

WEEKLY UPDATES – (28th Aug-3rd Sept)

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ENVIRONMENT

Reroute Rail Track Through Gibbon Sanctuary

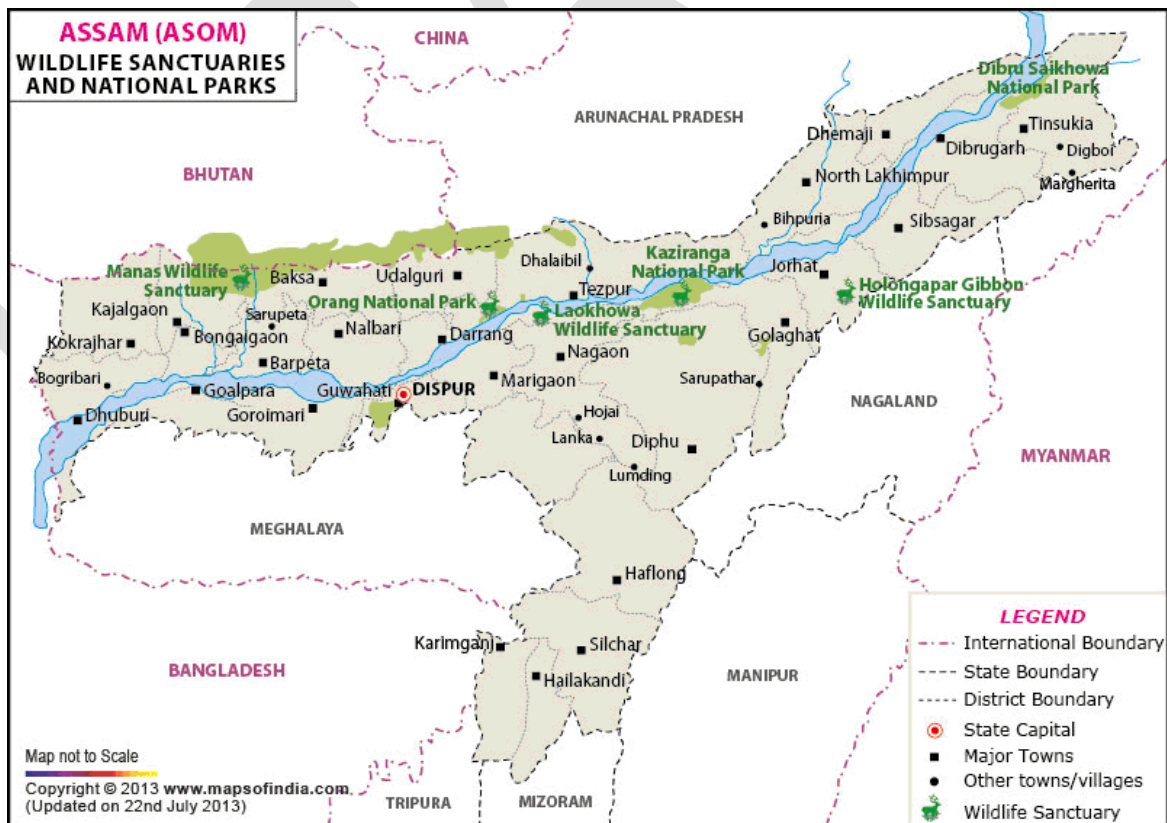
Context: Primatologists have suggested rerouting a 1.65-km long railway track that has divided an eastern Assam sanctuary dedicated to the western hoolock gibbon (*Hoolock hoolock*) into two unequal parts.

- ✓ Their report in *Science*, a journal, follows that of the Wildlife Institute of India (WII) on designing an artificial canopy bridge to facilitate the movement of the hoolock gibbons across the broad-gauge line within the Hollongapar Gibbon Sanctuary. The track is yet to be electrified.



About Hollongapar Gibbon Sanctuary

- ✓ Housing about 125 hoolock gibbons, India's only ape, the sanctuary in the Jorhat district of Assam, India and covers an area of 21 sq. km.
- ✓ It was established in 1997 as a protected area primarily to conserve the western hoolock gibbon, an endangered primate species.
- ✓ Set aside initially in 1881, its forests used to extend to the foothills of the Patkai mountain range.
- ✓ It contains India's only gibbons – the hoolock gibbons, and Northeastern India's only nocturnal primate – the Bengal slow loris.



What is the Issue?

- ✓ The sanctuary has become a ‘forest island’, having lost connectivity with surrounding forest patches as per Wildlife Institute of India report.
- ✓ Since gibbons are exclusively arboreal animals inhabiting the forest’s upper canopy, they are particularly sensitive to canopy gaps,” the WII’s technical report on May 2023, advising an artificial canopy across the railway track in the Hollongapar protected area, said.
- ✓ Gibbon families on both sides of the railway track have thus been effectively isolated from each other, thereby compromising their population’s genetic variability and further endangering their already threatened survival in the sanctuary.

