body. It is of two types that is natural infection and artificial production in the body itself (Vaccination).
- **Passive Immunity:** Antibodies given from outside. Examples are mother’s milk as natural and Artificial like anti-snake venom.

- Two significant terms associated with vaccine-derived polioviruses are **iVDPV** (Immunodeficiency-Related Vaccine-Derived Poliovirus) and **cVDPV** (Circulating Vaccine-Derived Poliovirus).
- Both of these forms arise from the use of the oral polio vaccine (OPV), but they have distinct characteristics and implications for public health.

Circulating Vaccine-Derived Poliovirus (cVDPV)

- cVDPV refers to strains of poliovirus that have mutated from the weakened strains found in the oral polio vaccine and have started circulating in communities.
- This typically occurs in populations with low vaccination coverage, allowing the vaccine-derived strain to spread.
- **Transmission:** cVDPVs can be transmitted from person to person, especially in areas where vaccination rates fall below critical levels needed for herd immunity.
- **Health Risks:** These viruses can cause paralysis and disease similar to wild poliovirus. cVDPVs can lead to outbreaks, especially in under-immunized populations.
- **Types:** There are three types of cVDPV:
 - **cVDPV2:** Derived from type 2 poliovirus in the vaccine.
 - **cVDPV1:** Derived from type 1 poliovirus in the vaccine.
 - **cVDPV3:** Derived from type 3 poliovirus in the vaccine.

Immunodeficiency-Related Vaccine-Derived Poliovirus (iVDPV)

- iVDPV refers to poliovirus variants that arise in individuals with primary immunodeficiency disorders (PID).
- These individuals can excrete the weakened poliovirus for extended periods, allowing it time to mutate and potentially become pathogenic.

Key Points:

- **Risk Factors:** Individuals with specific genetic deficiencies in their immune system may not effectively eliminate the weakened virus, leading to prolonged excretion and mutation.
- **Health Concerns:** iVDPVs can cause paralysis in these immunocompromised individuals, and the variants can persist in households or communities where such individuals live.

Comparison of cVDPV and iVDPV:

Feature	cVDPV	iVDPV
Source	Arises from mismanagement of vaccination campaigns and low immunization coverage	Arises in immunocompromised individuals
Transmission	Transmitted within communities	Transmitted mainly within close contacts of immunodeficient individuals
Health Risk	Can cause paralysis outbreaks in under-vaccinated populations	Can cause paralysis in the individual and those in close contact

Persistence	Circulates in populations for an extended period	Persists in the host's body for months to years
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The Kursk gambit, Ukrainian tactics and battle realities (23 August)

- Ukraine surprised Russia by launching a bold attack into the Kursk region of Russia, capturing several hundred Russian soldiers.
- This attack was a risky move by the Ukrainian government, led by Volodymyr Zelenskyy, involving thousands of its best soldiers.
- Despite Ukraine's gains in **Kursk, Russia** continues its offensive inside Ukraine, with no signs of slowing down.
- Russian forces are close to capturing the Ukrainian city of **Pokrovsk in the Eastern Donetsk region**, which is a key logistics hub and gives Ukrainian forces significant defensive strength.
- Ukrainian forces are being ordered to withdraw from Pokrovsk, which would allow Russia to make a major breakthrough and possibly capture the entire Donetsk region.
- Ukraine's offensive is significant because **no country has invaded Russia since Hitler's Germany during World War II**.
- Ukraine had been preparing for this attack for months and kept it secret from its western allies, although there may have been tacit approval from them.
- The attack in Kursk forces Russia to divert and redeploy its forces to weakly defended areas, potentially weakening its offensive inside Ukraine.
- However, it is unclear if Ukraine has considered the consequences of a strong Russian counter-attack, as Russia has much greater military strength.
- Ukraine now faces a decision: whether to push further into Russian territory or consolidate its current gains.
- Russia, on the other hand, is unlikely to stop its offensive and may be willing to allow some losses in Russia in exchange for **capturing important territories in Ukraine, such as Pokrovsk**.

