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JULY-2021

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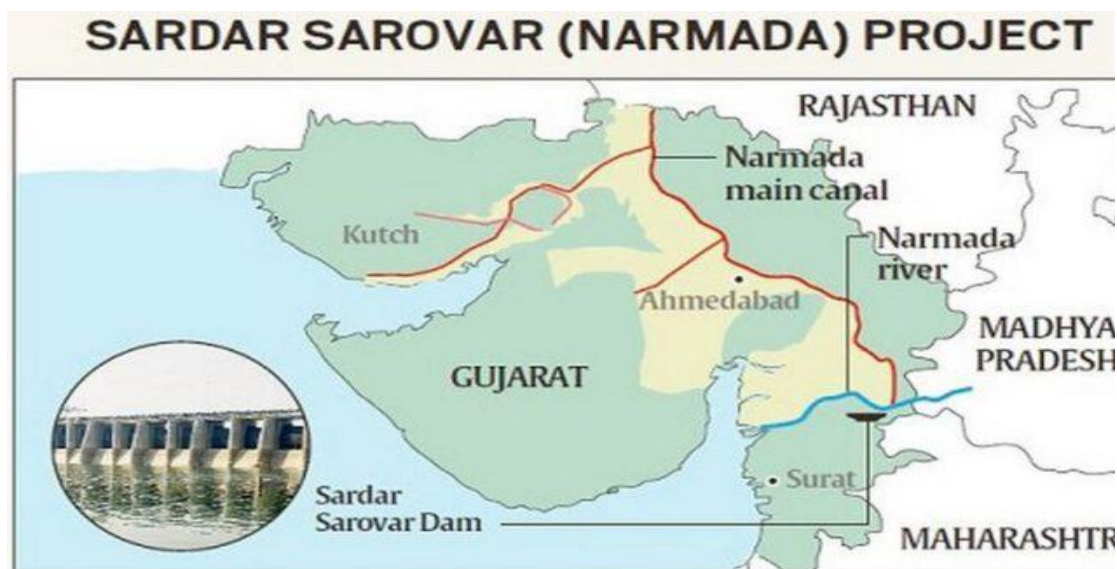
RAJASIR'S CRACKING IAS Academy

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HOW SARDAR SAROVAR DAM IS PROVIDING IRRIGATION WATER IN SUMMER FOR THE FIRST TIME IN HISTORY?

The **Sardar Sarovar Narmada Dam** is a **terminal dam** built on the **Narmada river** at **Kevadia in Gujarat's Narmada district**. Called the '**lifeline of Gujarat**', it usually has no water for irrigation during summers. However, this year, in the ongoing summer, the dam released **about 1.3 Million Acre Feet (MAF) water** for irrigation between 1 April and 31 May in its command area of **21.29 lakh hectares**.



And for the **first time in the history of the dam**, as many as **35 dams and reservoirs**, close to 1,200 check dams and 1000 village tanks have been filled with **Narmada water this year**, according to the **Sardar Sarovar Narmada Nigam Ltd (SSNNL)**.

As of 3 June, the dam had 122.72 metres with live storage of 1,711 million cubic metres. With an **inflow of about 15,000 cusecs**, the total outflow from the dam is at around 43000 cusecs —of **which 12,965 cusecs** is being released after generation of power from the Canal Head Power House and 30,361 cusecs from the Riverbed Powerhouse.

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River Narmada is a classic case of **Integrated River Basin Planning, Development, and Management**, with water storage available in all major, medium, and minor dams on the main river and its tributaries, shared amongst four party states – **Gujarat, Rajasthan, Madhya Pradesh and Maharashtra** — in the ratio stipulated by the 1979 award of the **Narmada Water Dispute Tribunal**.

Out of the **28 MAF capacity of Narmada basin**, Gujarat has been awarded a share of 9 MAF, while Madhya Pradesh has 18.25 MAF, Rajasthan 0.50 MAF, and Maharashtra 0.25 MAF. The power benefits from the project are to be shared thus: **Madhya Pradesh at 57 per cent, Maharashtra at 27 per cent, and Gujarat at 16 per cent**.

In 2017, **the dam was raised to a height of 138.68 meters** (spillway level until 2017 was 121.92 meters) and **30 gates were installed**. The dam achieved its **Full Reservoir Level (FRL) for the first time in 2019**. It also attained FRL in the monsoon of 2020 but SSNNL officials say that the live (utilisable) water storage capacity of **Sardar Sarovar Dam** does not even make up for **50 per cent of the annual water needs of the party states** and, therefore, the water management at Sardar Sarovar becomes critically dependent on the regulated releases from the upstream reservoirs in Madhya Pradesh, where hydropower generation ensures water inflow from time to time.

The water management initiatives that helped harness water

During the monsoon from July to October, the **reservoir operation is well synchronised with the rain forecast in the catchment area**. The strategic operation of **River Bed Power House (RPBH)** ensures that **minimum water flows downstream into the sea and maximum water is used during the dam overflow period**, which is not calculated in the annual water share. These measures help in maximizing the annual allocation of water share. Similarly, in non-monsoon months, the measures for efficient use of the allocated share typically include minimising the conventional and operational losses, **avoiding water wastage, restricting water-intensive perennial crops, adopting of Underground Pipelines (UGPL)**; proper

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maintenance of canals and structures and operation of canals on a rotational basis. In SSP, about 60 percent of canals constructed so far are UGPL.

How has Full Reservoir Level (FRL) helped?

Although the **Sardar Sarovar Dam**, after attaining its full height, was inaugurated in September 2017, it **could not be filled up to the FRL of 138.68 meters in 2017** and 2018 due to monsoon deficit. However, good rainfall in the catchment in 2019 and 2020 ensured that it achieved FRL for two consecutive years. **“The live storage capacity of the Sardar Sarovar Dam** increased by 3.7 times after the permission to close the gates was received in 2017. Its real benefit is realised now with the dam filled upto FRL for two consecutive years, an SSNNL official said.

The **annual share allocated to Gujarat** during the last two water years was 8.86 MAF (million acre-feet) in 2019 and 10.08 MAF in 2020, respectively. “However, in 2019-20, **reservoir operation and water management** were constrained a lot because it was the first time that the dam was to be filled to full capacity and stringent safety considerations were to be followed in order to check the strength of the structure for the first time, the official added.

Has the Covid-19 lockdown helped in preserving water in the basin?

The **industrial consumption of the water** from the Narmada dam is very less as compared to other uses. “Out of the **9 MAF awarded to Gujarat**, the water quantity earmarked for industrial use is only 0.2 MAF, which is roughly **only 2 per cent**. The **present utilisation of water by the industries is 0.07 per cent MAF** even during full operational years in normal times. Therefore, the lockdown or partial closure of industries has not impacted the storage levels much, the SSNNL official says.

How would the summer level of over 121 meters of the dam reservoir help in the functioning of the powerhouses during the next water year, beginning on 1 July?

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A water year is counted from 1 July to 30 June. “A comfortable water level at the beginning of monsoon can definitely lead to **higher hydropower generation** during non-summer months as we have experienced during the last two years. In the water year 2019-20, 4784 MU (million units) of hydropower was generated and in the current year 2833 MU are generated so far with June to go. It is noteworthy here that in a single month of September 2019, 988 MU were generated, and at present also, four turbines of **RBPH (river bed power house) are in operation. Madhya Pradesh and Maharashtra are getting 57 per cent and 27 per cent share respectively,**” the SSNNL official said, adding, “However, considering the limited storage capacity available at **Sardar Sarovar Powerhouse** and the requirements of the party states, it is not possible to forecast the scenario of the hydro power generation for the next water year as much will depend on the coming monsoon.”

Does the Garudeshwar Weir, located 12 km downstream from Narmada dam, help in maintaining water level in dam reservoir?

The **RBPH discharges almost 42,000 cusec at its peak operation phase**, which would be wasted by getting **drained downstream into the river** and eventually going into the sea. The **200 meter wide and 32.75 meter high Garudeshwar Weir** can contain 850 lakh square meter water that is released downstream after hydro power generation at the underground RBPH, stationed 165 meters from the dam, on the right bank of the river. The **RBPH has six Francis-type reversible turbines, each of 200 MW installed capacity**, to recycle this water stored in the Weir during non-peak hours of the grid because the power consumption per minute of reversing the water back from the Weir is more than the per unit generation capacity. While the **Garudeshwar Weir** does not directly help in maintaining the water level in the main dam, the storage of water after the generation of hydropower is of help in the non-monsoon season. This water stored in the Weir also helps maintain a water level in the river around the Statue of Unity, where there is a ferry service called the **Ekta Cruise**.

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How is the dam spillway operated to maximize storage in the dam reservoir and mitigate the risk of flood as seen in 2020?

The SSNNL explains that the **operation of Dam Spillway Gates is a specialized and complex issue**, involving domain expertise and experience in hydrology, flood routing, and hydraulics. **“It is about striking a balance between the safety of the dam** as well as the population and environment located downstream and the likelihood of having scarce water storage. **The dam has to have an adequate flood absorption capacity** by maintaining cushion levels and must also harness the available flood water in order to ensure that there is no water scarcity. Ideally, as a general guideline, a **major dam should not be filled more than 60 per cent** as of 31 July, more than 75 per cent on 31 August, and more than 85 per cent on September 15. Therefore, excess flood water received after attaining these levels is allowed to flow downstream by opening the gates. Each spillway gate level is decided after duly considering the storage and flood absorption capacity in the upstream dams, the rain forecast, **flood conveyance capacity of the river downstream**, and balancing hydropower generation with power grid requirements, SSNNL says.

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ANIMAL SERUM IN VACCINES

The government on 16 June 2021 issued a clarification stating that **Covaxin**, the Covid-19 vaccine developed by Hyderabad-based Bharat Biotech, **did not contain the serum of a newborn calf**. This was in response to discussions on the social media about the presence of **calf serum in Covaxin**.

In the clarification, the government reiterated the **well-known use of calf serum**, as also **serum extracted from other animals**, in the development of vaccines. These are needed to grow the **disease-causing virus, bacteria or other pathogens** in the laboratory, but do not themselves become an ingredient of the vaccine.

Vaccines like the one made by Bharat Biotech uses the **disease-causing virus** itself to trigger an immune response in human beings. The virus is **killed, or inactivated**, before being used in the vaccine, and injected into the human body, but it is **still able to trigger an immune response**.

To be used in the vaccine, the **virus needs to be grown, or cultured**, in the laboratory. Scientists try to create conditions conducive for the growth of these viruses by **recreating the kind of environment** that exists in an infected person's tissues. Therefore, solutions containing '**nutrients**' act as the growth medium for the virus. These nutrients, **like specific sugar and salt molecules**, are extracted from **tissues of suitable animals** like **horses, cow, goat or sheep**.

The virus grows in these **nutrient-rich solutions**. After that, it goes through several stages of purification that make it suitable to be used in a vaccine. There is **no trace of the growth medium after the entire process is over**.

According to the website of the **Food and Drug Administration of the United States**, cow components are used mainly because **cows are large animals**, easily available, and **rich in some of the useful chemicals and enzymes**.

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“**Cow milk is a source of amino acids**, and **sugars such as galactose**. Cow tallow derivatives used in vaccine manufacture include glycerol. **Gelatin and some amino acids come from cow bones**. Cow skeletal muscle is used to prepare broths used in certain complex media. Many difficult to grow micro-organisms and the cells that are used to propagate viruses require the addition of serum from blood to the growth media,” it says.

Synthetic serum, and **other nutrients**, has also been developed, but according to one international manufacturer of these chemicals, **Thermo Fisher Scientific**, **serum from newborn calf**, which has been used in vaccine production for over 50 years, has “**proven itself as an extremely effective growth supplement**”.

Historically, **animal serum has been used in the development of vaccines** in other ways as well. The **use of horse serum as an antibody supplement in diphtheria vaccine** is more than 100 years old. Horses used to be injected with small doses of bacteria that caused diphtheria so that they could develop antibodies. Later, **the blood of the infected animal was used to extract the antibodies** and used in the vaccine.

The story of the Poonawalla family, which graduated from owning a horse-breeding farm that also used to supply horse serum used in vaccines, to setting up the company that is now the **world's largest producer of vaccines**, **Serum Institute of India**, is very well known.

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'BREAKING THE DOWRY CHAIN' – GRASSROOTS MASS MOVEMENT

India has an alarming trend that sees 20 women die every day as a result of harassment over a dowry – either murdered, or compelled to commit suicide. National Crime Bureau of India, as recently as 2017, recorded nearly 7000 dowry linked deaths a year. Dowry deaths rose from about 19 per day in 2001 to 21 per day in 2016. And we are yet talking about reported dowry deaths here. There are many that go unreported. Taking or giving dowry has been criminalised by law as early as 1961. But, it is still a significant part of Indian marriage and is openly defying laws and failing women empowerment.

According to NCRB reports on an average, every hour a woman succumbs to dowry deaths in India with the annual figure rising upwards of 7000. No matter how many PhDs a woman earns, her identity and the right to live is decided according to the kilos of gold, cash, latest vehicles and appliances she brings in dowry for her in-laws.

In India traditional marriages, the dowry system, perpetuates the concept of the girl's parents giving gold, money, cars, homes and other material goods to the boy's family for 'taking care' of their daughter. It reinforces the 'belief', that Indian society has long perpetuated, that girls and women are a burden on society. This in turn reduces a girl's value to the money and material goods she brings to her wedded house.

For centuries, this has been a system actively followed. It's also projects the boy and his family as superior to the girl's and the girl's parents are 'expected' to service the boy's family with special treatment. The amount of dowry often becomes an issue of contention between the two families, and eventually leads to pressure on the girls who either suffer the marriage or kill themselves.

Not just rural India...

The brutal reality of the dowry system is not the story of rural areas only. Even the

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educated family sitting in metropolitan cities like Delhi and Bangalore is harassing a woman for not bringing enough gold or money. Not more than 16 days of the year 2020 had passed, Bengaluru, the silicon valley of India, reported 17 cases of abuse and death of women for dowry as mentioned in The New Indian Express. Going by this 2020 could be the worst for the plight of women due to dowry system, when is the end?

What's this dowry system all about?

Dowry system makes it necessary for a bride's family to give dowry in cash or kind to the groom's family as a pre-condition for marriage. After marriage, some families demand more dowry and when it is not fulfilled- either because of the inability of the bride's family or the denial of the bride herself- the groom and his family abuse and kill the bride. In one of the cases reported in Bengaluru in January 2020, a few weeks after marriage, a husband demanded cash despite receiving 1kg gold in dowry as per his demands. When the extra demand was denied, he burnt his wife.

In some cases, to escape the punishment by law, the husband and his family do not kill the woman directly but harass her mentally and physically forcing her to commit suicide. A similar case was reported in Kerala last year when a 27-year-old woman was starved to death by her in-laws because their demand of two lakhs in dowry was not met.

Why The Dowry System Is Still Prevalent

We are in 2021. Dowry system was abolished in 1961 in India. The reason for the prevalence of this custom is the patriarchal society that values men over women. In India boys have a rate card in many societies. This is the unofficial price the boy is worth. And that worth is measured by the amount of dowry a boy will get upon marriage. The stronghold of the gender inequality in Indian society makes a bride's family feel obliged to meet the dowry demands of the man who has 'agreed' to take care of the daughter. The second major reason is that the dowry system is too deeply rooted in the Indian culture that it is seen as normal and unchangeable. Even today, if people are reminded that dowry is a crime, they ignore it as an alternate reality

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which cannot change the age-old customs. Many educated families practice it, willingly or unwillingly, to avoid being criticized for not following the customs. After all who will dare to change the traditions? The third and most important reason is the dominance of the institution of marriage. A woman's marriage is of the paramount importance in Indian families. If a woman's marriage requires dowry in return of her secured married life which is a challenge in the world that is unsafe and discriminatory for women, it is never seen as a crime.

Dowry deaths are a result of this stagnancy in the traditions and cultures. Groom's families take advantage of the stronghold of the dowry system which will ultimately bring them wealth. Often they 'rightfully' abandon or abuse the woman for dowry because she and her family did not fulfil their duty. This is a harsh reality that still haunts the lives of the women who are moving ahead towards a respectable, empowered and independent future. This system is the major reason why daughters are considered as a burden for the families. Consequently, families either keep the wealth aside for the daughter's dowry rather than investing in her education or kill her before birth to get rid of the burden forever.