Cyclone Frequency May Rise Over Indian Coast from the Warming Of Pacific

Context: A combination of global warming and Pacific Decadal Oscillation can lead to more cyclones.

- Tropical cyclones that originate near the Equator, while being devastating, have been unusually subdued in recent decades.
- The last major cyclone of this kind in India was Cyclone Okchi, which devastated parts of Kerala, Tamil Nadu and Sri Lanka in 2017.
- However, a **combination of global warming and a cyclical event called the Pacific Decadal Oscillation (PDO)** that repeats every 20 to 30 years, could make such cyclones more frequent in the coming years, a study published in the journal Nature Communications said.

Key Highlights

- The number of such equatorial-origin cyclones was 43% less in the period from 1981 to 2010 compared with 1951 to 1980, and this was because the PDO was in a ‘warmer’ or positive phase.
- A warming of the Central Equatorial Pacific, called an El Nino, often corresponds to reduced rainfall over India whereas cooler-than-normal temperatures, or a La Nina, is linked to excessive rainfall.
 - This pattern, collectively called the El Nino Southern Oscillation (ENSO) phenomenon, repeats in the Pacific over two to seven years.
- However, the PDO is not an annual occurrence and, on an average, corresponds to a warmer than average Western Pacific Ocean and relatively cooler Eastern Pacific, though this plays out over much longer time scales.
 - However, unlike an ENSO, a ‘positive’ or ‘warmer phase’ of a PDO can be known only after several years of measuring ocean temperatures and their interaction with the atmosphere.
- In 2019, the PDO entered a cooler, negative phase and if it remains so, could mean more tropical cyclones in the post-monsoon months that originate near the equator.
- It’s usually rare for cyclones to form near the Equator but when the waters are warm, they can gain more moisture and rise in intensity.
- An El Nino is developing in the Pacific, the effects of which are manifested in central and southern India, which have recorded rainfall deficits of 7% and 17%, respectively.

ENSO and PDO

- ✓ ENSO with a positive PDO is generally not good, however, ENSO with a negative PDO brings more rain to India.
- ✓ If both ENSO and the PDO are in the same phase, it is believed that El Niño/La Nina impacts may be magnified.

ECONOMY

Loanable Funds Theory: How Interest Rates Are Determined In The Loan Market?

Context: The theory, which is attributed to Swedish economist Knut Wicksell, is seen as applying not just to the interest rates charged on loans. It is also said to apply to other credit transactions such as those in the bond market where businesses and governments issue bonds to borrow money from savers.

Loanable Funds Theory: Concept

It is also known as the neo-classical theory of interest.

- ✓ This theory argues that the interest rates on loans are determined by the supply of and demand for loans in the market for loanable funds.
- ✓ In other words, the market interest rate is seen as the price of loans and it is thought to be determined just the way the price of any other good or service is determined in the market.
- ✓ So, a rise in the supply of loanable funds from savers such as households is believed to cause the market interest rate to drop while a drop in the supply of loanable funds is seen as causing a rise in market interest rates.
- ✓ On the other hand, a rise in the demand for funds from borrowers such as businesses and governments is supposed to cause a rise in interest rates while a drop in their demand for funds is expected to cause a fall in interest rates.
- ✓ In short, the supply of funds from lenders and the demand for funds from borrowers are seen as influencing the market interest rate.

Interest as Compensation

- Loanable funds theorists argue that the interest paid on loans offers an incentive for savers to lend their money since they need to wait a certain period of time before they can get their original investment back.
 - In other words, interest is seen as fair compensation paid to savers for waiting.
- On the other hand, the rate that borrowers are willing to pay on loans is said to be determined by the return that these borrowers expect to earn by investing the borrowed funds, or the marginal productivity of capital.
- Finally, the market interest rate is seen as the equilibrium price that equals the supply of savings with the demand for loans in the market and which is mutually beneficial to savers and borrowers.

Monsoon Woes May Lift Food Prices

Context: Wide spatial and temporal variations in rainfall coupled with lower reservoir storage levels may hit rural incomes and crop output this year thus denting demand and increasing inflationary pressures, economists at CARE Ratings and BoB caution.

Rainfall risks

Economists have flagged the risks posed to inflation and growth by the erratic variations in this year's southwest monsoon



■ In August so far, rainfall is 32% below the month's long period average (LPA), dragging the overall monsoon tally to 8% below the LPA

■ Lower reservoir levels (currently below the 10-year average) may also hurt the rabi crop

■ A rise in food inflation could further destabilise the feeble rural demand recovery

Key Highlights

- In August so far, rainfall is 32% below the long period average (LPA) for the month, dragging the southwest monsoon's overall tally to 8% below its long-term average.
- Kharif sowing for crops like pulses (-8.3%), jowar (-7.7%) and oilseeds (-0.9%) remains lower than last year, and lower reservoir levels (currently below the 10-year average) may also impact the overall Rabi crop which has greater dependency on irrigation.
- Below normal rains have hit central, southern peninsula and eastern region. The impact of this scanty rainfall is likely to be reflected through higher prices in the coming months.
- As kharif sowing activity is expected to be over by the end of August, the sowing of these crops is unlikely to improve drastically," CARE Ratings economists wrote.
- A drop in yield due to irregular monsoon and a lower acreage can lead to a demand-supply mismatch, further increasing inflationary pressures in the food basket, adding that pulses and cereals were already seeing double-digit inflation.