Moscow is not blinking

- **If Russia takes over Pokrovsk, it could lead to further offensives inside Ukraine.**
- Ukraine's gains in Kursk are significant, with around 1,000 square kilometers of territory captured, but Russia has not shifted its focus away from Eastern Ukraine, where it controls around 100,000 square kilometers.
- Moscow isn't diverting many forces away from Eastern Ukraine, where it has the upper hand, although there are signs of some units being **moved from Kharkiv for a counterattack in Kursk**.
- Russia's full response to Ukraine's surprise incursion into Kursk might take time, as Moscow focuses on consolidating its gains in Eastern Ukraine.
- Ukraine's incursion into Kursk is not only a military move but also a demonstration to show its Western allies, particularly the U.S., that it can take the initiative and mount successful offensives inside Russia.
- This helps ensure continued support from the West, which Ukraine relies on, and could eventually lead to a resolution of the conflict with Russia.
- However, **Kyiv risks overstretching its forces by moving too deep into Russian territory and faces the possibility of significant losses or a retreat if Russia concentrates its military strength against Ukrainian forces in Kursk.**
- Whether the risks taken by Ukraine in this incursion will pay off will only become clear over time.

- The **Donetsk region** (also known as Donbas) is located in eastern Ukraine and is one of the country's most significant industrial areas.
- It is known for its rich deposits of natural resources, particularly coal, which have historically fueled both local and national economies.
- The region has been at the center of geopolitical tensions, especially due to the ongoing conflict since 2014.

Natural Resources in Donetsk Region:

1. Coal:

- **Significance:** The Donetsk region is renowned for its extensive coal deposits, making it one of the largest coal-producing areas in Ukraine. The region's coal mining industry dates back to the mid-19th century and has played a crucial role in the industrialization of Ukraine.
- **Types:** The coal found in Donetsk is primarily bituminous coal, which is utilized for electricity generation, heating, and in various industrial processes.
- **Mining Industry:** Numerous coal mines were operational in the region, although the ongoing conflict has severely impacted coal production and infrastructure.

2. Minerals:

- The region also hosts significant reserves of various minerals, including:
 - **Iron Ore:** Used in steel production, iron ore deposits provide raw materials for the iron and steel industry, which is a major economic sector in the region.

A look at ongoing Indian space missions

Over the past year, ISRO has made significant strides with several key missions; the Aditya L1 spacecraft began studying solar radiation from the earth-Sun Lagrange point, while the Gaganyaan TV-DI mission successfully demonstrated crew safety systems

GS Paper III: S&T

FULL CONTEXT

Pradeep Mohandas

The story so far:

After a busy 2023, things have been quiet at Sriharikota, India's spaceport. But silence here doesn't mean India's space programme itself has been dormant. A lot has been happening since the Indian Space Research Organisation (ISRO) successfully landed the lander of its Chandrayaan 3 mission, Vikram, on the surface of the moon. Prime Minister Narendra Modi has declared this date, August 23, India's National Space Day.

Highlights in the last year

Aditya L1: India followed its lunar success with the successful launch of its solar science mission Aditya-L1 on September 2, 2023. The launch was the easiest part of the mission, onboard ISRO's Polar Satellite Launch Vehicle (PSLV). The spacecraft executed a series of manoeuvres to move into an orbit around the first earth-Sun Lagrange point (L1) on January 6, 2024. It completed its first orbit around L1 on July 2, 2024. It studied a solar storm in May 2024 together with observatories on the ground and spacecraft in lunar orbit.

Gaganyaan TV-DI: ISRO used a modified L-40 Vikas engine to build its Test Vehicle (TV) that it used to perform the first abort mission on October 21, 2023, as part of its 'Gaganyaan' human spaceflight mission. The mission demonstrated the ability of the Crew Escape System (CES) to separate from the TV, take the crew module to safety, and the crew module's ability to decelerate before splashing down in the Bay of Bengal. The crew module at the test's end was recovered by the Indian Navy vessel INS Shakthi.

XPoSat: ISRO celebrated the new year with the launch of its X-ray Polarimeter Satellite (XPoSat) on January 1, 2024. The satellite will study how radiation from various celestial objects is polarised. It is the second such space-based observatory after NASA's Imaging X-ray Polarimetry Explorer (IPEX), launched in 2021. The two instruments on board XPoSat, called XSPECT and POLIX, began operating on January 5 and 10.