Dowry system gets an open passage in the society despite being a crime because no one dares to take legal action against the families.

Causes of Dowry System in India

- ❖ **High Illiteracy among girls and women:** According to 2011 census bureau, literacy rate in India was 74.04% but it is still a matter of concern that so many millions of people in India cannot even read and write.
 - The female literacy levels according to the 2011 census are 65.46% as compared to male literacy rate which is above 80%.
- ❖ **Age-old tradition:** People now resort to old customs to take dowry and tell the girl to the old tradition that you have to give dowry.
- ❖ **Male-dominated society:** Due to being a male-dominated society in India, women have no right to talk about themselves due to which women are exploited for dowry, they are tortured mentally and physically. (Page 3)

- ❖ **Dowry value – subject of respect:** At present, people have made a dowry subject to their respected honor, the more the dowry gets, the people respect it as much, which is leading to the promotion of dowry.
- ❖ **Unemployment:** It is also a major reason for the practice of dowry, because when the proposal comes for marriage of unemployed youths, then they say that to help you start your business.
- ❖ **Poverty and Child marriage:** Dowry has correlation to the age of the girl because in some tribes of India, late marriages can cause the bride family heavy toll in dowry payment.
 - Poverty in India is also cited as a cause of early marriages because some poor families of girls are forced to choose child marriages as a way out of desperate economic conditions and to reduce the expenses.
- ❖ **Lack of compliance towards dowry laws:** The Child Marriage Restraint Act of 1929 also known as Sarda Act and The Prohibition of Child Marriage Act, 2006 address child marriage issue but some people don't heed to the laws.

Impact of Dowry System

- ❖ **Domestic violence against women:** A few greedy families harass married women to bring more dowry or in case of failure to meet dowry demands.
- ❖ **Financial burden:** The bride's family starts collecting goods and saving money for dowry on her marriage from the day she takes birth.
 - In many cases, her parents have to take borrow money from relatives and friends, a loan from the bank, and even sell their property for doing just her marriage.
- ❖ **Waste of money:** People don't spend money as much money on their child's education and career as they spend on dowry and marriage expenses.

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- ❖ **Encourage to gender discrimination and female foeticide:** Dowry culture also encourages female foeticide due to gender inequality and most families can't afford wedding expenses.
- ❖ **Lowers the status of women and damages her dignity:** The prevalence of the custom of dowry reflects upon the inferior status of women in society.
 - In her own natal home, a girl is considered to be liability and a drain on the family resources.
- ❖ **Dowry leading to Immorality:** The practice of dowry is not only regarded as unlawful but even as immoral.
 - According to Gandhi Ji, one who makes dowry as a pre- condition of his marriage, not only shows disrespect to a woman but also humiliates his own nation, education and womanhood.

Measures to be adopted to end dowry system

- ❖ **Increase presence of women in the workforce:** Women should be supported to take up jobs and have independent incomes.
 - It can be done by expanding childcare and safe public transport, reduce discrimination in hiring, and create affirming workplace environments.
- ❖ **Compilation of gender-disaggregated data across the life cycle:** It aims to address gender inequality by looking at gender-disaggregated data such as birth, early childhood, education, nutrition, livelihood, access to healthcare, etc.
 - ❖ **Proper screening of gender laws:** It should be screened to remove gender bias, replacing words like “manpower” with gender-neutral equivalents.
 - ❖ **Zero tolerance towards domestic violence:** The families should store evidence and report at once, instead of sending battered women back fearing “what society will say”.

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- The support systems must be expanded to help victims with shelter, counselling, legal follow up, and livelihood support when required.
- ❖ **Stringent laws against dowry practice:** The government should try to stop this practice by making strict laws against the practice of dowry.

Road ahead

- ❖ **Marriage registration protects women's rights:** With over two and a half lakh gram panchayats in rural India, if registration is decentralised to panchayat secretaries, it will be accessible to rural families.
 - People will be able to register marriages easily and families can spend less.
- ❖ **Financial support from self-help groups (SHGs):** Millions of women's self-help groups in India have been a quiet force for financial support in times of stress.
 - Women's self-help groups should be systematically oriented about violence against women and the existence of local support systems.
 - Women's self-help groups can play a powerful role in building a more equal society by actively spreading awareness and displaying solidarity.
- ❖ **Spreading social awareness against dowry practice:** It is necessary to raise awareness in the society against dowry system as people's thinking has fallen so that they do not think anything other than dowry.

Every school should have such programs and dramas through which the day can be explained that the boy and the girl are equal, they should not discriminate in any way and taking dowry and giving both are punishable.

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UNKNOWN REGIONS OF THE SKY

The **mysteries** surrounding the **origin of the universe** continue to **draw human curiosity**. The development of a vital instrument, which will be used in **upcoming sky surveys to study stars**, is being led by an Indian astronomer. The project has been funded by the **world's leading institutions**, signalling India's growing expertise in building complex astronomical instruments.

PASIPHAE

Polar-Areas Stellar-Imaging in Polarisation High-Accuracy Experiment (PASIPHAE) is an international collaborative **sky surveying project**. Scientists aim to study the **polarisation in the light** coming from millions of stars. The name is **inspired from Pasiphae**, the **daughter of Greek Sun God Helios**, who was married to King Minos. The survey will use **two high-tech optical polarimeters** to observe the northern and southern skies, simultaneously.

It will focus on **capturing starlight polarisation of very faint stars** that are so far away that polarisation signals from there have not been systematically studied. The distances to these stars will be obtained from **measurements of the GAIA satellite**.

By combining these data, astronomers will perform a **maiden magnetic field tomography** mapping of the **interstellar medium of very large areas of the sky** using a **novel polarimeter instrument** known as **WALOP (Wide Area Linear Optical Polarimeter)**.

Scientists from the University of Crete, Greece, Caltech, USA, Inter-University Centre for Astronomy and Astrophysics (IUCAA), India, the South African Astronomical Observatory and the University of Oslo, Norway, are involved in this project, steered by the Institute of Astrophysics, Greece.

The Infosys Foundation, India, Stavros Niarchos Foundation, Greece and USA's National Science Foundation have each provided a grant of \$1 million, combined

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with contributions from the European Research Council and the National Research Foundation in South Africa.

Since its birth **about 14 billion years ago**, the **universe has been constantly expanding**, as evidenced by the presence of **Cosmic Microwave Background (CMB) radiation** which fills the universe.

Immediately after its birth, the universe went through a **short inflationary phase** during which it expanded at a very high rate, before it slowed down and reached the current rate. However, so far, **there have only been theories** and **indirect evidence of inflation** associated with the early universe.

A **definitive consequence of the inflationary phase** is that a **tiny fraction of the CMB radiation** should have its imprints in the form of a specific kind of polarisation (known scientifically as B-mode signal).

All previous attempts to detect this signal met with failure mainly due to the difficulty posed by our galaxy, the Milky Way, which **emits copious amounts of polarised radiation**. Besides, **it contains a lot of dust clouds** that are present in the form of **clusters**. When starlight passes through these dust clouds, they get scattered and polarised.

It is like trying to see faint stars in the sky during daytime. The galactic emission is so bright that the polarisation signal of **CMB radiation is lost**, said S Maharana, a PhD student at IUCAA who is involved in this project.

The **PASIPHAE survey will measure starlight polarisation over large areas of the sky**. This data along with **GAIA distances** to the stars will help create a **3-Dimensional model of the distribution of the dust** and magnetic field structure of the galaxy. Such data can help remove the galactic polarised foreground light and enable astronomers to look for the elusive B-mode signal.

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WALOP

Wide Area Linear Optical Polarimeter (WALOP) is an instrument, when mounted on **two small optical telescopes** that will be used to **detect polarised light signals emerging from the stars** along high galactic latitudes. A WALOP each will be mounted on the 1.3-metre **Skinakas Observatory, Crete**, and on the **1-metre telescope of the South African Astronomical Observatory** located in Sutherland.

Once built, they will be unique instruments offering the widest ever field of view of the sky in polarimetry. It will be capable of capturing **images within $\frac{1}{2}^\circ$ by $\frac{1}{2}^\circ$ area of the sky during every exposure**, said A N Ramaprakash, senior IUCAA scientist and fellow at IA, Crete. In simple terms, **the images will simultaneously have the finest of details of a star** along with its panoramic background.

WALOP will operate on the principle that at any given time, the data from a portion of the sky under observation will be **split into four different channels**. Depending on the manner in which light passes through the four channels, the **polarisation value from the star is obtained**. That is, each star will have four corresponding images which when stitched together will help calculate the desired polarisation value of a star.

As the survey will focus on sky areas where **very low polarisation values** (<0.5 per cent) are expected to emerge, a **polarimeter with high sensitivity and accuracy** clubbed with a **large field of view was needed**, so WALOP was planned sometime in 2013.

This was after the success of the **RoboPol experiment survey** during 2012-2017, in which some **PASIPHAE collaborators were involved**. Since then, the design, fabrication and assembly, led by Ramaprakash, is underway.

WALOP and its predecessor RoboPol share the single shot photometry principle. But the **200 kg weighing WALOP will be capable of observing hundreds of stars** concurrently present both in the northern and the southern skies

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as opposed to RoboPol, which has a much smaller field of view in the sky. Development of the instrument is in an advanced stage currently and progressing at the instrumentation facility in IUCAA.

Why WALOP will be deployed on 1-metre class optical telescopes?

A **major limitation** while **using large optical telescopes** is that they cover a relatively smaller area of the sky, defeating the overall purpose of PASIPHAE. Whereas the **1-metre-class telescopes** enable both larger fields of view of the sky combined with the minutest details of distant stars.

Since **the sky survey will continue for four years**, it will be a challenge to devote a **sizable amount of observation time** of any large telescope solely towards studying star polarisation.

So, the **maximum observation time offered by the smaller telescopes** will be diverted for the PASIPHAE sky survey using WALOP. The attempt to press-in the **1-metre-class telescopes** is also to demonstrate that breakthrough science and challenging experiments can be undertaken using **smaller telescopes**, even in the **era of large and extremely large telescopes**.

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WILL A NATIONAL JUDICIARY WORK?

The Union government appears to be steadfast in its resolve to implement reforms in recruitment and appointment to the subordinate judicial services.

<p>THE BIG PICTURE</p> <p>Law ministry has based its proposal on an earlier recommendation from a chief ministers' conference in 2013</p> <p>MOVE COMES ON THE BACK OF REPEATED ASSERTIONS BY UNION LAW MINISTER RAVI SHANKAR PRASAD CALLING FOR THE CREATION OF AN ALL-INDIA JUDICIAL SERVICE</p>	<p>Such a service has also been envisaged in Article 312 of the Constitution</p>  <p>As of now, there are states with judicial services but concern has been over those finally finding their way into higher judiciary</p>	 <p>Creation of such a service according to govt of India will bring a much more professional, better quality of judicial officers</p>
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Need for All India Judicial Service (AIJS)

- ❖ **Removal of intervention in judicial appointment:** It was in 1961 that a proposal for an All-India Judicial Service was first suggested in the Chief Justices' Conference as a way to remove any scope for judicial or executive intervention in the appointments to the judiciary.
- ❖ **Low judge to population ratio:** A Law Commission report in the year 1987 recommended that India should have 50 judges per million population as against 10.
 - In 2021, the working strength of the subordinate judiciary was 19,318 against the sanctioned strength of 24,247 which implies almost 5,000 posts remain vacant.
- ❖ **Lack of good quality judicial officers:** The continuous decline in their quality will delay delivery of justice, increase pendency of cases, impair quality of judgments, and in turn affect the competence of higher judiciary as well.

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- ❖ **Low budgetary support to state governments:** The state judicial services are not attractive for 'best talents' due to low salaries, rewards and compensations by the state governments.
- ❖ **Non-availability of specialized state training institutions:** Adjudication is a specialization which requires state of the art training institutes and professors but state institutes don't allow such exposure to interns.

Constitutional Perspectives for All India Judicial Service (AIJS)

- ❖ **Article 233(1) of the Constitution** lays down that the appointments of persons to be, and the posting and promotion of, district judges in any State shall be made by the Governor of the State in consultation with the High Court exercising jurisdiction in relation to such State.
- ❖ The 42nd Constitutional amendment in 1976 amended **Article 312 (1)** empowering Parliament to make laws for the creation of one or more All India Services, including an AIJS.

In favour

- ❖ **Equal Representation:** It will address the issue of social inclusion by enabling suitable representation to marginalised and deprived sections of the society.
- ❖ **Strengthening of judiciary system:** A properly framed All India Judicial Service (AIJS) on the lines of other all-India services such as IAS and IPS is important to strengthen the overall justice delivery system.
- ❖ **Appointment of fresh legal talent:** It will give an opportunity for induction of suitably qualified fresh legal talent selected through a proper all-India merit selection system.
- ❖ **Promotion of accountability and transparency:** A career judicial service will make the judiciary more accountable, more professional, and arguably, also more equitable.

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- ❖ **Infusion of objectivity in recruitment:** The open competitive exam would bring objectivity in the recruitment process of judiciary by reducing discretion of selection panel.
- ❖ **Uniformity across the country:** Quality of adjudication and the dispensation of justice would attain uniformity across the country by ironing out state-level differences in laws, practices and standards.

Against

- ❖ **Lack of consensus among states:** The consultative process of AIJS was mooted in 2019 and only four States and two High Courts supported the proposal.
 - Eight States have rejected it, five suggested changes, and 11 are yet to respond.
- ❖ **Existence of dichotomy with regard to Articles 233 and 312:** The Clause 3 of Article 312 places a restriction that AIJS shall not include a post inferior to that of a district judge.
 - It paves the way for Parliament to enact laws with regard to Administration of Justice; constitution and organisation of all courts, except the Supreme Court and the High Courts.
 - It was essentially intended to be the prerogative of the State but will now be the prerogative of the Union.
- ❖ **Violating principle of federalism:** If the fundamental power of the States to make such rules and govern the appointment of district judges is taken away, it may be against the principle of federalism and the basic structure doctrine.
- ❖ **Divergence among state governments and high courts:** While some state governments and high courts favoured the proposal, some were not in favour

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of creation of AIJS, while some others wanted changes in the proposal formulated by the central government.

- ❖ **Language barrier:** If all India judiciary is applied in India then judges from different states will be posted in different regions thus, they will face high language barrier which can affect the quality of adjudication.
- ❖ **Against independence of the judiciary:** It is guaranteed by the constitution but by applying All India Judicial services, we will be giving away the power to appoint judges solely to the executive.

Road ahead

- ❖ The feasibility of the AIJS in the **current context requires to be studied**, especially when reliance is placed upon archaic reports of the Law Commission.
- ❖ It is for the Union to **dispel doubts and at the same time give wings to the aspirations** of all stakeholders when implementing the proposal.
- ❖ It is necessary to **create a robust judicial system at the subordinate level** and a rich pool to draw from for the appointment of high court.
- ❖ A meritocratic service with a **competitive recruitment, high-quality uniform training and assured standards of probity and efficiency** would be able to ensure speedy and impartial justice in India.

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THE HISTORY OF TULU, AND THE DEMAND FOR OFFICIAL LANGUAGE STATUS



Various organizations initiated a Twitter campaign demanding **official language status to Tulu** in **Karnataka and Kerala** and received an overwhelming response. More than 2.5 lakh people tweeted in support of the campaign on 13 June 2021.

Who all speak Tulu in India now and what is its history?

Tulu is a Dravidian language spoken mainly in **two coastal districts Dakshina Kannada and Udupi of Karnataka** and **Kasaragod district of Kerala**. As per the 2011 Census report, there are **18, 46,427 Tulu-speaking people in India**. Some scholars suggest **Tulu is among the earliest Dravidian languages** with a history of 2000 years. Robert Caldwell (1814-1891), in his book, A Comparative Grammar of the Dravidian or South-Indian Family of Languages, called **Tulu “one of the most highly developed languages of the Dravidian family”**. (Page 1 of 3)

The **Tulu speakers**, mainly in **Karnataka and Kerala**, have been requesting the governments to give it **official language status** and include it in the **eighth schedule to the Constitution**. Assamese, Bengali, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Malayalam, Manipuri, Marathi, Nepali, Oriya, Punjabi, Sanskrit, Sindhi, Tamil, Telugu, Urdu, Bodo, Santhali, Maithili and Dogri are the **22 languages presently in the eighth schedule** to the Constitution.