Stagnant wages

- A rise in food inflation could further destabilise the feeble rural demand recovery, they reckoned, stressing that the weaker monsoon could hit crop yields and farm incomes while virtually stagnant wages, which account for 49% of rural household incomes, also pose a risk.
- Rural demand remains most vulnerable and can be hit by a dual blow of higher food inflation and lower income.

INTERNATIONAL RELATIONS

India, Kenya Sign MoU For Shipbuilding Collaboration

Context: Goa Shipyard Ltd. and Kenya Shipyard Ltd. signed a memorandum of understanding (MoU) for capacity building and collaboration in ship design and construction.

Key Highlights

- The MoU was signed as Defence Minister Rajnath Singh and Kenyan Cabinet Secretary for Defence Aden Bare Duale discussed defence industry cooperation during talks.
- Both the Ministers agreed that the defence relationship between the two countries has evolved from being training-centric to include more strategic aspects.
- The two Ministers also concurred on the need for deeper cooperation in maritime security of the Indian Ocean region.
- As a token of friendship, Mr. Singh presented 15 pairs of parachutes (main and reserve) manufactured by Gliders India Ltd. to the Kenyan Cabinet Secretary for Defence for use by the Kenyan forces.
- India also extended support towards setting up of an advanced CT scan facility in Kenya.



Note: Kenya is bordered by the Indian Ocean to the southeast.

Its neighbouring countries are

- ✓ Ethiopia
- ✓ Somalia
- ✓ South Sudan
- ✓ Tanzania
- ✓ Uganda



GOVERNANCE

Government Imposes Restrictions On Export Of Basmati Rice

Context: The Union government halted the export of Basmati rice valued at less than \$1,200 a tonne to restrict possible “illegal” shipment of plain white rice by wrongly classifying it as Basmati rice.

- The export of non-Basmati white rice was prohibited on July 20, citing the rise in domestic prices.

Key Highlights

- The Union Commerce Ministry said it had directed the Agricultural & Processed Food Products Export Development Authority (APEDA), the agency responsible for regulation of export of Basmati rice, that contracts for Basmati exports with a value of \$1,200 and above should be registered for issue of registration-cum-allocation certificate (RCAC).
- It also asked the APEDA that contracts with a value below \$1,200 a tonne may be kept in abeyance and evaluated by a committee to be set up by the APEDA Chairman for understanding the variation in prices and use of this route for export of non-Basmati white rice.
- It has been noted that there has been large variation in the contract price of Basmati being exported with lowest contract price being \$359 per MT in backdrop of average export price of \$1214 per MT during August,” the Ministry said.
- The Ministry directed the committee to submit its report within one month, and said a decision on lower price exports of Basmati can be taken based on the report.
- The Ministry also directed the APEDA to hold consultations with traders to sensitise them to the matter and work with them to discourage any use of the window for export of non-Basmati white rice.

Understanding Curbs On Rice Exports

Context: In a move to check domestic rice prices and ensure domestic food security, the Indian government has prohibited the export of **white rice**, levied a 20% export duty on **par-boiled rice** till October 15, and permitted the export of **Basmati rice** for contracts with value of \$1,200 a tonne or above.

- The export of broken rice has been prohibited since last September. However, it is allowed on the basis of permission granted by the government to other countries to meet their food security needs and based on the request of their government.

What Is The Rice Production Estimate?

According to the third Advanced Estimate of the Department of Agriculture and Farmers Welfare, during the Rabi season 2022-2023, rice production was 13.8% less, at 158.95 lakh tonnes against 184.71 lakh tonnes during Rabi 2021-2022.

- ✓ Kharif sowing data show that rice is sown on 384.05 lakh hectares this year as on August 25 compared with 367.83 lakh hectares during the same period last year.
- ✓ In States such as Tamil Nadu where the Samba crop sowing starts usually in August in the Cauvery delta area, a section of farmers says there will be delayed sowing due to a shortfall in the south west monsoon.
- ✓ Trade and rice millers say that new season crop arrivals will start after the first week of September and that El Nino effects are likely to impact arrivals to some extent.

About Rice Exports

India is the largest rice exporter globally with a 45% share in the world rice market.

- ✓ Overall rice exports in April-May of 2023 were 21.1% higher compared with the same period last financial year.
- ✓ In May alone, export of Basmati rice was 10.86% higher than its exports in May 2022.
- ✓ Non-Basmati rice shipments were 7.5% more, despite the government introducing a 20% export duty on white rice and prohibiting the export of broken rice last September.
- ✓ The shipment of non-Basmati rice has been on the rise for the last three years and the export of Basmati rice in 2022-2023 was higher than the previous year, according to data available on the website of The All-India Rice Exporters' Association.
- ✓ The data shared by the government says that till August 17 this year, total rice exports (except broken rice) were 15% more at 7.3 million tonnes as against the 6.3 million tonnes during the corresponding period last year.