INSAT-3DS: ISRO launched the meteorological satellite INSAT-3DS on February 17 onboard a Geosynchronous Satellite Launch Vehicle (GSLV). This mission was important to prove the vehicle's credibility before the critical NASA-ISRO Synthetic Aperture Radar (NISAR) mission, now expected to launch in early 2025. This version of the GSLV had previously successfully launched the NVS-01 satellite in 2023.

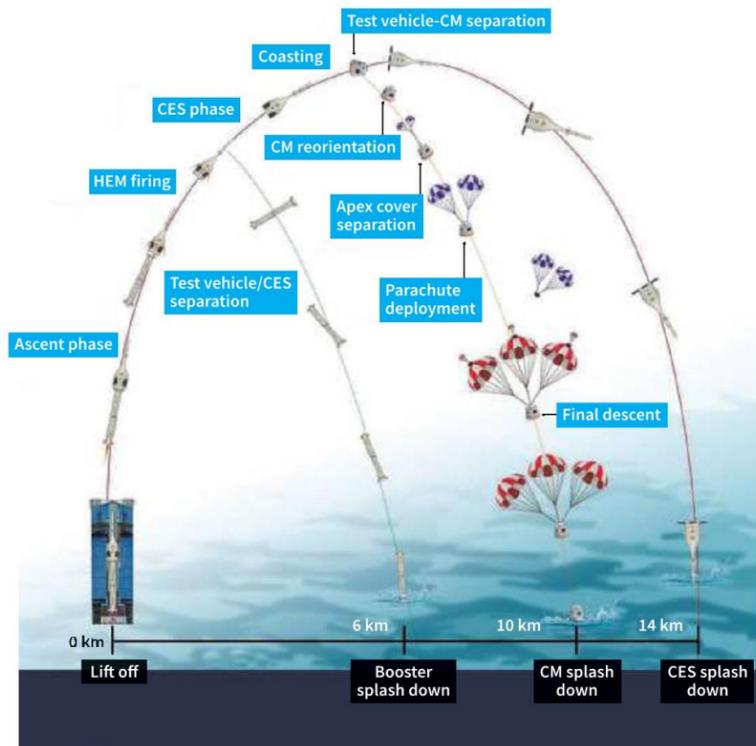
RLV-TD: ISRO used a downscale version of the Reusable Launch Vehicle, called Pushpak, to conduct two landing experiments – LEX-02 and LEX-03 – on March 22 and June 7 at its Aeronautical Testing Range in Challakere, Karnataka. The tests simulated landing conditions from space by dropping the Pushpak vehicle from a Chinook helicopter, in LEX-02 along its landing path and in LEX-03 500 metres to one side. Successes in these tests gave ISRO the confidence to move on to the 'Orbital Return Flight Experiment'.

SSLV: On August 16, ISRO launched the third and final development flight of the Small Satellite Launch Vehicle (SSLV), placing the EOS-08 and the SR-0 Demosat satellites in orbit. With two consecutively successful test flights, ISRO declared the SSLV's development complete and green-lit its transfer to industry. EOS-08 carried three payloads: one for earth observation in the infrared range, one to



Maiden test flight of Gaganyaan mission

The first uncrewed Gaganyaan flight is expected in late 2024



SOURCE: ISRO

demonstrate the use of reflections from a global satellite navigation system for earth observation, and one ultraviolet dosimeter and alarm to be tested ahead of their use in the Gaganyaan crew module.

ISRO roadmaps

After handing over operational responsibilities to NewSpace India, Ltd. (NSIL), ISRO has prioritised research. In December 2023, ISRO Chairman S. Somanath announced a 25-year roadmap until 2047 for Gaganyaan. It intersects with the lunar exploration roadmap in the form of an Indian landing on the moon by 2040. Mr. Somanath also shared a lunar exploration roadmap that includes – apart from a crewed lunar mission – a sample-return mission, a long-duration mission on the moon's surface, docking with NASA's Lunar Gateway (under the Artemis programme), and building moon habitats.