Backing the campaign, Dakshina Kannada MP and BJP Karnataka president Nalin Kumar Kateel tweeted in Tulu saying, **“Efforts and talks are on to include Tulu in the eighth schedule**. A few technical issues need to be sorted out. All efforts will be made to announce Tulu as the official language during our tenure itself.” Dakshina Kannada district-in-charge minister Kota Srinivas Poojary said, **“Tulu is not only a language but also a culture and tradition** with a history of its own,” he said. “Tulu language is our mother tongue. Every one of us wants Tulu to get official language status,” tweeted Vedavyas Kamath, MLA. Apart from politicians, Kannada film actors and native Tulu speakers Rakshit Shetty and Pruthvi Ambaar also tweeted supporting the twitter movement.

What is the present status of Tulu?

According to **Karnataka Tulu Sahitya Academy** president **Dayananda G Kathalsar**, people who speak Tulu are confined to the above-mentioned regions of Karnataka and Kerala, informally known as **Tulu Nadu**. “At present, **Tulu is not an official language in the country**. Efforts are being made to include Tulu in the eighth schedule of the Constitution. If **included in the eighth schedule, Tulu would get recognition from the Sahitya Akademi**,” Kathalsar said.

Tulu in Education

The Karnataka government introduced **Tulu as a language in schools a few years ago**. According to the state education department, in the year 2020, a total of 956 children from Dakshina Kannada and Udupi districts wrote Tulu as the third optional language in SSLC (Class 10) examination. In 2014-15, 18 students chose

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the language as the third optional when it was introduced. Last year, '**Jai Tulunad**' conducted an online campaign demanding to include **Tulu in the new National Education Policy (NEP)**. The organization started a 'Tweet Tulunad' campaign with the hashtag **#EducationInTulu**.

The demand for separate statehood for Tulu Nadu

The political party '**Tuluvere Paksha**', which got recognition from the Election Commission of India in February 2021 **under section 29A of Representation of the People Act 1951**, has given wings to the political aspirations of the Tulu-speaking people. '**Tuluvere Paksha**' central committee president **Shailesh R J said**, "When the country was reorganised based on languages, Tulu Nadu was partly shared among Kerala and Karnataka. When there was a separate state for Tamil, Telugu, Malayalam and Kannada-speaking people, why there cannot be a separate state for Tulu Nadu?"

Tulu art, culture and cinema

Tulu has a rich oral literature tradition with folk-song forms like paddana, and traditional folk theatre **yakshagana**. Tulu also has an active tradition of cinema with around 5 to 7 Tulu language movies produced a year. Tulu films are being screened every day in Mangaluru and Udupi in at least one theatre.

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WHO OWNS BASMATI RICE? INDIA AND PAKISTAN BATTLE FOR GI RIGHTS

The first-ever recorded reference to 'basmati' rice is found in the epic Indian poem Heer Ranjha dated 1766. Two and a half centuries later Pakistan is challenging India's ownership of the 'basmati'. Reports to the UK House of Commons in 1874, along with the Paris & Vienna Universal Exhibitions of 1867 & 1873, mention 'Indian Basmuttee rice'.

French, Spanish & Moroccan courts have also rejected the 'Basmati' trademark for rice grown outside India.

Over the last two decades, India also implemented steps to protect the legal status of 'Basmati', including DNA testing. While Pakistan hasn't taken such steps, it does claim a joint heritage.

India, the **world's largest exporter of basmati rice**, has applied for **protected geographical indication (PGI) status** from the **European Union's Council on Quality Schemes for Agricultural Products and Foodstuffs**. This would give it **sole ownership** of the basmati title in the EU. **Pakistan**, which is the **only other basmati rice exporter in the world**, has opposed this move as it would adversely impact its own exports, especially as the EU is a major market for its basmati.

In India, historically, the **long-grained, aromatic rice** has been cultivated in **Indo-Gangetic plains** at the foothills of the Himalayas. In modern India, this region is spread over **Himachal Pradesh, Punjab, Haryana, Uttarakhand**, Uttar Pradesh, Delhi and Jammu and Kashmir. Basmati has also been grown for centuries in the **Kalar tract**, which lies between the **Ravi and Chenab rivers in Pakistan's Punjab province**. Given the **high premium** that basmati, an **export-oriented product**, fetches in the international market, there have been frequent disputes over granting the protected status to rice that **may have been bred from basmati varieties** and has the same qualities, but **isn't grown in the historical basmati-growing belt**.

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In India, for example, the **Madhya Pradesh government has been lobbying the central government for its basmati rice varieties to be granted the GI status**, even taking the matter to the Supreme Court. The **All India Rice Exporters' Association (AIREA) is opposed to this**, on the basis that it compromises basmati's integrity.

The **Agricultural and Processed Food Products Export Development Authority (APEDA)** itself had stated that GI status is strongly linked to a particular geographical region and, based on this, AIREA has argued that granting MP's request would open the door to other regions within India as well as rival rice exporters like China and Pakistan to grow basmati varieties anywhere in their territories, thus diluting the power of the basmati brand.

In fact, **India's attempts to protect the basmati title** can be traced all the way back to a bitter dispute between the Indian government and the **US Company RiceTec** in the late '90s. The latter had sought a patent for certain rice varieties that it had bred from **basmati strains**, with names like **Kasmati, Texmati** and **Jasmati**. The **patent was granted in 1997**, much to the chagrin of the Indian government and the public, which argued that this would result in **Indian-grown basmati being edged out of the US market**.

There was also much anger in India over what was perceived as the **government's inability to protect Indian agricultural heritage**, with many arguing that the **lack of legal protection for basmati** even within India made it possible for such "**bio-piracy**" to occur. A legal battle followed, after which, in 2001, the US narrowed the patent to only three variants produced by RiceTec. Within India, the **GI tag for basmati came through only in 2016**.

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THE DRAFT RULES FOR E-COMMERCE COMPANIES, AND HOW IT WILL IMPACT ONLINE SHOPPERS

The government has proposed changes to the **e-commerce rules** under the **Consumer Protection Act** to make the framework under which firms operate more stringent. While a **number of new provisions** are similar to what the Centre sought of **social media companies through the IT intermediary rules** announced earlier this year, **several proposals in the e-commerce rules** are aimed at increasing liabilities for online retailers for goods and services purchased on their platforms.

Firstly, the **draft rules issued by the Consumer Affairs Ministry** seek to ban “**specific flash sales**” by e-commerce entities. While as per the draft rules, **conventional e-commerce flash sales are not banned, specific flash sales or back-to-back sales** “which limit customer choice, increase prices and prevents a level playing field are not allowed”.

The rules have also introduced the concept of “**fall-back liability**”, which says that e-commerce firms will be held liable in case a seller on their platform fails to deliver goods or services due to **negligent conduct**, which causes loss to the customer. In several cases, when problems arise with goods purchased from **their marketplaces, e-commerce platforms direct the consumers** to the respective sellers to solve any grievance. With **fall-back liability**, consumers will be able to reach out to the platform itself.

The rules also propose to **restrict e-commerce companies** from “**manipulating search results or search indexes**”, in what comes as a response to a long-standing demand from sellers and traders to prevent **preferential treatment to certain platforms**.

E-commerce companies will also be restricted from making available to any person information pertaining to the consumer **without express and affirmative consent. No entity shall record consent automatically**, including in the form of pre-ticked checkboxes.

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Further, the companies **will have to provide domestic alternatives to imported goods**, adding to the government's push for made-in-India products. The **draft amendment** also proposes to ask e-commerce firms to mandatorily become a part of the **National Consumer Helpline**.

Any online retailer will first have to register itself with the **Department of Promotion for Industry and Internal Trade (DPIIT)**. The rules propose mandating that **no logistics service provider of a marketplace e-commerce entity** shall provide differentiated treatment between sellers of the same category.

Taking on from the **DPIIT's foreign direct investment policy for e-commerce marketplaces**, parties and associated enterprises related to e-commerce companies will not be allowed to be enlisted as sellers on the respective platform. **Any entity having 10 per cent** or more common ultimate beneficial ownership will be considered an **"associated enterprise"** of an e-commerce platform.

On the lines of the **IT intermediary rules** announced for social media companies, the Consumer Affairs Ministry has proposed to mandate e-commerce companies appoint a **grievance officer**, a **chief compliance officer** and a nodal contact person **"for 24×7 coordination with law enforcement agencies"**.

The provisions also look to ask **e-commerce companies to share information** with a "government agency which is lawfully authorised for investigative or protective or cyber security activities, for the purposes of verification of identity, or for the prevention, detection, investigation, or prosecution, of offences under any law for the time being in force, or for cyber security incidents".

The draft rules propose that the **information sought by the government agency** will have to be produced by the e-commerce company **"within 72 hours of the receipt of an order from the said authority"**.

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WILL SEEK ACTION UNDER ANTI-DEFECTION LAW AGAINST MUKUL ROY?

In a shock to the Bharatiya Janata Party (BJP), national vice-president Mukul Roy left the saffron camp to rejoin Mamata Banerjee in Trinamool Congress. Leader of the Opposition in Bengal Assembly, Suwendu Adhikari, submitted a petition to Speaker Biman Banerjee, seeking disqualification of Roy's membership in the House under the **anti-defection law** as **he won the seat on a BJP ticket**.

The **Tenth Schedule of the Constitution**, better known as the **anti-defection law**, seeks **to prevent political defections** which may be prompted **by reward of office or other similar considerations**. It was **put into the Constitution in 1985**. It consists of the process by which legislators may be disqualified on grounds of defection by the Presiding Officer of a legislature. This will be taken forward when a member of the House moves a petition against a certain defecting member.

The law ensures that a **member does not violate the mandate of the party**, and if he does, **he may lose his membership of the House**. This is applicable to both the Parliament and the state assemblies.

A member is said to have '**defected**' when **he or she either has abandoned a position or association**, often to join an opposing group.

When can an MLA or MP be disqualified?

- ❖ If **an elected member gives up his membership of the party voluntarily**
- ❖ If the **MLA or MP abstains from voting in the house**, going against the party's direction
- ❖ If **any independently-elected member joins any political party**
- ❖ If a **nominated member joins any political party after six months**

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- ❖ The decision to disqualify a legislator is **referred to the Speaker or the Chairman of the House** and their decision is **considered final**.

Exceptions

- ❖ In case **two-third legislators of a political party** decide to **merge with another party**, neither the members who decide to join nor the ones who stay with the original party, will face disqualification.

How long can the Presiding Officer take to decide upon the disqualification?

- ❖ The **law does not mention a specific time limit** for the decision. The **courts cannot intervene before the decision is made**, so the only option is to wait. All the judicial institutions can do is express concern over unnecessary delays, if any.
- ❖ There have been cases where the **defecting members continued to be members of the House** due to a delay in the officer's decision.

How does the anti-defection law impact the legislators' decision-making ability?

- ❖ While the **main aim of the law is to maintain a stable House**, it also impedes the lawmakers' ability to vote as per their conscience and judgment.
- ❖ Under the law, the members are **obliged to vote according to decisions taken by the party leadership** and not what their constituents may require.

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UNDEAD SECTION: ON SECTION 66A OF THE IT ACT

It is quite disconcerting that the Supreme Court has been informed for the second time in two years that Section 66A of the IT Act, which was struck down as unconstitutional six years ago, is still being invoked by the police and in some trial courts. One can see why the Court deemed it “a shocking state of affairs” when a petition by the **People’s Union for Civil Liberties (PUCL)** came up for hearing. Section 66A made messages deemed by the police to be offensive or menacing to anyone, or those that caused “annoyance”, a criminal offence if these were sent through a computer or computer resource. It prescribed a prison term of up to three years on conviction. In its landmark judgment in **Shreya Singhal (2015)**, the Court ruled that the provision was vague and violated the freedom of free speech. It was so broadly defined that it took into its sweep protected speech also, and therefore upset the balance between the exercise of the free speech right and the imposition of reasonable restrictions on it. In January 2019, too, the Court’s attention was drawn to the same problem of the invalidated provision being used by the police to register cases based on complaints. Not much seems to have changed since then, and it is quite surprising that the police headquarters and prosecutors in the various States had not disseminated the effect of the Court ruling among officers manning police stations.

There were also instances of courts framing charges under Section 66A even after lawyers had cited the 2015 judgment. The PUCL has said as many as 745 cases are still pending in district courts in 11 States. It is not difficult to surmise that police officers who receive complaints and register them as First Information Reports may not be aware of the judgment, though one cannot rule out instances of the section being invoked deliberately as a tool of harassment. Ignorance of the law is no excuse for the citizen, and it must equally be no excuse for police officers who include invalidated sections in FIRs. Recently, police in Uttar Pradesh booked a journalist for defamation under Section 500 of the IPC, even though the Supreme Court has ruled that defamation can be pursued only by way of private complaints and there can be no FIR. The current hearing may

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result in directions to States and the police, as well as the court registries, for appropriate advisories to both station-house officers and magistrates, but it is not necessary for those concerned to wait for such orders. Police chiefs and the directorates of prosecution must proactively begin a process of conveying to the lower courts and investigators all important judgments and their effect on the practices relating to investigation, prosecution and the framing of charges from time to time..

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WHAT IS A DNA-BASED VACCINE?

As the **world collectively battles the Covid-19 pandemic**, scientists are now looking towards **developing a DNA vaccine** which can **train the human immune system to ward off the infection**, before it even takes root. Referred to as **third-generation vaccine**, a DNA-based vaccine uses **engineered DNA** to induce a response against the virus.

According to the World Health Organisation, this “**radical new approach**” offers several advantages over traditional vaccines, which include “**improved vaccine stability**, the **absence of any infectious agent** and the relative ease of large-scale manufacture.” The technology, still in its **nascent stage**, has been developing rapidly in recent times.

If approved, Gujarat-based pharmaceutical major, **Zyodus Cadila**, will become the **first DNA vaccine**. According to official sources, Zyodus Cadila is likely to apply for emergency use authorization for its Covid-19 vaccine **ZyCoV-D** in a few days. Apart from adults, data is also being collected on if the vaccine can be administered to **children belonging to the age group of 12 to 18 years**.

There are presently various concerns of safety around rollout of new vaccines — ranging from **effect on immune system** response to logistics and even public apprehension to certain vaccines.

The **ZyCoV-D** can be **stored at two to four degree Celsius** and will be a **three-dose vaccine** which will be administered intradermally. Furthermore, due to no requirement of cold chains, transportation to remotest parts of the country will also be made easy. At a time like this, many companies are stepping forward to help drive down the caseloads in the countries.

J&J vaccine technology previously tried out on HIV

J&J is developing vaccines **using technologies that were previously tried out on**

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HIV (human immunodeficiency virus). It is currently carrying out **two human efficacy trials** for its HIV vaccine candidate. Initial results from one of the vaccine are expected to be released by the end of this year

What's interesting to note here is that while the **human immune system doesn't self-cure HIV**, it is **quite capable of self-curing Covid-19**. The vaccine candidate is currently being trialed in 2,600 women in sub-Saharan Africa as well.

It's also being tested in around 3,800 men who have intercourse with men and transgender individuals across the US, South America and Europe in the Mosaico trial.

J&J vaccine uses similar adenovirus technology to its Covid-19 vaccine, a genetically modified cold virus delivers genetic cargo carrying instructions for the host to develop "**mosaic immunogens**". These molecules are capable of inducing an immune response to a **wide variety of HIV strains**.

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WHAT IS A RANKED CHOICE VOTING?

Ranked choice voting made its **debut in New York City's mayoral primary** on 22 June 2021 in one of the most high-profile tests yet for a system gaining use in pockets across the US. The system is **based on a simple premise**: Democracy works better if people aren't forced to make an all-or-nothing choice with their vote.