Trade sources add that Thailand expects nearly 25% lower production in 2023-2024; Myanmar has stopped raw rice exports; and the crop is said to be hit in Iraq and Iran as well.

THE GIST

- The Indian government has prohibited the export of white rice, levied a 20% export duty on par-boiled rice till October 15, and permitted the export of Basmati rice for contracts with value of \$1,200 a tonne or above.
- India is the largest rice exporter globally with a 45% share in the world rice market. Overall rice exports in April-May of 2023 were 21.1% higher compared with the same period last financial year.
- For domestic consumers, though there is a slight increase in rice prices, in the long run, availability is secured and prices are not expected to spiral.

What Can Indian Farmers Expect?

The government has increased the Minimum Support Price (MSP) for rice, and the paddy procured now by rice millers are at a price higher than the MSP. The prices will not decline for farmers.

The restrictions on exports will ensure that there is no steep climb in rice prices in the market. When the bench mark price set by the government is high, the farmers will realise better prices, say trade sources.

For domestic consumers, though there is a slight increase in rice prices at present, in the long run, availability is secured and prices are not expected to spiral.

A clear situation on the arrivals and government policy will be known by mid-September.

HEALTH

Using AI On X-Rays Can Detect More TB Cases

Context: In AI-assisted chest X-rays, India has a powerful technology to screen for presumptive TB.

- The AI algorithm qXR, developed by Mumbai-based Qure.ai, can help detect people with presumptive TB early and in less than a minute.
- The 2019-2021 National TB prevalence survey in India report said nearly 43% of TB cases would have been missed without a chest X-ray.
- When used at scale for population-based screening or for targeted screening, qXR plus molecular tests for TB confirmation can increase detection rates.

Key Highlights

India's ambitious goal of "eliminating" TB by 2025 will remain possible only if early diagnosis and initiation of care for millions of people with TB becomes a reality. Large-scale use of AI-assisted chest X-rays for screening is the first step to achieve this goal.

- In Vietnam, a community-wide screening of people older than 15 years using a molecular test in 2014-2017 resulted in lower prevalence of pulmonary TB in 2018 than standard passive case-detection alone.
- Unlike in Vietnam, the use of qXR to read digital X-rays before molecular testing as part of community screening will reduce TB prevalence and minimise the number of molecular tests required to detect TB.
- The qXR algorithm is already being used in over 50 countries.

Approved or Not?

Systematic screening for TB for early diagnosis is an important 'End TB' strategy.

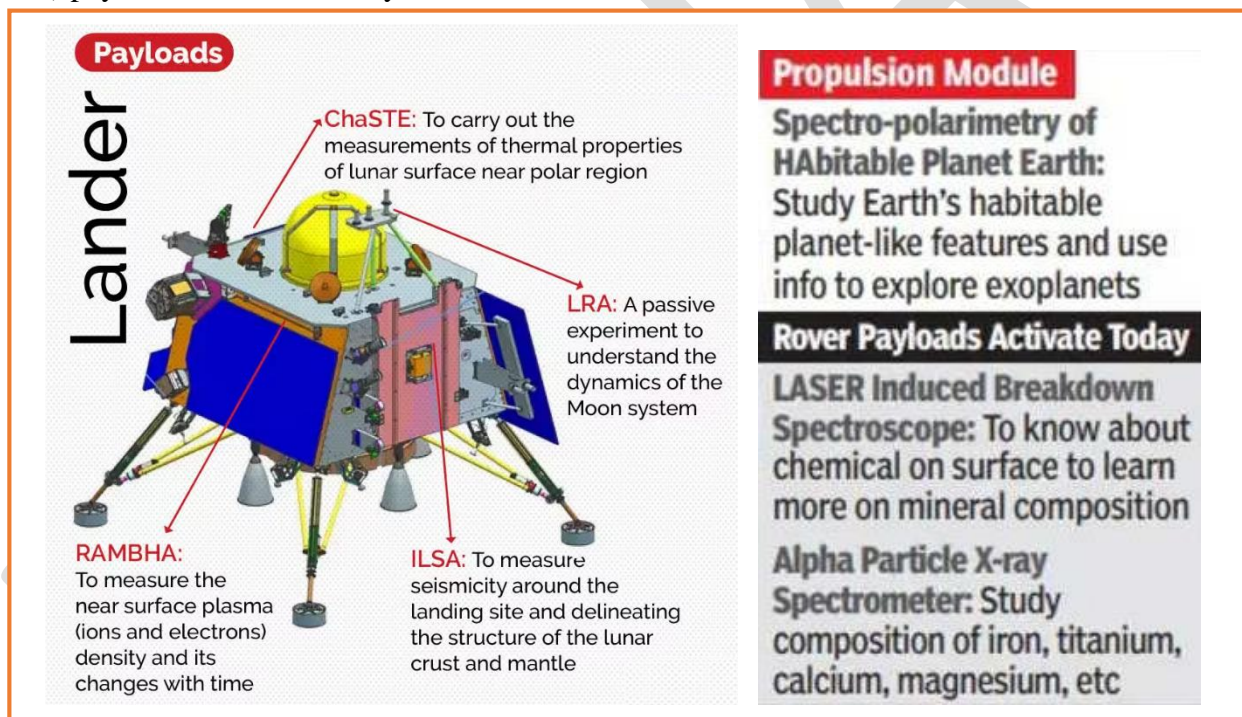
- The Indian drug regulator cleared qXR a few months ago.
- qXR also meets the WHO requirement with >90% sensitivity and >70% specificity in people older than 15 years.
- States are currently waiting on a Central TB Division directive to adopt qXR, which could encourage widespread adoption. The absence of policy guidance has kept adoption thus far.
- The Central TB Division is waiting for an approval from the Health Technology Assessment.