Gaganyaan

One of ISRO's primary focus areas of late

has been to train its astronaut-candidates, or Gaganyatris, for spaceflight.

Prime Minister Modi revealed the candidate's names on February 27: Wing Commander Shubhanshu Shukla and Group Captains Prashanth Nair, Ajit Krishnan, and Angad Pratap.

Earlier this month, Mr. Shukla and Mr. Nair travelled to the U.S. for advanced training ahead of a flight to the International Space Station (ISS). Mr. Shukla is likely to fly in this mission, with Mr. Nair as his designated backup. The mission will be conducted by Axiom Space, a private company, with inputs from NASA and using SpaceX's launch vehicle and crew capsule. The flight is scheduled for 2025.

ISRO has also planned at least four more abort tests using its Test Vehicle before the historic crewed flight. The first uncrewed Gaganyaan flight is expected in late 2024.

Mr. Somanath's roadmap also includes plans to build an Indian space station called the 'Bharatiya Antariksh Station'

(BAS) by 2035.

Next-generation Launch Vehicle

Since India is aspiring to both the BAS and a full-fledged lunar programme, it requires a new launch vehicle that can deliver heavier payloads per launch than its PSLV or GSLV rockets. This is set to be the Next Generation Launch Vehicle (NGLV).

ISRO set up a team led by S. Sivakumar that submitted a project report to the Union Cabinet in February with a request for funding and details of the NGLV, including manufacturing requirements.

ISRO has planned for NGLV to be a three-stage launch vehicle powered by a semi-cryogenic engine, a liquid engine, and a cryogenic engine. ISRO doesn't plan to continue the use of the GSLV once the NGLV is ready. The PSLV is already under production by a private consortium led by Larsen & Toubro and Hindustan Aeronautics, Ltd.

This said, ISRO is developing a semi-cryogenic engine for the LVM-3 rocket – another name for the GSLV Mk III – to enhance its launch capability. On May 2 and 21, it successfully tested the engine's pre-burner ignition test article.

NSIL missions

ISRO is focusing on research because NSIL has been tasked with conducting missions and chaperoning commercial activities. On May 1, ISRO transferred all commercial activities related to Indian Remote Sensing satellite data and products to NSIL.

NSIL signed an agreement with SpaceX to launch the GSAT-20/GSAT-N2 satellite. LVM-3 currently can't launch this 4,700-tonne machine. SpaceX is expected to launch it in August 2024.

On May 10, NSIL released a request for qualification for the production of LVM-3 through a public-private partnership and signed a dedicated launch service agreement with an Australian private space company to launch the SSLV.

Private space missions

Agnikul Cosmos successfully launched its SoRTeD-01 vehicle from its launch pad at the Satish Dhawan Space Center in Sriharikota on March 21. This was the first launch of a vehicle powered by a semi-cryogenic engine as its first stage from Indian soil.

Skyroot Aerospace is progressing towards the launch of its Vikram 1 rocket. It had previously pressure-tested solid-fuel engines between May and July 2024 and launched a test vehicle called Vikram S from Sriharikota on November 18, 2022.

Dhruva Space and Bellatrix Aerospace flew their experiments on the fourth and final stage of the PSLV-C58 mission on January 1.

IN-SPACE

In the last year, there have been several notable policy updates and licences issued by India's new space regulator, IN-SPACE. Most importantly, it released the 'Norms, Guidelines, and Procedures for Authorisation of Space Activities' on May 3.

It also granted the country's first satellite broadband licence to Eutelsat OneWeb on November 21, 2023, and the first licence for a ground station as a service to Dhruva Space on July 15.

Finally, on February 21, the Government of India amended its foreign direct investment (FDI) policy to allow 100% direct FDI in all space and spaceflight segments except for a 74% ceiling in satellite manufacturing and operations and 49% in launch infrastructure.