Rather than pick just one candidate, **voters get to rank several in order of preference**. Even if a voter's top choice doesn't have enough support to win, their rankings of other candidates still play a role in determining the victor. But the system is more complex than a **traditional election**, making it tough to forecast a winner. It could take longer to get results.

How does ranked choice voting work?

In **New York City's version**, voters get to rank up to five candidates, from **first to last**, on their ballot. If one candidate is the **first choice of a majority of voters — more than 50%** — that person wins the race outright, just like in a traditional election. If nobody hits that threshold, ranked choice analysis kicks in.

Vote tabulation is done in rounds. In each round, the candidate in last place is eliminated. Votes cast ranking that candidate first are then redistributed to those voters' second choices. That process repeats until there are only two candidates left. The one with the most votes wins.

There are **13 candidates on the ballot** in New York City's Democratic mayoral primary. Only two candidates face off on the Republican side, making ranked choice a nonfactor.

Won't that take forever?

All rounds of **counting are done by computer** in a process that takes very little time. **But absentee ballots complicate things**. Because of the ongoing coronavirus pandemic, all people in New York are being **allowed to vote by mail** Page 1 of 3)

Ballots are valid as long as they are postmarked by 22 June 2021, even if they take several days to arrive. A complete ranked choice analysis can't be done until those ballots are included.

After polls close at 9 pm on 22 June 2021, New York City's Board of Elections plans to release data on where the vote count stands based only on people's first choices, and only for votes cast in person.

A week later, on 29 June 2021, it will run its **first ranked choice analysis**, using only votes cast in person. Results will be posted on the board's website. They will show who the winner and runner-up would be if no votes had been cast by mail.

A week after that, on 6 July 2021, the **board will do another round of ranked choice analysis** that includes all of the **absentee ballots processed as of that date**. If there are still uncounted or disputed ballots, the process will be run yet again on 13 July 2021, and every subsequent on 22 June 2021 until a winner can be declared.

Why do people like ranked choice?

One benefit of the system is that nobody "**wastes**" their vote by picking an unpopular candidate as their first choice. You can follow your heart and rank someone you like No. 1, even if you suspect that candidate doesn't stand a chance. If that person is eliminated, you still get a say in who wins the race based on your other rankings.

Another benefit is that **it's tough for someone to get elected without broad support**. In a traditional election, it's possible for someone with fringe political views to win in a crowded field of candidates, even if they are deeply disliked by a majority of voters.

That's theoretically less likely in a ranked choice system. A candidate could get the **largest share of first-choice votes**, but still lose to someone **who is the second or third choice of a large number of people**.

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What are the negatives?

The **system is tough to grasp**. It requires voters to do a lot more research. It also makes **races less predictable**.

Transparency and trust are also potential problems. Ordinarily, candidates, the public and news organizations can see votes coming in, precinct by precinct, and know exactly who is leading and where their support is coming from.

Under the **modern ranked choice system**, the process of redistributing votes is done by computer. Outside groups will have a harder time evaluating whether the software sorted the ranked votes accurately.

That's a **headache for news organizations**, like The Associated Press, that analyze vote tallies and attempt to report a winner before the count is complete.

And there may be instances where candidates who seem to have a comfortable lead in **first-place votes on election night** lose because relatively few voters rank them as their second or third choice. That could lead to people questioning the results.

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CHINA'S DRAGON MAN, AND WHERE IT FITS IN THE EVOLUTIONARY TREE OF MODERN HUMANS

Researchers from China have claimed to have found an **ancient human skull** that could belong to an altogether **new species of humans**.

The researchers have published their findings in the journal **'The Innovation'**, in which they note that the **cranium (the portion that encloses the brain)** could be over 146,000 years old. The skull was found in the **Songhua river** in north-east China's Harbin city.

Separately, news came in this from researchers **working in Israel**, who said they had identified a previously unknown kind of ancient human called "**Nesher Ramla Homo**" that co-existed with **Homo sapiens nearly 100,000 years ago** when several species of humans co-existed in **Asia, Europe and Africa**. These include **Homo sapiens**, the **Neanderthals**, and the **Denisovans**.

Homo sapiens, the species to which all existing humans belong, **evolved in Africa nearly 300,000 years ago** as a result of some dramatic climate change events. **Neanderthals (Homo neanderthalensis)** are believed to be the **closest extinct human relatives** and lived about 400,000-40,000 years ago in Europe and southwestern to central Asia.

The findings from the site in Israel that has been dated to 140,000-120,000 years ago, have been published in the journal 'Science'. These researchers note that **this archaic Homo population** had mastered the use of technology that until recently was linked only to **Homo sapiens or Neanderthals**. Members of the species **Nesher Ramla Homo** could hunt small and large game; they used wood for fuel, cooked and roasted meat, and maintained fires. These findings are important because they provide evidence that there were **cultural interactions between different human lineages**.

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But first, how many species of humans are there?

Modern humans are the only human species that exist in the world today. While the exact number of human species is a matter of debate, most scientists believe that there are at **least 21 of them.** As per the **Smithsonian National Museum of Natural History**, there are over 21 human species. These are:

* **Sahelanthropus tchadensis** is believed to be the **oldest member of the human family tree.** According to the **Smithsonian National Museum of Natural History**, this species lived **about 7-6 million years ago** somewhere around present day Chad in Africa. Researchers only have cranial material as evidence that this species existed, from which they have deciphered that it had both **ape-like and human-like features and was bipedalled**, an ability that may have increased its chances of survival.

* **Orrorin tugenensis** lived **about 6.2-5.8 million years ago in Eastern Africa.** As per the **Smithsonian Museum**, this species is the oldest early human on the family tree and members from this species were approximately the size of a chimpanzee.

***Ardipithecus kadabba** lived **5.8-5.2 million years ago**, in Eastern Africa. They were **bipedalled**, and are believed to have had a body size similar to that of modern chimpanzees.

***Ardipithecus ramidus** lived **about 4.4 million years ago in Eastern Africa**, and was **first reported in 1994.** It is not clear if this species was bipedalled.

***Australopithecus anamensis** lived **about 4.2-3.8 million years ago.** A skull belonging to this species was discovered **in Ethiopia in 2016** at a **palaeontological site.** Two studies published in 2019 analysed this skull and determined that it was older than Lucy, the name for another specimen belonging to the species **Australopithecus afarensis**, which was previously thought to be the **oldest ancestor of modern humans.** The new research also indicated that the two species (Lucy and her ancestors) co-existed for at least 100,000 years. (page 2 of 5)

***Australopithecus afarensis** (members from Lucy's species) **existed 3.85-2.95 million years ago in Africa**. Paleontologists have discovered remains from over 300 individuals belonging to this species over the years.

***Kenyanthropus platyops** lived **about 3.5 million years ago in Kenya**. The Smithsonian Museum notes that the species inhabited Africa at the same time as Lucy's species did, which could mean that there is a closer branch to modern humans than Lucy's on the evolutionary tree.

***Australopithecus africanus** lived **about 3.3-2.1 million years ago in Southern Africa**. This species had a **combination of human and ape-like features**.

***Paranthropus aethiopicus** lived **about 2.7-2.3 million years ago in Eastern Africa** and members of this species are defined by their strongly protruding face, large teeth, and a powerful jaw.

***Australopithecus garhi** lived **about 2.5 million years ago in Eastern Africa**, and is characterised by their long, powerful arms. The Smithsonian museum notes that the arms could mean the longer strides needed during bipedal walking.

***Paranthropus boisei** lived **about 2.3-1.2 million years ago in Eastern Africa**, and were characterised by a skull that was specialised for heavy chewing.

***Paranthropus robustus** lived **about 1.8-1.2 million years ago in Southern Africa** and were characterised by their wide, deep-dished faces.

***Australopithecus sediba** lived about 1.9 million years ago in Southern Africa. Members of this species had facial features similar to the later specimens of Homo.

***Homo habilis** lived **about 2.4-1.4 million years ago** in Eastern and Southern Africa, and is **one of the earliest members of the genus Homo**. Members of this species still retained some of the ape-like features, however. (page 3 of 5)

***Homo erectus** lived about **1.89 million-110,000 years ago**, in Northern, Eastern, and Southern Africa and Western and East Asia. '**Turkana Boy**' is the most complete fossil belonging to this species and is dated to be around 1.6 million years old.

***Homo floresiensis** lived around **100,000-50,000 years ago**, in Asia. One of the most recently discovered early human species has been nicknamed the "**Hobbit**". Specimens have so far only been found on an Indonesian island.

***Homo heidelbergensis** lived about **700,000-200,000 years ago in Europe**, some parts of Asia and Africa. As per the Smithsonian museum, this was the first early human species to live in colder climes.

***Homo neanderthalensis** lived about **400,000-40,000 years ago**, and co-existed with *Homo sapiens* for a few thousand years. They lived in Europe and in southwestern and central Asia.

***Homo sapiens** evolved about 300,000 years ago, and are found worldwide.

So where does the "Dragon Man", the latest Chinese discovery, fit in?

The **cranium found in China** has been dubbed the "**Dragon Man**" or **Homo longi**, a name that has been derived from the Long Jiang or Dragon river in the Heilongjiang province of China where the city of Harbin is located.

The **skull was reportedly discovered back in 1933**, when a bridge was built over the **Songhua river**. For thousands of years, the skull remained buried in sediments.

The **UK's Natural History Museum notes** that because of the distinctive shape of the skull, which was found almost complete, some members of the team have suggested that it be declared a **part of a new species of the genus Homo**. Significantly, **the size of the skull**, which has a considerable brain capacity, is comparable to that of modern humans and Neanderthals. (Page 4 of 5)

Modern humans are considered to have very large brains. While sizes can vary between populations and males and females, the **average capacity of a human brain is about 1,300 cubic centimetres**, and it can weigh anywhere between 1,300-1,400 grams. In comparison, a cat's brain weighs just about 30 grams.

Why is this discovery being considered significant?

For one, **it brings new knowledge about the evolution of Homo sapiens** — which is to say that if the “**Dragon Man**” is indeed a new species, it might help to bridge the gaps between our ancient ancestors called Homo erectus and us.

This knowledge is important because **there is very little consensus in the scientific community about how different human species are related**, and which species are our immediate ancestors.

Smithsonian for instance notes that some **palaeontologists believe Homo heidelbergensis** to be our immediate ancestors. **This species was discovered in 1908**, and **lived about 700,000 to 200,000 years ago in Europe** and possibly China and some parts of Africa.

There are **some other unanswered questions as well** — such as whether **there was interbreeding among different human species**. For instance, it is believed that **Neanderthals contributed nearly 1-4 percent of DNA** in non-African modern humans.

The Natural History Museum also notes that **interbreeding with ancient humans** allowed **Homo sapiens to acquire genes** that improved their chances of survival, and that some of these genes are present in modern humans even today. For instance, some of the **DNA inherited from Neanderthals** is believed to be involved in boosting immunity.

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WHAT THE INDEMNITY CLAUSE IS AND HOW ITS WAIVER WILL ACCELERATE ARRIVAL OF COVID-19 VACCINES IN INDIA?

The Centre has held multiple rounds of discussion with pharma giants **Pfizer** and **Moderna** over the supply of their **Covid-19 vaccines** in India, the point of contention being the **question of indemnity**.

This has raised many questions in the minds of people regarding **what indemnity entails**. Here's all you need to know:

Indemnity protects the producers from being sued in case their Covid-19 vaccine shows any adverse effects. The vaccine producers are **demanding indemnity** as they manufactured the vaccine in a **very short period of time** to fight the pandemic and their vaccines may show unknown side effects.

It must, however, be noted that **grant of indemnity doesn't mean** that the **beneficiaries cannot demand compensation in case of any adverse events**, but grant of indemnity sets the bar high.

The **Indian drug regulator** has not yet granted **vaccine indemnity** to any of the **three Covid-19 vaccines** currently in the market — **Covishield, Covaxin and Sputnik V**.

The government has laid out rules in case of any adverse effects during the trial phase of the vaccines. However, **there are no such laws for commercial vaccines** under the **Drugs and Cosmetic Act**.

The government is **negotiating a middle way for international companies** like **Pfizer** who are **demanding indemnity**. "Similarly, they (Pfizer) have requested indemnity from all nations. That is their expectation, that liability should be indemnified. They have expressed this in legal language. We are examining this request and we will make a decision in the larger interest of people and on merits. This is under discussion but there is no decision as of now," Dr V K Paul, head of India's Covid-19 task force said.

(Page 1 of 2)

Countries like the US and the UK have granted vaccine indemnity to some Covid-19 vaccine producers.

The US government, which started its vaccination drive back in **December 2020**, granted **immunity from liability to both Pfizer and Moderna for their m-RNA Covid-19 vaccines**. This will protect the two big vaccine companies from lawsuits arising from any medical complications due to their **vaccine until 2024**.

However, through the US Countermeasures **Injury Compensation Program (CICP)**, individuals who suffer from serious adverse effects **due to the Covid-19 vaccines** can file for compensation.

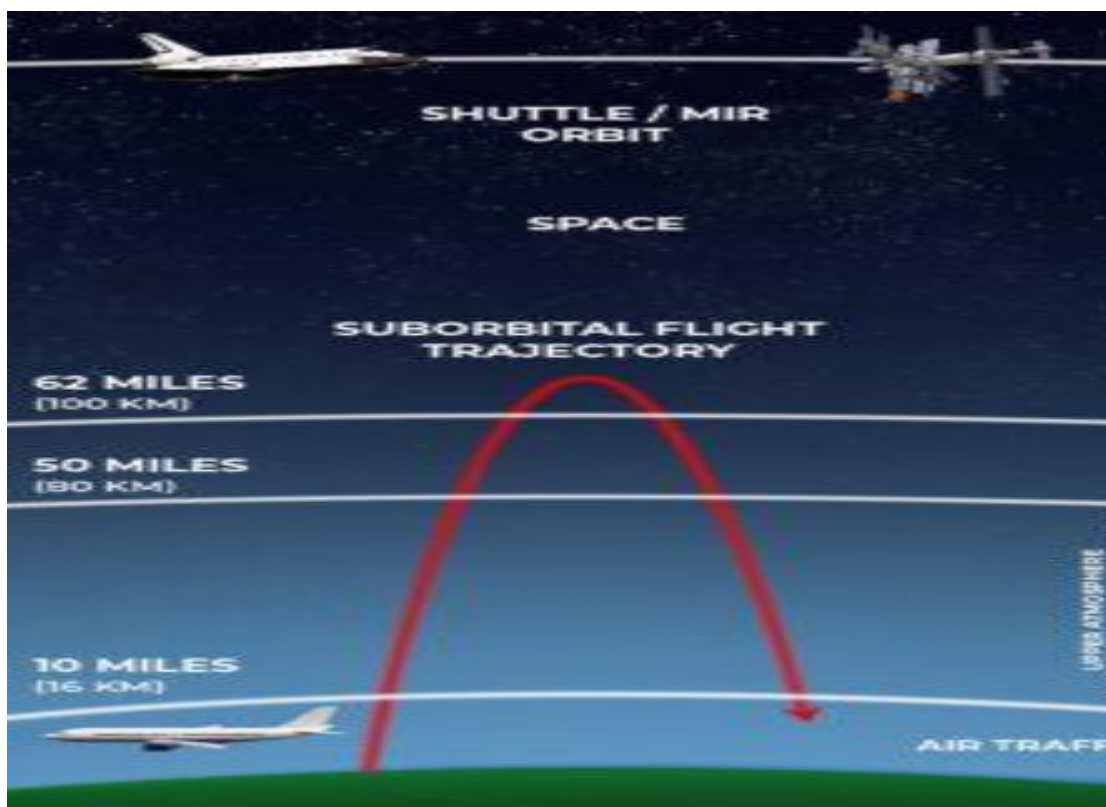
Similarly, the **UK has a Vaccine Damage Payment scheme**. It is not a **compensation scheme**, but any individual who suffers from **severe physical disability** due to certain vaccines can receive a **one-off tax-free payment of £120,000**.

Through **World Health Organisation's (WHO) COVAX facility**, the **members will have to provide indemnity and no-fault compensation for faster availability** of Covid-19 vaccines.