- In India, 24 States are using qXR at about 150 sites. But nowhere in India is the software used at scale. And in some States, the qXR software is used in just one site, like in Kerala.
- Around six outreach mobile vans in Chennai use qXR; nine government hospitals and one mobile van in Mumbai are equipped with the software for surveillance.
- The use of qXR to screen the X-rays increased the positivity of molecular tests by 18-27%.
- This portable device cuts the amount of X-ray exposure to 1/20th to 1/30th of a normal X-ray even while capturing all the details.

SCIENCE

ISRO Releases Graph Of Temperature Variation Of Topsoil In Lunar South Pole

Context: The Indian Space Research Organisation (ISRO) released a graph of the temperature variation on the lunar surface with an increase in depth measured by the Chandra's Surface Thermophysical Experiment (ChaSTE) payload aboard Chandrayaan-3's Vikram lander module.



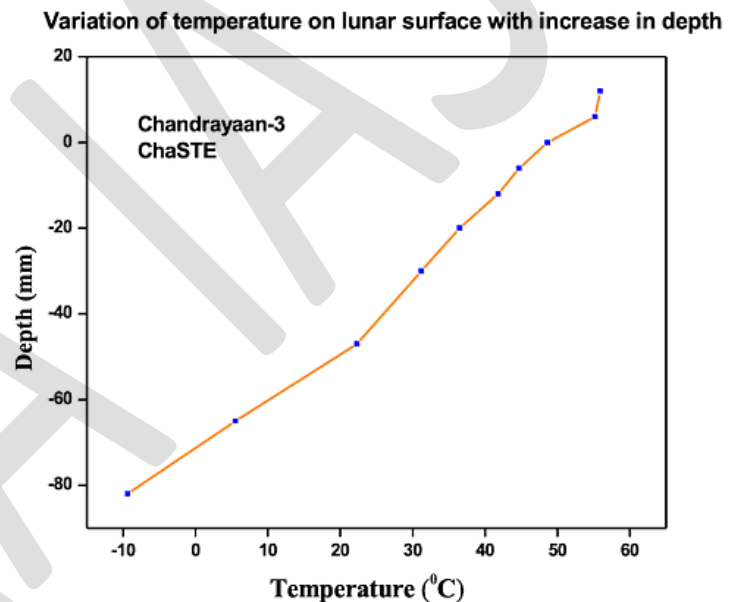
ChaSTE Payload Objective

- ✓ The primary objective of ChaSTE is to perform in-situ measurements of thermal conductivity and temperature profile on the lunar surface to derive the vertical temperature gradient up to a depth of 100 mm at the site of landing.
- ✓ It provides thermophysical properties of a high latitude region on the Moon for the first time.

Key Highlights

According to the space agency, ChaSTE measured the temperature profile of the lunar topsoil around the South Pole, to understand the thermal behaviour of the moon's surface.

- The payload has a temperature probe equipped with a controlled penetration mechanism capable of reaching a depth of 10 cm beneath the surface.
- The probe is fitted with 10 individual temperature sensors.
- The presented graph illustrates the temperature variations of the lunar surface/near-surface at various depths, as recorded during the probe's penetration.
- This is the first such profile for the lunar South Pole. Detailed observations are underway," it said.
- For the first time in lunar history, the top soil of the South Pole has been profiled to understand the thermal behaviour of the moon's surface.
- ISRO released a graph of the temperature variation on lunar surface with increase in depth.
 - It was found that at a depth of 8 cm, the temperature was as low as (-) 10 degrees centigrade.
 - With gradual rise towards the surface, the temperature too was seen to be rising.
 - Above the surface, the graph showed a relative stagnancy in temperature between 50-60 degrees centigrade.
 - Putting it in perspective, a scientist explained that when we go two to three centimetres inside the Earth, we hardly see two to three degree centigrade variation. We believed that on the moon the temperature would be somewhere between 20° Celsius and 30° Celsius on the surface, but the variation is between 70°C and -10°C. This is surprisingly higher than what we had expected.