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THE GIST

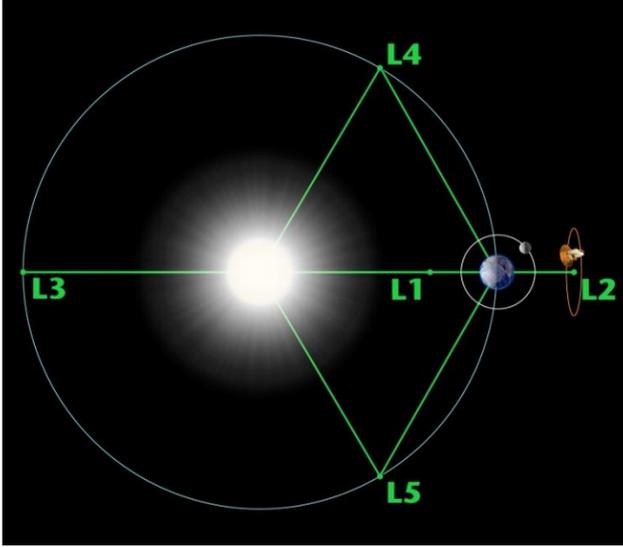
ISRO made major progress with missions like Aditya L1 for solar research, Gaganyaan TV-D1 testing crew safety, and XPoSat for X-ray studies.

Successful launches and tests include the SSLV's final development flight, the INSAT-3DS meteorological satellite, and the RLV-TD landing experiments.

ISRO is focused on its 25-year roadmap for Gaganyaan, a new Next Generation Launch Vehicle, and the Bharatiya Antariksh Station by 2035.

NSIL manages commercial missions, and private companies like Agnikul Cosmos and Skyroot Aerospace are advancing their own space technologies.

New policies and licenses are boosting private sector participation and foreign investment in India's space sector.



- Lagrange Points are five special points in the Space because of two very large objects where third very small object can be placed into a stable orbit. However the required centripetal force comes from the combined gravitational effect of two larger objects.
- For the earth-sun system the L1 point is 1.5 million Km from the Earth towards the sun it has been major advantage of continuously viewing the sun without any type of eclipse and at the same time as L1 point is locked in Earth-Sun system a solar observatory kept here can maintain a communication channel from the Earth.
- Aditya L1 will orbit around L1.
- NASA mission the Solar and Heliospheric Observatory (SOHO) is around L1 point.
- The orbit around L1 point is called Halo Orbit.
- L2 point is also approximately around 1.5 million Km, however, in opposite direction. This point is suitable for astronomy because a telescope can look at the deep space without coming in shadow of Earth and moon.
- At the same time we can maintain a communication channel and received data from the telescope.
- James Web Space Telescope is orbiting around L2 point. It is a collaborative project of NASA, European Space Agency (ESA) and Canadian Space Agency (CSA).
- L3 point is not very useful as it always remains behind sun.
- L4 and L5 are examples of stable equilibrium as of now they are not being used. However, in future they may be very useful.

Indian National Space Promotion and Authorization Center (IN-SPACE)

- The **Indian National Space Promotion and Authorization Center (IN-SPACE)** is a pivotal organization within the Indian Space ecosystem that aims to promote and facilitate the participation of private players in space activities.
- Established in June 2020 by the Government of India, IN-SPACE serves as a regulatory body to enhance the opportunities for private sector participation in space missions while ensuring that these activities align with national interests.

Objectives of IN-SPACE:

1. **Promote Private Sector Participation:**
 - IN-SPACE is designed to encourage private players to engage in a range of activities related to space, including satellite launches, satellite manufacturing, and other space exploration initiatives.
2. **Authorization and Regulation:**
 - The organization is responsible for providing the necessary approvals and regulatory frameworks for private entities involved in space operations. This includes ensuring compliance with safety, security, and environmental regulations.
3. **Support and Coordination:**
 - IN-SPACE acts as a bridge between the Indian Space Research Organisation (ISRO) and the private sector, facilitating collaboration, technology sharing, and access to ISRO's infrastructure and expertise. This enables startups and private companies to leverage the existing capabilities of ISRO.
4. **Foster Innovation:**
 - By promoting a conducive environment for private sector involvement, IN-SPACE encourages innovation and the development of new technologies in the space sector, contributing to India's advancement in space exploration and applications.