WHO's "**No-Fault compensation programme**", started in February, is available for rare but serious adverse events after administering COVAX-distributed vaccines until June 2022. This is available for **92 low- and middle-income countries** across the world.

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WHAT'S A SUBORBITAL FLIGHT?



“**Suborbital**” is a term you’ll be hearing a lot as Sir Richard Branson flies aboard **Virgin Galactic’s VSS Unity winged spaceship** and Jeff Bezos flies aboard **Blue Origin’s New Shepard vehicle** to touch the **boundary of space** and **experience a few minutes of weightlessness**.

But what exactly is “**suborbital**”? Simply put, it means that while **these vehicles will cross the ill-defined boundary of space**, they **will not be going fast enough to stay in space** once they get there.

If a spacecraft – or anything else, for that matter – **reaches a speed of 17,500 mph (28,000 km/h) or more**, instead of falling back to the ground, it will continuously fall around the Earth. That continuous falling is what it means to be in orbit and is **how satellites and the Moon stay above Earth**.

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Anything that **launches to space but does not have sufficient horizontal velocity to stay in space** – like these rockets – **comes back to Earth** and therefore **flies a suborbital trajectory**.

Although the **two spacecraft launched in July 2021** will **not reach orbit**, the accomplishment of reaching space in **private spacecraft is a major milestone in the history of humanity**. Those aboard these and all future private-sector, suborbital flights will for a few minutes be in space, experience a few minutes of **exhilarating weightlessness** and **absolutely earn their astronaut wings**.

Conceptually, the flights that Branson and Bezos will be on are not terribly different from a baseball thrown into the air.

The **faster you can throw the baseball upward**, the **higher it will go and the longer it will stay in the air**. If you throw the ball with a bit of sideways velocity as well, it will go farther down-range.

Imagine throwing your baseball in an open field. As the ball rises, it slows down, as the **kinetic energy inherent in its velocity is exchanged for potential energy** in the form of increased altitude. Eventually the ball will reach its maximum height and then fall back to the ground.

Now imagine that you could throw the baseball fast enough to reach a **height of perhaps 60 miles (97 km)**.

The baseball has reached space. But when the ball reaches its maximum height, it will have **zero vertical velocity** and **start to fall back to Earth**.

The flight may take several minutes, and during most of that time the ball would experience near weightlessness – as will the newly minted astronauts aboard these spacecraft. Just like the **hypothetical baseball**, the astronauts will reach space but won't enter orbit, **so their flights will be suborbital**.

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WHAT IS THE EU'S NEW 'VACCINE PASSPORT' PROGRAMME, AND ISN'T COVISHIELD INCLUDED?

Covishield manufactured by **Serum Institute of India** is not among the vaccines which have been approved by the **European Medicines Agency's (EMA)** for the "vaccine passport" programme that allows **free movement of people in and out of Europe**.

The **EU Digital Covid Certificate**, or the "green pass" as it is popularly known, has been created to restore freedom of travel for the public and remove the barriers on entry placed due to the pandemic.

With the **new vaccine passport system coming into effect across EU from 1 July 2021**, the absence of Covishield from the list of EMA-approved vaccines can be of particular concern for Indians who hope to travel to European countries soon.

But **what is EU's new "vaccine passport" system** and **why does Covishield not feature on the list of vaccines** approved for the purpose?

The **EU Digital Covid Certificate**, which has been created to **ensure that restrictions currently in place can be lifted in a coordinated manner**, is a digital proof that a person has **either been vaccinated against Covid-19, or received a negative test result, or recovered from the viral infection**. The document is **valid across all EU countries**.

The certificate includes information such as name, date of birth, date of issuance, the name of the vaccine or the details of the negative test result or recovery from Covid-19.

National authorities are in **charge of the programme** and the document can be issued by **test centres or health authorities**, or directly via an **eHealth portal**. The certificate has a QR code which can be scanned and it is available in both digital and paper formats.

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The **certificate contains a digital signature** which is **verified when the QR code is scanned**. Each issuing body has its own digital signature key, all of which are stored in a secure database in each country.

The European Commission has designed a gateway through which all the signatures can be verified across the EU.

The **“green pass” is expected to ease travel restrictions for people travelling to EU countries**. According to the official EU website, the certificate holder should “in principle be **exempted from free movement restrictions**” and “Member States should refrain from imposing additional travel restrictions on the holders of an **EU Digital COVID Certificate**, unless they are necessary and proportionate to safeguard public health”.

Will the ‘green pass’ be absolutely compulsory for travel to EU?

No. While the **“green pass” is expected to make the experience of travel hassle-free** for people by doing away with restrictions, it is not absolutely compulsory. The EU website states that the certificate will not be a **“pre-condition to free movement, which is a fundamental right in the EU”**. However, those who do not possess the certificate will be subject to the usual travel restrictions and quarantine rules which are in effect in every country.

As a case in point, **Indians travelling to France now have to produce a negative RT-PCR report** before boarding and need to be tested again after reaching France. Moreover, they need to **self-isolate for seven days** after reaching the country and those who have not been vaccinated need to undergo **“mandatory 10-day quarantine supervised by security forces”**.

Which are the vaccines that have been approved by EMA for the purpose?

The EMA list only includes **four vaccines** now—**Vaxzevria (Oxford-AstraZeneca), Comirnaty (Pfizer-BioNTech), Spikevax (Moderna) and Janssen**

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(Johnson & Johnson). None of the **three vaccines** which have been approved for use in India till date —**Covishield, Covaxin and Sputnik V** — feature on the list.

Why has Covishield not been included in the list?

Though **Vaxzevria** has been among the vaccines approved by EMA, **Covishield**, which is **derived from AstraZeneca's shot**, is not on the list. EMA said Serum Institute of India has not applied for Covishield's approval, the BBC reported.

Even if the vaccine is the same, different manufacturers of the same product need to submit separate applications for approval from EMA. This is because the EMA takes into consideration local manufacturing facilities.

Serum Institute of India CEO Adar Poonawalla has said that the issue will be looked into and taken up at the highest level. He tweeted, "I realise that a lot of Indians who have taken COVISHIELD are facing issues with travel to the E.U., I assure everyone, I have taken this up at the highest levels and hope to resolve this matter soon, both with regulators and at a diplomatic level with countries."

Covaxin, which has not received WHO approval, has also not applied for inclusion in the EMA list.

What is India's stand on vaccine passports?

Though EU has made it clear that **the "green pass" will not be compulsory**, the issue has once again raked up the larger debate on concerns around privacy and ethics.

The **vaccine passport has been largely touted to be a ticket back to normalcy**, but it has given rise to larger concerns over intrusion, privacy and a curb on the right to free movement. At the recent meeting of G7 countries, Union Health Minister Harsh Vardhan said that India was **"strongly opposed to a 'vaccine passport' at this juncture"**.

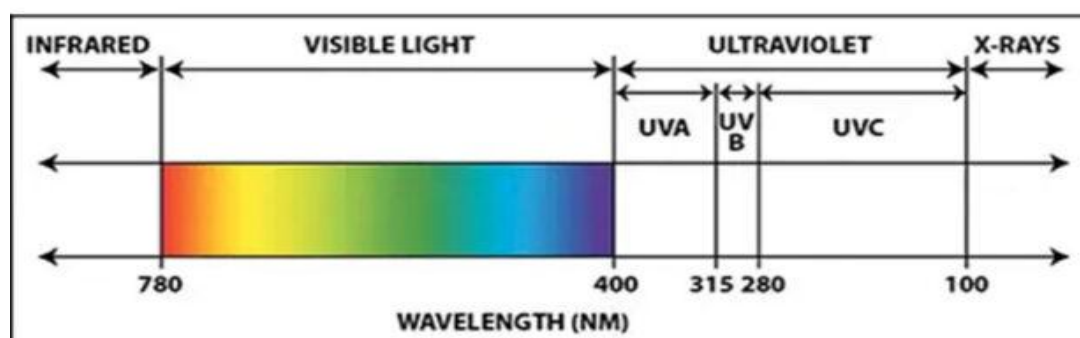
(Page 3 of 3)

WHAT IS UV-C TECHNOLOGY, AND HOW DOES IT WORK ON CORONAVIRUS?

Union Minister of State for Science and Technology Dr Jitendra Singh has said that **Ultraviolet-C or UV-C Disinfection Technology** will soon be installed in Parliament for the “**mitigation of airborne transmission of SARS-COV-2**”.

The **UV-C air duct disinfection system** was developed by **CSIR-CSIO (Central Scientific Instruments Organisation)**. CSIR-CSIO mentioned in a release that the system is designed to **fit into any existing air-ducts** and the virucidal dosages using **UV-C intensity** and residence time can be optimised according to the existing space. The release adds that **the virus is deactivated in any aerosol particles** by the calibrated levels of **UV-C light**. It can be used in auditoriums, malls, educational Institutions, AC buses, and in railways.

Ultraviolet (UV) is a type of light or radiation naturally emitted by the Sun. It covers a **wavelength range of 100-400 nm**. The **human visible light ranges from 380-700 nm**.



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UV is divided into three bands: **UV-C (100-280 nm)**, **UV-B (280-315 nm)** and **UV-A (315-400 nm)**.

UV-A and UV-B rays from the Sun are transmitted through our atmosphere and all UV-C is filtered by the ozone layer. UV-B rays can only reach the outer layer of our skin or epidermis and can cause sunburns and are also associated with skin cancer. **UV-A rays can penetrate the middle layer of your skin** or the dermis and can cause aging of skin cells and **indirect damage to cells' DNA**. UV-C radiation from man-made sources has been known to cause skin burns and eye injuries.

UV-C radiation (wavelength around 254 nm) has been used for decades to disinfect the air in hospitals, laboratories, and also in water treatment. But these **conventional germicidal treatments** are done in unoccupied rooms as they can cause health problems.

A paper published in June 2020 in Scientific Reports noted that **UV-C radiation can destroy the outer protein coating of the SARS-Coronavirus**. They showed that **222-nm, known as 'far-UVC light'**, efficiently kills airborne human coronaviruses – **alpha HCoV-229E** and **beta HCoV-OC43**. This is different from SARS-CoV-2 virus. There is very limited data on the required wavelength and duration needed to inactivate SARS-CoV-2.

An **in-vitro experiment conducted by Hiroshima University researchers** showed that **99.7% of SARS-CoV-2 viral culture** was killed when exposed to **222 nm UV-C irradiation** at 0.1 mW/cm² for 30-seconds. The study was published in September 2020 in the American Journal of Infection Control.

Another study published in Scientific Reports in March 2021 noted that **UV-C irradiation was highly effective in inactivating SARS-CoV-2 replication**. "A complete inactivation at all viral concentrations was observed with 16.9 mJ/cm². These results are important for the development of novel sterilising methods to contain SARS-CoV-2 infection," write the authors.

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Researchers from the **Indian Institute of Technology-Kanpur** who developed a portable disinfectant device that used **UV-C radiation (222-254 nm)**, noted that the device was specifically developed to disinfect non-living things. “UV-C radiation used in this device could be harmful to the skin and eyes of the living beings, therefore the operator of the device must use spectacles with **UV-C radiation protection** and use this device safely,” noted the paper published in June 2020.

The release from our **Ministry of Science and Technology** does not state the **wavelength or duration used**, but mentioned that the product was tested for more than 99% disinfection.

Dan Arnold, who works for **UV Light Technology**, a company that provides disinfecting equipment to hospitals, pharmaceutical companies across the UK, told bbc.com: “**UV-C is really nasty stuff** – you shouldn’t be exposed to it...It can take hours to get sunburn from UV-B, but with UV-C it takes seconds. If your eyes are exposed... you know that gritty feeling you get if you look at the sun? It’s like 10 times, just after a few seconds.”

But few studies have shown that **far-UVC light (207–222 nm) does not harm mammalian skin**. “**Far-UVC light has a very limited range** and cannot penetrate through the outer dead-cell layer of human skin or the tear layer in the eye, so it’s not a human health hazard. But because viruses and bacteria are much smaller than human cells, far-UVC light can reach their DNA and kill them,” explained David J. Brenner, director of the Center for Radiological Research at Columbia in a release. His team has demonstrated in 2018 that far-UVC light can help control the spread of airborne-mediated microbial diseases.

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NASA'S NEW SPACECRAFT NEA SCOUT – A SHOEBOX-SIZED SPACECRAFT

In July, NASA announced that its **new spacecraft**, named **NEA Scout**, has completed all required tests and has been safely tucked inside the **Space Launch System (SLS) rocket**. **NEA Scout is one of several payloads** that will hitch a **ride on Artemis I**, which is expected to be launched in November.

Artemis I will be an uncrewed testflight of the **Orion spacecraft and SLS rocket**. Under the Artemis programme, NASA has aimed to land the **first woman on the Moon in 2024** and also establish **sustainable lunar exploration programs by 2030**.

NEA Scout

Near-Earth Asteroid Scout, or NEA Scout, is a **small spacecraft**, about the size of a big shoebox. Its **main mission is to fly by and collect data from a near-Earth asteroid**. It will also be **America's first interplanetary mission using a special solar sail propulsion**.

Les Johnson, principal technology investigator for the mission, said in a release, "This **type of propulsion is especially useful for small, lightweight spacecraft** that cannot carry large amounts of conventional rocket propellant."

NEA Scout will use stainless steel alloy booms and deploy an **aluminum-coated sail** measuring 925 square feet. "The **large-area sail will generate thrust by reflecting sunlight**. Energetic particles of sunlight bounce off the solar sail to give it a gentle, yet constant push. Over time, **this constant thrust can accelerate the spacecraft to very high speeds**, allowing it to navigate through space and catch up to its target asteroid," explained NASA in the release.

The **spacecraft will take about two years to cruise to the asteroid** and will be about 92 million miles away from Earth during the asteroid encounter. (Page 1 of 2)

How will it study the asteroid?

NEA Scout is equipped with special cameras and can take pictures **ranging from 50 cm/pixels to 10 cm/pixels**. It can also process the image and reduce the file sizes before sending them to the **earth-based Deep Space Network** via its medium-gain antenna.

“The images gathered by **NEA Scout** will provide critical information on the **asteroid's physical properties** such as **orbit, shape, volume, rotation, the dust and debris field surrounding it**, plus its surface properties,” said Julie Castillo-Rogez, the mission's principal science investigator at **NASA's Jet Propulsion Laboratory (JPL)**.

Why should we study near-Earth asteroids?

“**Despite their size**, some of **these small asteroids could pose a threat to Earth**,” Dr. Jim Stott, NEA Scout technology project manager, said. “Understanding their properties could help us develop strategies for reducing the potential damage caused in the event of an impact.” Scientists will use this data to determine what is required to reduce risk, **increase effectiveness**, and **improve the design** and operations of robotic and human space exploration, added Castillo-Rogez.

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NEW SOURCE OF GRAVITATIONAL WAVES DISCOVERED

The **first confirmed detection** of a **neutron star-black hole (NSBH) collision** has triggered huge excitement in the scientific community. This ground-breaking discovery of **gravitational waves for a pair of NSBH mergers** (collisions between a neutron star and a black hole) was published 29 June 2021 in the Astrophysical Journal Letters.

Prof **Somak Raychoudhury**, director of **Inter-University Centre for Astronomy and Astrophysics**, said that this was expected for a long time but was not confirmed. A new analysis was done to reconfirm this discovery which has now been published in the international journal.

Until now, the **LIGO-Virgo collaboration (LVC) of gravitational waves detectors** has only been able to **observe collisions between pairs of black holes or neutron stars**. For the first time in **January 2020**, the **LIGO-Virgo network of detectors** made the **ground-breaking discovery of gravitational waves** from a **pair of NSBH mergers**. Researchers from **Laser Interferometer Gravitational-wave Observatory- India** have contributed to this major discovery.

Prof Raychoudhury said there is a lot of interesting science here. “For instance, a **neutron star has a surface** while a **black hole does not**. A **neutron star is about 1.4-2 times the mass of the sun** while the other **black hole is much more massive**. Widely unequal mergers have very interesting effects that can be detected,” he explained.

Data as to **how often they merge will also give us clues about their origin** and how they were formed, said Dr. Shasvath Kapadia from the International Centre for Theoretical Sciences (ICTS) in Bengaluru. Dr Kapadia helped with the estimation of the NS-BH merger rate, using a method he co-developed.