Earlier missions have revealed that the surface of the moon is blanketed by a thin layer of weakly cohesive detrital materials which are generally referred to as "soil" or "regolith."

- Chandrayaan-3 is the first to study the thermo physical properties of the first 10 cm of the lunar surface; according to scientists, a few meters of lunar soil may offer a detailed record of 60 per cent of lunar history.

Pragyan Confirms Sulphur Near South Pole Of Moon; Search On For Hydrogen

Context: Pragyan, the rover of the Chandrayaan-3 mission, has confirmed the presence of sulphur on the moon's surface, near its south pole, and is still searching for hydrogen, the Indian Space Research Organisation (ISRO) said.

Key Highlights

- The Laser-Induced Breakdown Spectroscopy (LIBS) instrument aboard the rover has made the first-ever in-situ measurements on the elemental composition of the lunar surface near the south pole.
- The LIBS is a scientific technique that analyses the composition of materials by exposing them to intense laser pulses.
 - A high-energy laser pulse is focused onto the surface of a material, such as a rock or soil, and generates localised plasma.
- The collected plasma light is spectrally resolved and detected by charge coupled devices. Since each element emits a characteristic set of wavelengths of light when in a plasma state, the elemental composition of the material can be determined.
- Preliminary analyses have unveiled the presence of Aluminum (Al), Sulphur (S), Calcium (Ca), Iron (Fe), Chromium (Cr), and Titanium (Ti) on the lunar surface.
- Further measurements have revealed the presence of manganese (Mn), silicon (Si), and oxygen (O). Thorough investigation regarding the presence of Hydrogen is under way,” the ISRO said.

The Union Cabinet adopted a resolution hailing the Chandrayaan-3 mission, saying it is a victory not just for the ISRO but also a symbol of India’s progress and ascent on the global stage. **The Cabinet welcomed that August 23 would be celebrated as National Space Day.**

Chandrayaan Probe Finds Sparse Plasma On Moon

Context: A payload on board Chandrayaan-3’s lander, Vikram, has completed the first in situ measurements of the surface-bound lunar plasma environment over the south polar region.

- The Radio Anatomy of Moon Bound Hypersensitive Ionosphere and Atmosphere-Langmuir Probe (RAMBHA-LP), named after American chemist Irving Langmuir, who was awarded the Nobel Prize in Chemistry, is a device used for characterising plasma.

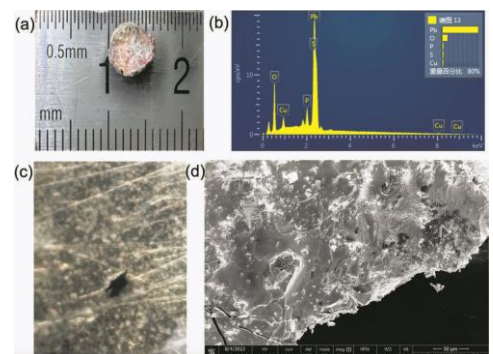
Key Highlights

- The initial assessment indicates that the plasma encompassing the lunar surface is relatively sparse, characterised by a number density ranging from approximately 5 to 30 million electrons per cubic metre.
- This evaluation specifically pertains to the early stages of the lunar daytime.
- The probe operates without interruption, aiming to explore the changes occurring in the near-surface plasma environment throughout the lunar day.

How scientists found that LK-99 is probably not a superconductor

Context: LK-99 has been claimed by South Korean scientists as a superconductor at room temperature and atmospheric pressure. However, currently scientists have discarded their claims.

A substantial amount of electricity generated is lost while being transmitted between power plants and our factories and households as heat. Tiny wires inside computers and cellphones dissipate heat, draining the batteries in the process. So it is natural that scientists are



looking for materials that can conduct electricity without resistance, especially for applications where heat loss is a deal-breaker.

Key Highlights

- In July 2023, a group of scientists in South Korea uploaded two preprint papers claiming that a lead apatite material was an ambient condition superconductor.
- Apatites are materials that have a regular arrangement of tetrahedrally shaped phosphate ions (i.e. one phosphorus atom and four oxygen atoms).
- When lead ions sit in between these phosphate motifs, it is lead apatite.
- While apatites have been well-studied, no one had anticipated that they could be superconductors – let alone one in ambient conditions.

Superconductors

- ✓ Many metals become superconducting – i.e. allow current to flow with zero resistance – if cooled to below -250°C .
- ✓ Superconductors aren't just materials with zero resistance: they have a remarkable new quantum state in which the electrons in the material work together.
- ✓ Several fantastic properties of superconductors then came to light, opening the door to new technologies – including advanced medical imaging, 'maglev' trains, and quantum computers.
- ✓ Superconductivity also remained an extremely-low temperature-phenomenon for a long time. It was only in the mid-1980s that scientists discovered copper-oxide superconductors, whose transition temperature was higher than -200°C .
- ✓ One of the highest transition temperatures has been found in a sulphide compound, but it needs to be placed under extreme pressures – like that found at the centre of the earth.

The novelty of the South Korean group's work was to replace 10% of the lead ions in lead apatite with copper, to produce the supposed wonder material that they had christened LK-99 (after their own last names).

Independent verification

In their papers, the group described subjecting their LK-99 samples to a variety of tests.

- They measured the material's electric resistance, which seemed to drop below a certain temperature.
- They showed that the low resistance state vanished when a sufficiently strong magnetic field was applied.
- They also showed that the resistive state was restored if a sufficiently large amount of current was passed through the sample.
- They even included an image of the sample partially levitating over a magnet in their second paper – a famous test for superconductivity.
- But while all of these data suggested superconductivity, the group also missed several crucial tests, including some to confirm the quantum nature of the microscopic state of the system.

Despite their scepticism, **research groups from around the world worked fervently to reproduce the South Korean team's results.**

- ✓ In their second paper, the team had provided instructions to synthesise LK-99. Researchers in Australia, China, India, the U.S., and several European countries followed them and tried to replicate the South Korean team's findings – but no one found conclusive evidence of superconductivity in their samples.

- ✓ In fact, the Indian group, from the CSIR-National Physical Laboratory, New Delhi, was one of the first to report that it didn't find any signs of superconductivity in LK-99.
- ✓ Some groups did find a drop in resistance, and others found that their samples showed partial levitation in a magnetic field.
- ✓ Some of the most recent work also tried to produce LK-99 using alternative methods. At least one group was able to make a highly pure crystal – where all the ions are regularly arranged in space.
 - It had a brownish-purple hue and was transparent, which was unusual for a superconductor.
 - More remarkably, this single crystal behaved like an insulator, showing no signs of superconductivity from low temperatures up to 800° C.
 - Researchers also found that it was ferromagnetic – i.e. it could be magnetised by, say, rubbing a magnet on it. Superconductors cannot have this property.

Science In Action: How can we reconcile these findings with those of the South Korean team?

The key seems to be the way the material was prepared.

- ✓ The South Koreans had made lead sulphate react with copper phosphide to produce polycrystalline LK-99 (i.e. small crystallites randomly arranged in space, unlike in a single crystal, where the atoms are arranged regularly over very large distances) and some by-products.
- ✓ One of the important by-products was copper sulphide, which could have become embedded in the LK-99 matrix.
- ✓ Independent researchers confirmed this by using X-rays to 'look' inside the crystal.

Scientists who were already studying copper sulphide, for other purposes, pointed out that its arrangement of ions changes when heated to 100° C, and that the material's resistivity also jumps at that temperature for reasons quite unrelated to superconductivity.

- ✓ The South Korean LK-99 samples had shown a jump in resistance at almost the same temperature, meaning that the tantalising graphs in their papers were the handiwork of copper sulphide rather than LK-99.
- ✓ Researchers also found a more mundane way to explain the levitation: that the LK-99 sample also contained impurities (other by-products) that were diamagnetic, i.e. materials that could be magnetised but whose magnetic field is the opposite direction of the applied field. Diamagnetic materials can also partially levitate above magnets as a result.

The current evidence suggests that LK-99 is not a superconductor. Even as the replication efforts were underway, some scientists also made models of LK-99's quantum properties.

- ✓ They found that if copper atoms replaced a certain set of lead atoms in LK-99, the material would have some electronic states that are very interesting in that their kinetic energy could take on very restricted values.
- ✓ These are called flat-band systems. Electrons in flat-bands can interact strongly with each other and are predicted to form superconducting phases, but only at very low temperatures.

The LK-99 story provides a view of science in action, even as the narrative remains that we are yet to find an ambient-condition superconductor.

REPORT & INDEX

State of Food Security and Nutrition in the World' (SOFI) 2023

Context: In India, 74% can't afford a healthy diet: UN agency report State of Food Security and Nutrition in the World' (SOFI) 2023 says.

- While food prices remain relatively low in India, a healthy diet is unaffordable to nearly three-fourth of the people given their low incomes.

Key Highlights

- The report, 'State of Food Security and Nutrition in the World' (SOFI) 2023, shows that while the cost of a healthy diet has increased in recent years in India, it is still the lowest among the BRICS nations (including the newly added six countries) and India's neighbours.
- However, the share of people who are able to afford such a healthy diet is still low: India features at the bottom of that list since income levels are stagnant or going down.
- SOFI is **published by** the Food and Agriculture Organization and jointly produced with fellow United Nations agencies.
- The Data Point published concluded that the cost of meals in Mumbai rose by 65% in five years, while salaries/wages rose by just 28%-37%.
 - Mumbai was chosen as an exemplar due to the availability of consistent data.
 - Today's analysis takes a broader view by comparing India's numbers with other countries.
- In the SOFI report, the cost of a healthy diet is arrived at by looking at the cheapest local food items that meet dietary guidelines.
 - The cost and availability of such food items is averaged from national data. To check if the diet is affordable, its cost is compared to the average income in each country.
 - A diet is considered too expensive if it costs more than 52% of a country's average income.
 - This percentage is based on data showing that people in low-income countries spend about 52% of their income on food.
 - The percentage of people who cannot afford this diet is then calculated by using income distributions within a nation.