“Among the authors of this paper is also Bhushan Gadre who was a PhD student at IUCAA till recently and took part in a lot of our Marathi outreach programmes. He is now at Max Planck Institute in Germany,” Prof Raychoudhury said. (Page 1 of 2)

According to the IUCAA director, the technique used here to detect the signal is called **matched filtering**. “This was also used for the **first discovery of gravitational waves**. It may be recalled that this was developed at IUCAA in the 1990s by Sanjeev Dhurandhar and collaborators,” Prof Ray choudhury said.

Prof Sanjith Mitra, s scientist with **LIGO-India** said what is so exciting is that LIGO-India will significantly improve the sky localisation of these events. “This increases the chance of observation of these distant sources using **electromagnetic telescopes** which will, **in turn, give us a more precise measurement** of how fast the universe is expanding,” Prof Mitra said.

How the detections were made

As the **two compact and massive bodies orbit around each other** they come closer, and **finally merge, due to the energy lost in the form of gravitational waves**. The gravitational waves signals are buried deep inside a lot of background noise. To search for the signals, scientists use a method called **matched filtering**. In matched filtering, various expected gravitational waveforms predicted by **Einstein's theory of relativity** are compared with the different chunks of data, to produce a quantity that signifies how well the signal in the data (if any) matches with any one of the waveforms. Whenever this match (in technical terms “**signal-to-noise ratio**” **or SNR**) is significant (larger than 8), an event is said to be detected. Observing an event in multiple detectors separated by thousands of kms, almost simultaneously, gives scientists increased confidence that the signal is of astrophysical origin, which is the case for both events.

How sure are we that they are NS-BH MERGERS?

Using **Parameter Estimation tools** scientists find the probable masses, spins, distances, locations of these mergers from the data. Both of these events occurred 1 billion light-years away. As the **GWs also travel with the speed of light**, this means that we observed mergers that happened **over 1 billion years ago**, well before life appeared on earth.

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GENDER SELF-IDENTIFICATION

The **Spanish government** on 29 June 2021 approved the **first draft of a bill** that **would allow anyone over the age of 14 to legally change gender** without a medical diagnosis or hormone therapy, its Equality Ministry said.

The bill will now go to a public hearing, and will then come for a second reading in the national cabinet. To become law, it then **has to be approved by the lower house** of the Spanish parliament.

Currently, for someone **to change their gender in official records**, the **law first requires two years of hormone therapy** and a **psychological evaluation**. The proposed law will remove these requirements for everyone above 14 years of age. **Those between 14 and 16**, however, would require parental approval.

What is gender self-identification?

Self-identification, or 'self-id', is the **concept that a person should be allowed to legally identify with the gender of their choice** by simply declaring so, and without facing any medical tests. This has been a long held demand of trans-right groups around the world, **including in India**, as prejudice against trans people remains rampant.

In Europe, this **issue has remained divisive not only on liberal-conservative lines**, but also within the LGBT community, reports The Economist. While some believe that the current processes for declaring **one's desired gender are lengthy, expensive and degrading**, some feminist and gay-rights groups insist that such a law could endanger women and cause more gay teenagers to be told that they might be trans and thus encouraged towards hormones and surgery.

Feminist forums that believe that **sex is not something which can be chosen** have insisted that allowing **self-identification could put at risk all laws** that specifically prevent discrimination against women, and have instead asked

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lawmakers to look at concerns that they say are more pressing, such as the gender pay gap.

Even in Spain, where **feminist groups are protesting against the proposed law**, President **Pedro Sánchez** has maintained the need to “**safeguard the balance of women’s rights** and of a group as punished as the trans people,” El Pais reported.

Where is self-ID legal?

As per the advocacy group **ILGA (the International Lesbian, Gay, Bisexual, Trans and Intersex Association)**, **15 countries around the world recognise self-ID**, including Denmark, Portugal, Norway, Malta, Argentina, Ireland, Luxembourg, Greece, Costa Rica, Mexico (only in Mexico City), Brazil, Colombia, Ecuador and Uruguay.

In Denmark, the law requires a **six-month reflection period for formalising gender change**. In Portugal, changing one’s gender for the second time requires going to court.

Italy does not allow self-ID, and **neither does Germany**, where last month a bill was voted down that would have legalised **gender-reassignment surgery** from the **age of 14 regardless of opposition from parents**, as well as introduced a fine of 2,500 euros for referring to a trans person based on their natal sex. In Hungary, a newly adopted law effectively bans all content about **homosexuality and gender change** from school curriculum and television shows for children under the age of 18.

What is the process for declaring one’s desired sex in India?

In India, the **rights of transgender persons** are governed by the **Transgender Persons (Protection of Rights) Act, 2019** and the **Transgender Persons (Protection of Rights) Rules, 2020**. Under the Rules, an application to declare gender is to be made to the District Magistrate. Parents can also make an application on behalf of their child.

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A **much-criticised previous draft of regulations** required transgender persons to go through a medical examination for **declaring their desired sex**. This requirement was omitted in the final Rules, which state that the District Magistrate will “**subject to the correctness of the applicant's particulars**, get the application processed based on the affidavit submitted declaring the gender identity of any person, without any medical or physical examination, and thereafter, issue an identification number to the applicant, which may be quoted as proof of application.”

As per the Rules, state governments have also been directed **to constitute welfare boards for transgender persons** to protect their rights and interests, and facilitate access to schemes and welfare measures framed by the Centre.

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MAKING SENSE OF THE RBI'S FINANCIAL STABILITY REPORT

The **Reserve Bank of India (RBI)** has released the **23rd edition of its Financial Stability Report (FSR)**.

- ❖ The Report discusses issues relating to development and regulation of the financial sector.
- ❖ **Financial Stability Report:** The FSR which is **published biannually** reflects the collective assessment of the **Sub-Committee of the Financial Stability and Development Council (FSDC** – headed by the Governor of RBI) on risks to financial stability and the resilience of the financial system.
- ❖ **Impact of Vaccination:** As per the RBI, Policy support & **Vaccination** have been nurturing global recovery though the **second wave of Covid-19** has dented domestic economic activity.
- ❖ **Gross NPA for Banking Sector:** The latest report suggests that the gross **Non-Performing Assets (NPAs)** for the whole banking sector is expected to slip but not as great a level as mentioned in previous **FSR**.
- ❖ **MSME Sector at Risk:** In the retail loans and the loans given to the **MSMEs** sector, the NPA level or the quality of credit may actually deteriorate in the months to come which will adversely impact consumer credit.
 - The stress level forecast for the banking sector is seen to be improving and the banks seem to be having better capital provisioning. But the MSME sector is facing stress which is an issue of concern.

23rd Financial Stability Report

Gross NPA Ratio: The **Gross Non-Performing Assets (NPAs)** ratio was found under control at 7.5% as of March 2021, contrary to all expectations of NPAs increasing due to the pandemic.

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- The stress tests indicate that under normal conditions the NPA ratio will increase to 9.8% by March 2022.
- ❖ **. NPA Ratio under Stress Cases:** Under the medium stress scenario, where **GDP** growth is at 6.5%, the gross NPA ratio could rise to 10.36%.
 - Under the severe stress scenario, where GDP growth is at 0.9%, the gross NPA ratio for the banking sector may rise to 11.22%.
- ❖ **Rise in Fiscal Deficit:** As per the **budget 2020-21**, the fiscal deficit was at 9.3%. The **fiscal deficit** is likely to increase.
 - As per the recent data, a burden of around Rs. 3 lac crore is likely to be added which will increase the fiscal pressure to about Rs. 14 lac crore which further adds 3-4% to the fiscal deficit of 9.3%.
- ❖ **Increased Dependence on Govt. Securities:** One more important area of concern is the increasing dependence of the banking sector on government securities.
 - Banks are finding recourse in investing their liquidity in government securities.
- ❖ **RBI's Assistance amid the Crisis:** There are two major factors that have led the GDP in negative growth; **Gross Fixed Capital Formation** and **Private Final Consumption Expenditure**.
 - It is the expenditure incurred on the final consumption of goods and services by the resident households and non-profit institutions serving households.
 - During this period, RBI has provided support to the banking sector in terms of credit support.
 - RBI has provided collateral support and has opened new credit lines.
 - The **plan of giving moratorium** during tough times and rolling back the same has helped to keep things under check.

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Road ahead

- ❖ **RBI's Advice:** The FSR is advising the banks to reinforce their capital and liquidity positions to fortify themselves against potential balance sheets stress.
- ❖ **Generating Demand in Economy:** What is now required is to generate demand in the economy. The banks and the significant leaders in the economy have a key role to play in this. When the demand begins to rise, only then economic recovery can occur.
- ❖ **Second Generation Reforms:** The second generation reform needs to be initiated. The most important segment of the second generation reform is the rural development including agriculture & allied sectors and small scale industries.
 - Reviving the rural economy furthers the scope of overall economic growth.
- ❖ **Increasing the Efficiency of Public Sector Banks:** The difference between the Private Sector and Public Sector Banks is almost 5% points in terms of NPA.
 - In the case of private sector banks, the NPA in a baseline scenario will get to around 6% whereas in the public sector banks it will be almost double; 12%.
 - The public sector banks need to be made more efficient, if necessary the **ownership changes (privatisation) need to be done too.**
 - It needs to be noted that the private sector banks have responded better to the economic crisis and have proven themselves to be comparatively less affected by the Covid-19 pandemic.

Bringing Bad Banks in Action: In order to bring the banking industry out of this challenging time, the creation of **Bad Banks** is the most crucial step that needs to be taken.

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- A bad bank is an **Asset Reconstruction Company (ARC)** or an Asset Management Company (AMC) that takes over the bad loans of commercial banks, manages them and finally recovers the money over a period of time.
- Similar to this, in 2002, the **SARFAESI Act** was enacted for hiving off the bad assets which led to a significant decline in NPAs.

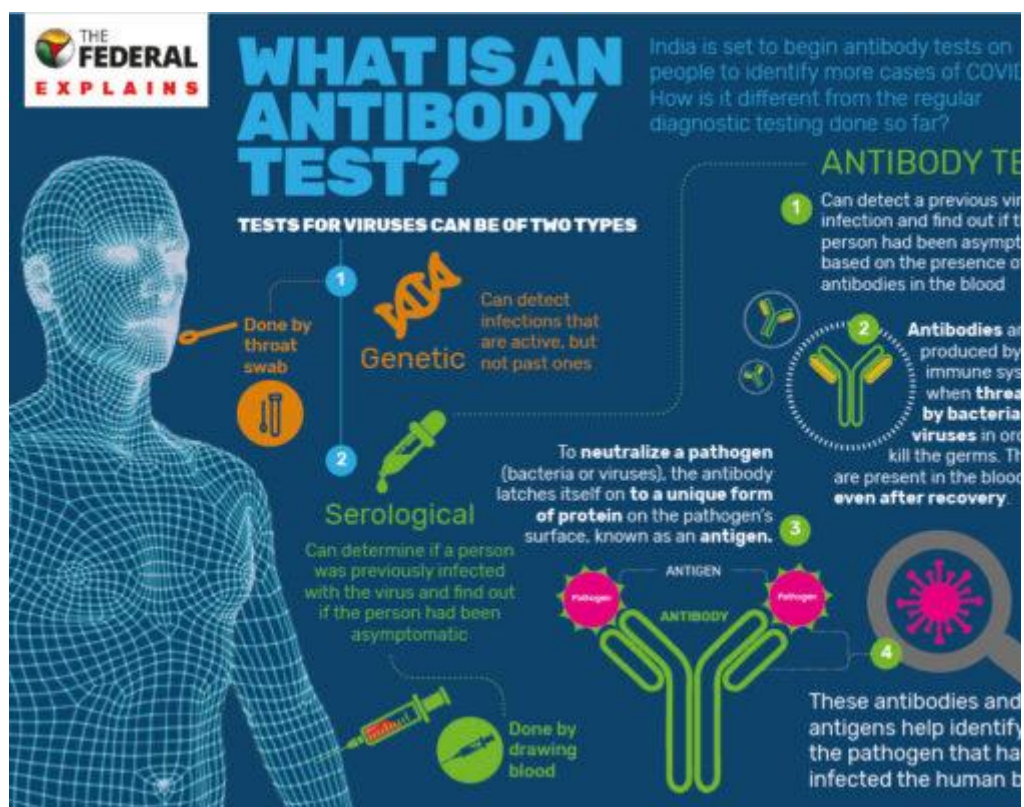
Meeting the Financial Needs: Stronger capital positions, good governance and efficiency in financial intermediation can be the touchstones of this endeavor so that financing needs of productive sectors of the economy are met while the integrity and soundness of banks and financial institutions are secured on an enduring basis.

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COVID-19 ANTIBODY

As countries start re-opening, people are making sure they are 100% secure before stepping out into the new normal. As such, many have been seen falling back on antibody tests to ascertain their immunity against the novel coronavirus. While many nations have made an antibody test mandatory to determine whether vaccinated travelers need to get quarantined, there are offices which are asking for similar reports before allowing people to rejoin work.

However, with a lot of debate going on regarding the efficacy of such tests and whether these can be an indicator of one's immunity towards coronavirus infection, we explain what these tests are and how they work.



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Antibodies are proteins created by the **body's immune system to fight a particular virus**, such as **SARS-CoV-2**. With these being very specific for their intended target, antibodies directed towards one virus would not protect the body from another. In other words, if you have had the measles, your body has antibodies for the measles virus, but measles antibodies will not protect you from catching a coronavirus.

The antibody test, hence, isn't checking for the virus itself. Instead, it looks to see whether your immune system — **your body's defense against any illness** — has responded to the infection.

Of the **five main types of antibodies** that would be produced after an infection, a test looks for just three — **immunoglobulins A (IgA), M (IgM) and (IgG)**.

White blood cells — specifically B lymphocytes — first produce IgM antibodies after being presented with a **foreign antigen**, but later **switch to producing IgG or IgA antibodies**. **IgG antibodies are the most common type to be found in the blood** and have the largest part to play in conferring immunity to bacteria or viruses, while **IgA antibodies tend to be found in bodily secretions such as saliva**.

According to the Centers for Disease Control and Prevention, **IgM and IgG antibodies for SARS-CoV-2 antigens** are usually produced between **two and three weeks** after infection, but it is not yet known as to how long these remain in the blood.

A positive antibody test result shows that **one may have antibodies from a previous infection**. One may test positive for antibodies even if they have never had symptoms of Covid-19. This happens when one has had an asymptomatic infection.

Sometimes a person can test positive for SARS-CoV-2 antibodies when they do not actually have those specific antibodies. This is called a **false positive**.

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However, a **negative result means that either one has not been exposed** to the coronavirus, or even if one were, the time of your test was too soon for one's body to produce antibodies or the level of antibodies present at the time of the test were below the test's limit of detection. It typically takes one to three weeks after infection for your body to make antibodies.

There are two types of tests that can determine if one has developed antibodies against a virus: a **laboratory test**, requiring a healthcare professional to take a blood sample from the patient, which is sent to a lab for results; or a **rapid point-of-care test**, which uses **finger-prick blood** and can be taken at home.

A Cochrane review of **38 antibody test accuracy studies** from four countries found that tests which **looked for IgG/IgM antibodies** had low sensitivity — the ability of the test to correctly identify samples with antibodies — during the first week since the **onset of symptoms (30.1%)**. **Sensitivity increased by the second week (72.2%)** and peaked in the third week (91.4%).

The reviewers concluded that “**antibody tests are likely to have a useful role for detecting previous Sars-CoV-2 infection** if used 15 or more days after the onset of symptoms”.

However, a report written by the **Scientific Pandemic Influenza Group on Behaviours** in April 2020 for the **Scientific Advisory Group for Emergencies**, expressed concern that even with a specificity rate of 98%, if **5% of a population had Covid-19**, 28% who test positive for antibodies may not have actually ever been infected.

This is a question that researchers are eager to answer. In some diseases, the **presence of antibodies means you are immune**, or **protected against future infection**. Your body has learned to recognize that virus and has created antibodies to fight it.

However, for others, **the immunity may fade over time**. Researchers hope that having some antibodies to the coronavirus might protect you from a more severe case of Covid-19. More research will help clarify the relationship between **having antibodies and being immune** or **protected from future SARS-CoV-2 infection**.

The US Food and Drug Administration, on the other hand, believes **the tests are unnecessary and unreliable**, and should not be used to determine how much protection someone gains from Covid-19 vaccines. “If antibody test results are interpreted incorrectly, **there is a potential risk that people may take fewer precautions against SARS-CoV-2 exposure**, the FDA says.

Since one of the most puzzling things about the coronavirus is **how differently it affects individuals**, testing is the best way to determine whether or not you have Covid-19. Whether or not your antibody test is positive or negative, **you should remember that you might still be able to catch Covid-19** or unknowingly spread the disease to someone else, regardless of whether you have any symptoms.

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INDIAN POLICY GIVES ALUMINUM BATTERY A CHANCE TO TAKE ON LITHIUM IN EVS

A **drive to reduce dependence on imported materials and technology**, especially from China, is pushing **India to invest in a battery technology that uses aluminium rather than lithium** as the key ingredient. **Indian Oil Corp.**, the nation's largest oil refiner, has teamed up with **startup Phinergy Ltd.** to develop the Israeli company's **aluminium-air battery**.

India has few exploitable options to produce lithium, the key metal for the current generation of **electric-vehicle batteries**, but its eastern jungles hold large reserves of bauxite, the ore used to make aluminium.

"Lithium is scarce in the country and we started scouting for an element which is abundantly available as a natural resource," said Indian Oil R&D Director S.S.V. Ramakumar.

India is among the top 10 bauxite producers. It has **some 600 million tons of the ore in proven reserves**, according to the U.S. Geological Survey, though India's mining ministry estimates that untapped resources may be many times that amount. Moreover, **the country has invested heavily in production of aluminium** over the years to become the **world's second-biggest smelter of aluminium**.

"Clearly the special consideration here is that **aluminium is in better supply than lithium**," said James Frith, Head of Energy Storage at BNEF in London. "But with the ever-falling prices of **lithium-based systems**, developers will be under pressure to find niche applications where **Aluminium-Oxygen can gain a foothold**."

An aluminium-air battery could win advantages over its **lithium-ion rival** in three other crucial ways, Ramakumar said: It's potentially cheaper, vehicles using it would have a longer range, and it's safer.

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Swapping Batteries

The **battery works by tapping electricity** generated when **aluminium plates react with oxygen in the air**. It has one of the **highest energy densities for a battery**. But the system has a number of drawbacks that have kept it from **wide-scale use** since it was **first proposed in the 1960s**.

Chief among them is the cost of materials that need to be added to the **battery to prevent the power from dropping** and the fact that the **cells can't be recharged**. Instead, Phinergy's plan is for users to be able to quickly swap in a new battery and send the used one to a recycling facility.

It takes just three minutes to replace the battery, about the time it takes to fill up at a **gas station**, Ramakumar said. The **fuel retailer plans to use its network** of filling stations as swapping points.

In comparison, **lithium-ion batteries often contain hazardous materials** that can be toxic if not disposed of correctly, making them **harder to recycle**. By 2035, the world will have accumulated about **4 millions tons of Li-ion batteries** that have reached the end of their lives.

Lithium is already entrenched in the EV market and absorbs most of the research dollars, with many potential challengers based on **sodium, magnesium or aluminium** focused on smaller segments such as backup power systems, energy storage or low-power transport, like forklifts.

Yet demand both from **electric transport and renewable energy storage** means India could provide a market **big enough for aluminium-air batteries** to find a role. Battery demand will rise to as much as **185 gigawatt hours by 2035**, according to BNEF.

Amara Raja Batteries Ltd., India's largest producer of lead-acid cells, is examining existing lithium-based technologies as a "**next growth engine**," though
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also sees scope for alternatives to be developed, Vijayanand Samudrala, the firm's president of new energy, told a BNEF summit. "I don't think **there's a final word on the maturity of the technology**, I can see at least two or three generations of technology shift happening in the batteries area in the next 10 years," he said.

Indian Oil made a strategic investment in Phinergy in early 2020 and the **Indian firm's 30,000 service stations** can "serve as the infrastructure for the deployment of Phinergy's technology, the Israeli company said in an e-mail.

Phinergy's systems have been tested by telecoms companies for backup power at transmission towers and other sites. The company, **which raised \$60 million** from an **initial public offering in Tel Aviv** earlier this year, has run a test car using an **aluminium-air battery** to keep the vehicle's lithium-ion power pack charged that it says would have a range of 1,750 kilometres.

To assess the **viability of wide-scale use in India**, automakers Mahindra and Mahindra Ltd., Maruti Suzuki India Ltd. and Ashok Leyland Ltd. are carrying out vehicle tests that are **expected to take almost a year**. If **there's enough demand**, Indian Oil and Phinergy plan to set up a **gigawatt-scale facility** to make the batteries in India, Ramakumar said.

Success would help Prime Minister Narendra Modi's efforts to tackle **three urgent problems for the country: cutting pollution, reducing raw material imports and creating jobs**.

India's dependence on fossil fuels has made it the **world's third-biggest emitter of greenhouse gases** and its cities regularly top the rankings for polluted air, **putting hundreds of millions of citizens at the risk of lung diseases** and premature death. The government has also been pushing companies to reduce the imports bill and **increase self-sufficiency**. **Indian Oil is the nation's biggest importer of crude oil**. The refiner has joined major oil companies including Royal Dutch Shell Plc and BP Plc in pivoting toward clean energy as governments tighten emission regulations. (Page 3 of 3)

LAMBDA, THE NEWEST WHO VARIANT OF INTEREST, IS NOW IN 29 COUNTRIES

COVID-19


Comparing variants of concern


Like all viruses, the SARS-CoV-2 coronavirus **has been evolving since it first emerged in late 2019**. The WHO has identified four variants of concern and four variants of interest:


Variants of concern

Earliest documented sample:

 **Alpha**
United Kingdom
September, 2020
Reported in: 173 countries

 **Beta**
South Africa
May, 2020
Reported in: 122 countries

 **Gamma**
Brazil
November, 2020
Reported in: 74 countries

 **Delta**
India
October, 2020
Reported in: 104 countries

Variants of interest

Earliest documented sample:

Eta
Multiple countries
December, 2020

Iota
United States
November, 2020

Kappa
India
October, 2020

Lambda
Peru
December, 2020



Source: World Health Organization | Last updated July 6, 2021

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Even as the **Delta variant of the SARS-CoV-2 coronavirus** continues to drive the **rise in infections around the world**, another variant, **Lambda**, is **increasingly being seen by scientists** and health experts as a new emerging threat. On 14 June 2021, the **World Health Organization** designated the **Lambda variant**, previously known by its formal scientific name **C.37**, as the **seventh and newest “variant of interest”**, meaning it was **something to watch out for**.

Like the Delta variant, the **Lambda variant**, which has now been **detected in more than 25 countries**, is feared to be **more transmissible** than the original virus, although it is not yet established because of **lack of enough studies on it**. It has been the **dominant variant in Peru** and other countries of South America. The Lambda variant has **not yet been found in the Indian population**, but has recently been detected in the UK and other European countries.

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The **Lambda variant is not a new emergence**. It has been around at least since last year, possibly as early as August 2020. **In Peru**, where it is **believed to have originated**, it accounts for **almost 80% of the infections**. It is the dominant strain in neighbouring Chile as well. But until recently, it was largely concentrated in a handful of South American countries, including **Ecuador and Argentina**.

Since the end of March, this variant has been detected in more than 25 countries, although the numbers are still very small. The UK, for example, said it had found this variant in six infected people, all international travellers. Recently, **it has also been found in Australia**.

According to the WHO, the **Lambda variant** has at least **seven significant mutations** in the **spike protein** (the Delta variant has three) which could have a range of implications, including **the possibility of increased transmissibility** or enhanced resistance to antibodies, created either through natural infection or vaccination.

A recent study by researchers at Chile reported that the **Lambda variant had greater infectivity than the Alpha and Gamma variants** (known to have originated in the UK and Brazil respectively). The study also reported decreased effectiveness of the Chinese **Sinovac vaccine (Corona Vac)** against the Lambda variant.

However, the **behaviour of the Lambda variant is not very well understood right now**. “There is currently limited evidence on the full extent of the impact associated with these **genomic changes**, and further robust studies into the **phenotype impacts** are needed to better understand the **impact on countermeasures**, and to control the spread,” the WHO said in a statement. “Further studies are also required to validate the **continued effectiveness of vaccines**.”

But, the designation as a “**variant of interest**” means that the **genetic changes involved are predicted or known to affect transmissibility**, disease severity, or immune escape. It is also an acknowledgement of the fact that the variant has

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caused significant community transmission in multiple countries and population groups.

There are **currently seven variants**, including the **Lambda** that the WHO classifies as “**variants of interest**”. Another four – **Alpha, Beta, Gamma and Delta** – have been designated as “**variants of concern**”, and are considered a **bigger threat**. These were all recently named after letters of the Greek alphabet **to avoid linkage with the country of their origin** that had been happening until then.

The **Lambda variant** has so far **not been found in India or neighbouring countries**. In Asia, **only Israel has reported this variant** until now. But several countries in Europe from where travel to India is frequent, including France, Germany, UK, and Italy have reported this variant.

The **potential of emerging variants to bypass the immunity gained through vaccination** means that **there could be fresh waves of infections** even in populations that were being considered close to reaching **community-level protection**. That is what is happening in many countries in Europe right now, particularly in the UK. There has been a **sharp rise in cases in several countries** in the last few weeks.

That means that a country like India, which is still recovering from the debilitating second wave, would need to proactively watch out for, and prevent the spread of any new variant that could trigger a fresh wave.

DISCRETE AURORAS ON MARS

The **UAE's Hope spacecraft**, which is **orbiting Mars since February this year**, has captured images of **glowing atmospheric lights in the Red Planet's night sky**, known as **discrete auroras**.

The **UAE Space Agency** said on its website that the data gathered by the orbiter **"include far and extreme ultraviolet auroral emissions** which have never been imaged before at Mars."

"The **beacons of light** that stand out against the **dark nightside disk** are highly structured discrete aurora, which traces out **where energetic particles excite the atmosphere** after being funneled down by a **patchy network of crustal magnetic fields** that originate from minerals on the surface of Mars." **Unlike auroras on Earth**, which are seen only near the north and south poles, discrete auroras on Mars are seen all around the planet at night time.

Auroras are caused when **charged particles ejected from the Sun's surface** — called the **solar wind** — **enter the Earth's atmosphere**. These particles are harmful, and **our planet is protected by the geomagnetic field**, which **preserves life by shielding us from the solar wind**.

However, at the **north and south poles**, some of these **solar wind particles are able to continuously stream down**, and interact with different gases in the atmosphere to cause a display of **light in the night sky**.

This display, **known as an aurora**, is seen from the **Earth's high latitude regions** (called the auroral oval), and is **active all year round**.

In the **northern part of our globe**, the **polar lights are called aurora borealis or Northern Lights**, and are seen from the US (Alaska), Canada, Iceland, Greenland, Norway, Sweden and Finland. **In the south**, they are called **aurora Australis or southern lights**, and are visible from high latitudes in Antarctica, Chile, Argentina,

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New Zealand and Australia.

Unlike Earth, which has a **strong magnetic field**, the **Martian magnetic field has largely died out**. This is because the **molten iron at the interior of the planet**– which **produces magnetism**– **has cooled**.

However, the **Martian crust**, which **hardened billions of years ago** when the **magnetic field still existed**, retains some magnetism. So, in contrast with Earth, which acts like **one single bar magnet**, **magnetism on Mars is unevenly distributed**, with **fields strewn across the planet** and differing in direction and strength.

These **disjointed fields channel the solar wind to different parts** of the **Martian atmosphere**, creating “**discrete**” **auroras over the entire surface** of the planet as charged particles interact with **atoms and molecules in the sky**– as they do on Earth.

Studying Martian auroras is important for scientists, for it can offer clues as to **why the Red Planet lost its magnetic field** and **thick atmosphere**– among the essential requirements for sustaining life.

The **Hope Probe**, the **Arab world's first mission to Mars**, took off from Earth in July last year, and has been **orbiting the Red Planet since February**.

The **primary objective of the mission** is to **study Martian weather dynamics**. By **correlating the lower atmosphere and upper atmosphere conditions**, the probe will look into **how weather changes the escape of hydrogen and oxygen into space**.

By **measuring how much hydrogen and oxygen is spilling into space**, scientists will be able to look into **why Mars lost so much of its early atmosphere** and **liquid water**.

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It is expected to create the **first complete portrait of the planet's atmosphere**. With the information gathered during the mission, scientists will have a **better understanding of the climate dynamics of different layers of Mars' atmosphere**.

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WHY INDIA AT 75 IS READY FOR SEDITION-LESS FUTURE?

Recently, the Chief Justice of India N V Ramana has ignited a passionate debate during a preliminary hearing concerning whether “**sedition**” should be an offence at all

Sedition Law in India

- The law was **originally drafted in 1837 by Thomas Macaulay**, the British historian-politician, but was inexplicably omitted when the IPC was enacted in 1860.
- **Section 124A was inserted in 1870 by an amendment introduced by Sir James Stephen** when it felt the need for a specific section to deal with the offence. It was one of the many draconian laws enacted to stifle any voices of dissent at that time.
- The term ‘sedition’ has been defined under **Section 124A of the Indian Penal Code**.
- It is defined as an offence committed when “**any person 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 in India**”.
- **Disaffection includes disloyalty and all feelings of enmity**. However, comments without exciting or attempting to excite hatred, contempt or disaffection, will not constitute an offence under this section.

Why India needs sedition-less future?

Sedition restricts enjoyment of fundamental rights: The meandering meanings of expressions such as “disaffection” towards the government, “hatred”, “contempt” etc. constitute an unreasonable restriction on the fundamental right to free expression guaranteed under Article 19(1)(a). (Page 1 of 5)

- **Cognizable and non-bailable offence under sedition law:** The law is exacerbated by harsh provisions that make seditious conduct both “cognizable” and “non-bailable” and punishable with a maximum sentence of life imprisonment.
- **Colonial-era law to suppress freedom fighters:** The CJI argued that the sedition offence was being used by “the British to suppress the freedom” of legendary figures like “Mahatma Gandhi and Bal Gangadhar Tilak”.
- The colonial administrators used sedition to lock up people who criticized the British policies.
- **Lack of interpretation of sedition law:** The disloyalty to a government established by law is not the same thing as commenting in strong terms upon the measures or acts of the government, or its agencies.
- **Judicial repeal of Section 124-A:** The focus on the fact that neither the framers of the Constitution nor the authors of the amended Article 19(2) included “sedition” as a ground for “reasonable restriction” to freedom of speech and expression.
- **Use of Sedition Law as means to achieve political end:** It is being misused as a tool to persecute political dissent and a wide and concentrated executive discretion is inbuilt into it which permits the blatant abuse.
- **Lack of support from Constituent Assembly to use sedition in Constitution:** The Constituent Assembly did not agree to include sedition in the Constitution and the members felt it would curtail freedom of speech and expression.
- It is unfortunate that the legislative intent of the Constituent Assembly not to have the provision of sedition in the Constitution got negated when the state retained it in the IPC.

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Implication of Sedition Law

- **India is being described as an elected autocracy:** People surely will act in the letter and spirit of Ambedkar's electrifying slogan, "Educate, Agitate and Organize", notwithstanding the aggressive application of sedition charges to silence them.
- **Sedition Law often used to stifle democracy:** Such laws were abolished long ago in Britain and ironically, India is continuing with such laws, which were put in the Indian Penal Code by the British authorities when they were ruling India.
- **Rapid increase in filing sedition cases:** According to the National Crime Records Bureau, 47 cases of sedition were booked in 2014. The number of cases dropped to 30 in 2015, rose steadily to 35 in 2016 and to 51 in 2017, and jumped to 70 in 2018.
- **Curb freedom of expression on social media:** India is ranked 142 among 180 countries in the World Press Freedom Index 2020.
- In its annual Freedom in the World report released on March 3, US-based NGO Freedom House downgraded India from the "free" to the "partially free" category.
- **Simultaneous use of Sedition and Anti-national:** In today's media discourse, the term "sedition" is often translated as desh-droh or opposition to the nation which has led to a conflation of the terms "seditious" and "anti-national" in the popular imagination.
- **Undermine Right to Dissent:** The chilling effect of these laws threatens to undermine, and gradually destroy, the legitimate and constitutionally protected right to protest, dissent or criticize the government.