Chart 1

- ✓ In India, a healthy diet costs 3.066 PPP dollars per person per day, the lowest among the countries considered.
- ✓ PPP stands for 'Purchasing Power Parity'. In simple terms, 1 PPP dollar in the United States should buy the same amount of goods and services as 1 PPP dollar in, say, India or Brazil.
- ✓ The cost of a healthy diet expressed as 'X PPP dollars per person per day' means that it would cost that much per person every day to maintain a healthy diet, accounting for differences in the cost of living between countries.

Chart 1: The chart shows the cost of a healthy diet in terms of PPP dollars per person per day in 2021, the latest year with comparable data

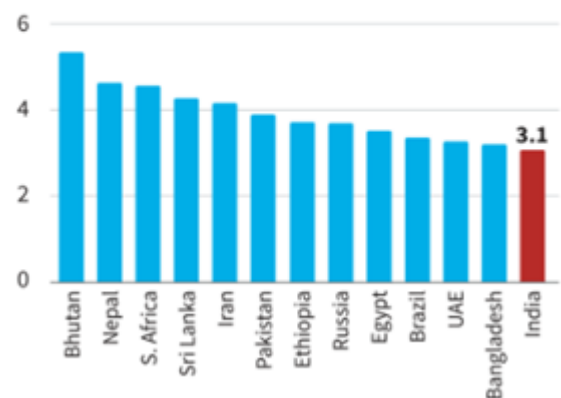


Chart 2

- ✓ In India, 74% were not able to afford a healthy diet, the fourth highest share among the nations considered.
- ✓ Charts 1 and 2 show that the cost of a healthy diet in India, though increasing, is still lower than many comparable economies.
- ✓ However, given the poor income levels in India, a healthy diet is still unaffordable to many.

Chart 2: The chart shows the share of the population that is unable to afford a healthy diet in 2021. For instance, in India, 74% were not able to afford a healthy diet

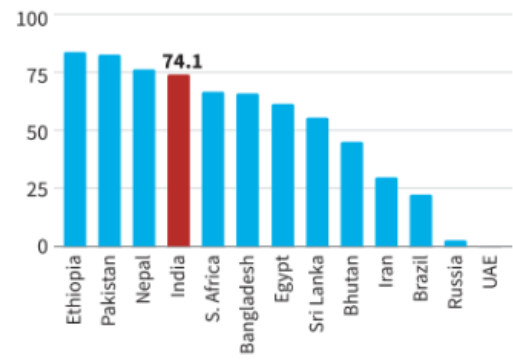


Chart 3

- ✓ Between 2019 (before the COVID-19 pandemic) and 2021, the expense of maintaining a healthy diet increased by almost 9% in Asia — the highest across regions.

Chart 3: The chart shows the change (in %) in the cost of a healthy diet over the years across regions

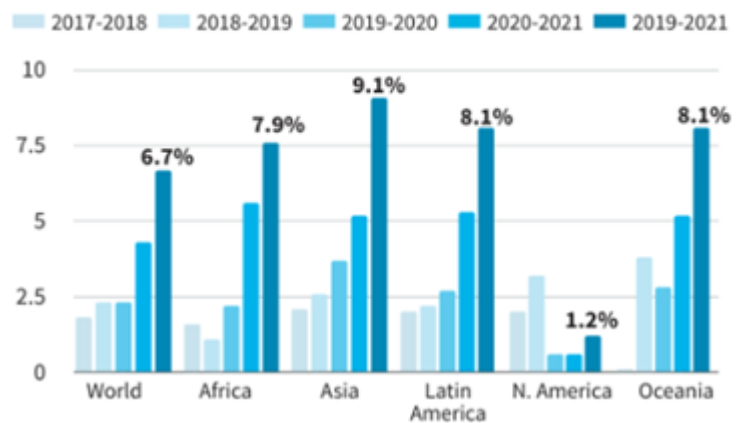


Chart 4

- ✓ Chart 4 shows the change in the number of people who were unable to afford a healthy diet over the years across regions.
- ✓ Between 2019 and 2021, Asia followed by Africa recorded the highest growth in the number of people who could not afford a healthy diet.
- ✓ The two continents together made up 92% of the worldwide increase.
- ✓ In Asia, South Asia had the highest number of people (1.4 billion) and the highest share (72%) who could not afford a healthy diet.
- ✓ This rate was nearly double the average for the region. In Africa, Eastern and Western Africa together had the most people (712 million) and the highest share (85%) who could not afford a healthy diet.

Chart 4: The chart shows the change in the number of people (in million) who were unable to afford a healthy diet over the years across regions