The enforcement or the threat of invocation of sedition constitutes an insidious form of unauthorized self-censorship by producing a chilling effect on the exercise of one's fundamental right to free speech and expression.

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- **Judicial process is too slow:** India's slow moving judicial system ensures prolonged delays in disposing cases.
- The people charged with sedition have to surrender their passports, are not eligible for government jobs, must produce themselves in the court as and when required, and spend money on legal fees.

How India is ready for sedition-less future?

- **Right to question, criticize and change rulers:** It is very fundamental to the idea of democracy because criticism of the government is an important tool of a vibrant democracy.
 - It should not be considered as sedition.
- **Implementation of laws curbing unlawful acts:** The Unlawful Activities Prevention Act has provisions that penalize “disrupting the public order” or “overthrowing the government with violence and illegal means” is sufficient for protecting the national integrity.
 - The creation of any “public disorder” or “disturbance of public tranquility” is already upheld as a reasonable restriction in other draconian collective security laws in the State's arsenal.
- **Dissent and criticism make the democracy robust:** The legal experts say that the sedition law has no place in a democracy as the Indian Constitution guarantees freedom of speech and expression.
- **Intervention from Judiciary:** The top court must make it compulsory for the authorities to “produce a reasoned order” from the local chief of police certifying that the seditious act could either lead to incitement of violence or could lead to public disorder, before any police complaint or arrest can be made.

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Road ahead

- The attorney general of India has observed that the most immediate step is to **forbid rampant private complaints by citizens and authorize only very senior police officials** to take appropriate action.
- The apex court has directed the Government of India Press, on the pain of sanction, **not to publish the voided sections of the law**, or provisions which are read down.
- The **political executive and law enforcement officials must take most seriously the judicial directions** reading down the criminal statutes.
- The foundational maxim that the mere **possibility of abuse is no ground for the denial of power may only remain in place** if the SC adopts the path of denying constitutional validity to the offence of “sedition”.
- It is important to note that **India needs to progress in the field of human rights and be a shining example of an effective, vibrant democracy**, then the voice of the people can never be stifled.

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FALLING GOVERNMENT SCHOOL ENROLMENT IS ALARMING AND IT NEEDS TO BE ADDRESSED SOON

Recently, the Union Education Minister has released the Report on **Unified Information System for Education Plus (UDISE+) 2019-20** for School Education in India

Status of Government School Enrolment

- **One out of every eight students enrolled in a school or college tends to drop out midway** without completing the education and over 62% of all dropouts happen at the school level.
- **More than one-third of the dropouts happen at the secondary and upper primary levels** of education while 19.8 per cent students discontinued education at the secondary level.
- **About 20.4 per cent boys and 19.2 per cent girls stopped their education** at this level which is followed by the upper primary level for boys and diploma (below graduate) level for girls.
- **More than 40 per cent of girls drop out because of marriage or engagement in domestic** (household) work, while most boys leave education to involve in economic activities to support families.

Reasons for falling Government School Enrolment

- **India's meritocracy is sabotaged by flailing government schools:** The cynical confiscation of 25 per cent of private school capacity by the Right to Education Act is a tacit acceptance of state failure and parents' "revealed preference".
- **Poor academic record:** Apart from few government schools, all other government schools show low or moderate academic achievement in the board exams.

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- **School participation in competitions:** The competitive approach is almost missing in many government schools and the private schools are in a position to win the competition to popularize their schools.
 - The government schools are not in a compulsion to popularize their school whether the children win the competition or not because it does not affect their earnings.
- **Professional ethics is diminishing:** It has been observed that many teachers involved in business like money lending, giving vehicle on lease, taking tuitions, running groceries and few are running tour and travels too.
- **Engaging teachers for non-teaching work:** The Directorate of Education puts many teachers on clerical work and they are drawing salary for teaching children but actually they are doing clerical work.
- **Lack of incentives:** The measures to incentivize school going children like providing bicycles, free meals and improving infrastructure, have not really helped in making public education attractive.
- **Ill-equipped teachers:** The education officers admit that the qualification of teachers for primary and higher primary schools which is PUC+D.Ed is insufficient.
- **Parents do not value education:** They do not think that education would make any difference to the child's life as an adult.
- **Financial constraint or non-affordability of education:** One-fourth of the boys have had to leave education and about 17.7 per cent of girls drop out from different levels of education due to financial reasons.

Implications of falling Government School Enrolment

- **Increase in burden on private schools:** The burden on private schools is increasing exponentially and with the enrolment in government schools

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declining, the huge physical and social infrastructure in government schools will become redundant.

- **Little improvement in ability to read:** The students of private schools showed a little improvement in their ability to read, whereas the students of government schools showed no sign of improvement.
- **Prevalence of Illiteracy:** One in three children does not complete his or her schooling in India i.e. one third of India's population turns out to be not adequately educated and skilled to realize their true potential.
- **Indian children behind Asian children:** The proportion of India's children attending a government school has now declined to 45 per cent as compared to 85 per cent in America, 90 per cent in England, and 95 per cent in Japan.
- **Low primary-secondary school ratio:** For every 100 primary schools, there are only 8 secondary schools, which is a huge disadvantage in the system.
- **School dropouts are more irresponsible than non-dropouts:** They have higher rates of drug and alcohol abuse, and fall into criminal activities more often than those who complete their schooling.

Measures to be adopted to address falling Government School Enrolment

- **Padho aur Badho (PAB) Programme:** It should focus on improving learning outcomes and promoting holistic development in marginalized children to augment their competency for facing the world.
- **Project Based Learning (PBL) pedagogy and curriculum:** It should disseminate through well-trained and compassionate educators belonging to the slum itself.
 - The educational experts should design and develop PBL pedagogy and curriculum in order to understand the style correlating with day-to-day lives.

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- **Increase in financial aid to government schools:** The central and state governments should develop and devise schemes for government schools to increase the financial assistance.
- **Classroom management:** It needs assessment by classroom observation of learning (teaching often happens without learning), physical set-up, instructional differentiation (for process, product, and learning styles), and communication (clarity, questioning, responsiveness).
- **Fragmentation of education needs revisiting:** India's constitution wrote Education Policy into Lists I (Centre), II (State), and III (concurrent jurisdiction).
 - It needs revisiting because it tends to concentrate decisions that should be made locally in Delhi or state capitals.
 - The recruitment at the block level will minimize teacher absenteeism and reduce the stakes and payments on the "transfer industry" and school consolidation will reduce teacher shortages.

Road ahead

- The governance must **shift from control of resources to learning outcomes** i.e. learning design, responsiveness, teacher management, community relationships, integrity, fair decision making, and financial sustainability.
- The governance must **enable performance management to be substantive and replace the current system** best captured by the Tamil aphorism i.e. I will pretend as if I am beating you, you pretend as if you are crying.
- The NEP 2020 proposes to **improve the infrastructure so that each student (pre-primary to Class 12) receives safe and engaging school education** in order to ensure universal access to education and that no student drops out of school.

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- For a new India, to mark its superior presence in the global arena, **education is the key** which can open the door for our 'young nation' to forge ahead as an economic super power and global leader.
- It is the **fundamental duty of the state to deal with falling enrolment** because a quality, free and regular school education represents our most potent infrastructure of opportunity.

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WHAT IS ONDC PROJECT AND HOW WILL IT CURB DIGITAL MONOPOLIES?

The **Department for Promotion of Industry and Internal Trade (DPIIT)** on 5 July 2021 issued orders **appointing an advisory committee** for its **Open Network for Digital Commerce (ONDC) project** that is aimed at curbing “**digital monopolies**”. This is a step in the direction of **making e-commerce processes open source**, thus creating a platform that can be utilized by all online retailers.

The purpose of project

ONDC seeks to promote open networks, which are developed using the open-source methodology. They will encourage the usage of standardized open specifications and open network protocols, which are not dependent on any particular platform or customized one.

ONDC is expected to digitize the entire value chain, standardize operations, promote inclusion of suppliers, derive efficiencies in logistics and enhance value for stakeholders and consumers. They will provide a level-playing field.

An open-source project means that anybody is free to use, study, modify and distribute the project for any purpose. These permissions are enforced through an open-source license easing adoption and facilitating collaboration.

Committee members

A nine-member advisory council has been constituted to advise the government on measures needed to design and accelerate the adoption of ONDC.

Nandan Nilekani, non-executive chairman, Infosys and RS Sharma, CEO of National Health Authority and the former chairman of the Telecom Regulatory Authority of India (TRAI) are on the council.

The other members are: Adil Zainulbhai, chairman, Quality Control of India; Anjali Bansal, founder, Avaana Capital; Arvind Gupta, co-founder, Digital India (Page 1 of 3)

Foundation; Dilip Asbe, CEO, National Payments Corporation India; Suresh Sethi, managing director and CEO, NSDL e-Governance; Praveen Khandelwal, secretary general, CAIT; Kumar Rajagopalan, CEO, Retailers Association of India (RAI).

Digital monopolies

Digital monopolies refer to a scenario wherein e-commerce giants or Big Tech companies tend to dominate and flout competition law pertaining to monopoly.

The giants have built their own proprietary platforms for operations.

In March, India moved to shake up digital monopolies in the country's \$ 1+ trillion retail market by making public a draft of a code of conduct — Draft Ecommerce Policy, reported Bloomberg.

The government sought to help local start-ups and reduce the dominance of giants such as Amazon and Walmart-Flipkart. The rules sought to define the cross-border flow of user data after taking into account complaints by small retailers.

The government wants to ensure that local players are able to access the data first. Safeguards under consideration include regulation and audits of the cross-border flow of data of Indian consumers and users.

The proposals also seek to prevent the e-commerce giants from giving deep discounts and have exclusive tie-ups with preferred sellers.

Processes

Sellers will be onboarded through open networks. Other open-source processes will include those such as vendor and price discovery; and product cataloguing.

The format will be similar to the one which is used in the Unified Payments Interface (UPI).

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Mega e-commerce companies have proprietary processes and technology for these operations. Marketplaces such as Amazon, Flipkart, Zomato, Big Basket and Grofers will need to register on the ONDC platform to be created by DPIIT and QCI.

The task of implementing DPIIT's ONDC project has been assigned to the Quality Council of India (QCI).

QCI was set up in 1997 by the government of India jointly with Indian industry (represented by CII, FICCI and ASSOCHAM) as an autonomous body under the administrative control of the department.

QCI establishes and operates the National Accreditation Structure for conformity assessment bodies; providing accreditation in the field of education, health and quality promotion.

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EUROPE IS PROPOSING A BORDER CARBON TAX. WHAT IS IT AND HOW WILL IT WORK?

The **European Union's sweeping new plan to tackle climate change** includes a proposal that if adopted would be the **first of its kind: A carbon tariff on imports from countries** that aren't taking similarly aggressive steps to slash their own planet-warming greenhouse gas emissions.

Carbon border taxes, which have been debated for years, are **intended to solve a basic problem**. If a single country **tries to impose policies** to cut emissions domestically, it runs the risk that, for instance, **its steel and cement factories** will face higher costs and be at a disadvantage to foreign competitors with looser environmental rules. If **steel and cement production shifts overseas** as a result, that would undercut the climate policy, since those foreign factories would be emitting just as much or more carbon dioxide elsewhere.

In theory, a **carbon border tax could help prevent that undercutting**. If factories all over the world that wanted to sell steel, cement, aluminum or fertilizer to the EU had to **pay a surcharge for the pollution they emit**, they would have incentive to clean up their act too. Companies within Europe would have less incentive to shift operations overseas. And, if other countries adopted similar rules, that could put pressure on nations that are **reluctant to curb their use of fossil fuels**.

But skeptics say a **carbon border tax** could prove challenging to implement while angering Europe's major trading partners, including **Russia and China**. The EU's proposal is an early test case of whether this idea can succeed.

The idea could also spread. In the United States, Democrats proposed their own version of a **tax on imports from countries** that lack substantial climate policies as part of a \$3.5 trillion budget plan. While that proposal is far less detailed than the EU's plan, it's a sign that climate policy is increasingly becoming interwoven in trade policy.

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“It’s still an open question of **whether border adjustments are the best way to spur global cooperation on climate change**, or **whether other approaches might work better**,” said Brian Flannery, a visiting fellow at Resources for the Future, a think tank in Washington. “But now that Europe has a concrete proposal on the table, we can start having a serious discussion about how this might work in practice.”

The details of the European Commission’s proposed “**carbon border adjustment mechanism**” is detailed in a 291-page document.

Right now, **most industries in the EU are covered by a program** that charges polluters for the carbon dioxide they emit. Known as the **Emissions Trading System**, the program sets a cap on overall emissions and steadily tightens that cap over time. Large polluters must procure permits for **every ton of carbon dioxide they emit**, and the number of permits dwindles over time, driving up the price. Currently, **the price of those permits is nearly \$60 per ton**, giving European companies a strong incentive to cut emissions.

The **EU is now proposing to tighten** that cap further, while phasing out the number of free allowances it has long given to industries exposed to trade competition, like steel. The aim is to help slash the **EU’s overall greenhouse gas emissions 55% below 1990 levels by 2030**.

To meet that target, many of Europe’s industries may have **to make drastic and costly changes**. Steel producers like ArcelorMittal are experimenting with ways to use hydrogen instead of fossil fuels in their furnaces, though they warn that such upgrades could cost tens of billions of dollars.

That’s **where the proposed carbon border tax would come in**. Companies abroad that wanted to sell cement, iron, steel, aluminum, fertilizer or electricity to the EU would also be required to pay that price for each ton of carbon dioxide they emit in making their products. The **idea would be to level the carbon playing field**.

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The **border tax would not take effect until 2026**. European officials are proposing a phase-in period where they would try to figure out how the border tax would work in practice, giving time for other countries to prepare.

The countries that would potentially be most affected include **Russia, Turkey, China, Britain and Ukraine**, which collectively export large amounts of fertilizer, iron, steel and aluminum to the European Union. The United States sells significantly less steel and aluminum to Europe, but could also see an impact.

For one, companies hoping to **sell certain goods to the European Union** would need to monitor and verify the emissions associated with making their products. If countries can't or won't do that, the **EU would impose its own price**. Experts say that such verification is possible, but can be tricky.

What's more, countries such as the **United States, China and Russia** have all objected to the **border carbon tax**, raising the prospect of retaliatory tariffs and trade wars. Countries may also try to mount challenges to the border adjustment at the World Trade Organization, although European officials say they are working to ensure the rules will withstand legal objections. (Among other things, they are calling it an "adjustment" and not a "tax" for legal reasons.)

The **European Union has backed down on similar proposals before**. A decade ago, European officials wanted to charge foreign airlines taking off and landing in Europe for the **carbon pollution they produce**. But the EU scrapped the idea after heavy pressure from the United States and China.

European officials have left open the prospect that **they could negotiate individual trade agreements** with different countries that obviate the need for **carbon tariffs**, particularly with nations that are moving to adopt climate policies. But the details would need to be worked out.

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The **EU proposal still needs to be negotiated** among the 27 member countries and the European Parliament before becoming law. While many EU companies, such as steel producers, support the idea of a border adjustment, they are less keen on losing their free allowances under the **current carbon-pricing program**, since that would force them to make more drastic changes to their businesses. That dispute could complicate domestic negotiations.

There is still a great deal of debate among experts over how effective the **EU's carbon border adjustment** will ultimately be, said Johanna Lehne, a Brussels-based senior policy adviser at E3G, a research and advocacy group that works on climate policy. But, she said, officials saw the policy as vital for addressing fears that the **EU's climate policies** could place the continent at an economic disadvantage.

“It sends a real signal that the EU is serious about **trying to decarbonize these industrial sectors**,” she said. “And they’re trying to find an answer to a lot of those **domestic political concerns**.”

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