

WEEKLY UPDATES – (7th-13th Aug)

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ART & CULTURE

18th Century Tamil Manuscripts Found In Monastery In Italy

Context: Palm manuscripts from the 18th Century, titled Gnanamuyarchi, have been discovered in an Armenian monastery in northern Italy.

- It could be a **copy of the first Tamil translation of Spiritual Exercise**, written by **St. Ignatius of Loyola in the 16th century**.
- This translation is most likely by Michele Bertoldi, known in Tamil as **Gnanaprakasasamy**.
- The manuscript was initially misclassified as **‘Indian Papyrus Lamulic Language–XIII Century,’** unaware that they were written in Tamil.
- The monastery authorities think the manuscripts might have been **brought to Italy by Armenians** in Chennai.

What is a Manuscript?

A manuscript is a handwritten or typewritten document, usually historical or literary in nature, before the age of printing. For example, ancient religious Sanskrit texts written on palm or birch leaf.

Kancheepuram Classic

Context: Silk saris from the town are prized for their exquisite craft but weavers worry about job losses, drop in income and diminishing interest in the profession.

- Kancheepuram has become eponymous for its silk saris, both in India and abroad.
- The Kancheepuram silk sari got its Geographical Indication tag in 2005.
- The handloom silk saris are prized attire for weddings and other special occasions: a Kancheepuram silk sari can cost anywhere between ₹10,000 and ₹1,00,000.
- The intricate process of getting the sari ready involves dyeing of the raw silk, drying it under the scorching sun for four to five hours, spinning, warping, and, finally, weaving. The process can take 10-15 days.

What is the Issue?

- Up to the turn of the century (early 2000s), the Kancheepuram silk sari enjoyed tremendous patronage. But now, with shifting fashion trends,

Kanjeevaram Sarees

- ✓ Traditionally, the Kanjeevaram is a sari that is handwoven in **mulberry silk** and **has pure gold or silver zari** that renders it a festive quality.
- ✓ It is identified as the most luxurious and classy fabric in Indian traditional clothing. Originating from the village ‘Kanchipuram’ in Tamil Nadu, Kanjeevaram is considered the queen of silk sarees.
- ✓ The temple architecture of south India especially around Kanchipuram has historically served as the design inspiration for the traditional Kanjeevaram motifs.
- ✓ One can spot motifs such as the mythical creature called the Yali (an elephant-lion fusion), the Ganda Berunda (a two-headed majestic mythical bird) and the ubiquitous temple border called reku.
- ✓ Tracing its long and rich history from the Chola Dynasty, Kanchipuram sarees today are considered as one of the oldest and rich legacies of the Indian textile industry.

competition from the faster power loom and the availability of cheaper artificial silk, there are fewer buyers, the weavers say.

- Earlier, customers and traders were willing to wait for two weeks for the sari to get woven but today they prefer readymade ones.
- This shift has led to job losses and a drop in revenue for the weavers.
- The pandemic also had a significant negative impact on the industry as the number of direct customers visiting Kancheepuram dwindled to nothing.
- Most of the handloom weavers today are of an older age group or middle-aged. They say that the next generation is neither motivated nor interested in learning and continuing the centuries-old craft.

The major concern of the weavers is that their generation may be the last to practise the profession, leaving no one to carry on their legacy.

ENVIRONMENT

5% of Birds in India are Endemic, says Zoological Survey of India

Context: A recent publication by the Zoological Survey of India (ZSI) points out that about 5% of the birds found in the country are endemic and not reported in other parts of the world.

- The publication, **75 Endemic Birds of India**, was recently released on the **108th foundation day of the ZSI**.

Key Highlights

- India is home to 1,353 bird species, which represents approximately 12.4% of the global bird diversity. Of these, 78 (5%) are endemic to the country.
- Three of the 78 species have not been recorded in the past few decades.
- They are
 - The **Manipur bush quail** (*Perdica manipurensis*), listed as “**endangered**” by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species with its last recorded sighting in 1907.
 - The **Himalayan quail** (*Ophrysia superciliosa*), listed as “**critically endangered**” with its last recorded sighting in 1876.
 - The **Jerdon’s courser** (*Rhinoptilus bitorquatus*), listed as “**critically endangered**” with its last confirmed sighting in 2009.
- The publication highlighted the importance of endemic bird species in the country.
- Since endemic species are restrictive in nature, it is important that their habitats are conserved so that they don’t dwindle out.

Endemic Birds & Western Ghats

- The highest number of endemic species have been recorded in the Western Ghats, with 28 bird species.
- Some of the species recorded in the country’s bio-geographic hotspot are

Malabar grey hornbill (*Ocyrocus griseus*)

Malabar parakeet (*Psittacula columboides*)

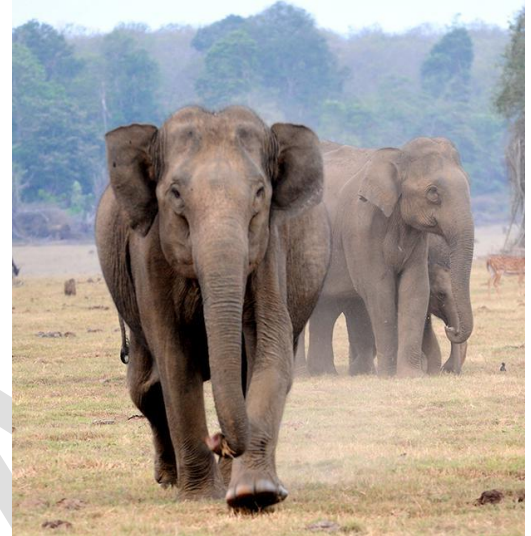
Ashambu laughingthrush (*Montecincla meridionalis*)

White-bellied sholakili (*Sholicola albiventris*)

Asian Elephant Population and Demography Estimates, 2023

Context: Asian Elephant (largest living land animal in Asia) Population and Demography Estimates, 2023 was released recently.

- The report was released by Karnataka Minister for Forests Eshwar Khandre, ahead of the World Elephant Day being observed on August 12 to create awareness about the importance of preserving and protecting these animals that are classified as endangered species.



Key Highlights

- The number of elephants in Karnataka has increased by 346, from an estimated 6,049 in 2017 to 6,395 now, which is the highest in the country, according to an interim report.
- Their population range is estimated to be between 5,914 and 6,877.

Synchronised Census

- The report has been prepared after a synchronised elephant census was conducted from May 17 to 19 by the Forest Department in collaboration with neighbouring Kerala, Tamil Nadu, Andhra Pradesh, Maharashtra, and Goa.
- The number of elephants in Karnataka that had risen from 5,740 in 2010 to 6,072 in 2012 had decreased to 6,049 in 2017.
- However, this time the number of pachyderms has increased by 346. With this, the elephant numbers have increased by 655 in the State since 2010.
- The census, which was taken up in 23 forest divisions, shows that the State has an average elephant density of 0.34 per sq. km. Bandipur Tiger Reserve with 1,116 elephants accounted for the highest density of 0.96 per sq. km followed by Nagarahole Tiger Reserve that has 831 elephants with a density of 0.93.

About Asian Elephant	
Habitat	Indian Subcontinent and Southeast Asia. <ul style="list-style-type: none"> ✓ The habitat varies from wet tropical evergreen forests to semi-arid coniferous and scrub forests. ✓ However, the largest population of elephants is found in tropical deciduous forests. ✓ Elephants are “mega herbivores” that require vast forests and grasslands with plenty of food and water.
Subspecies	<ul style="list-style-type: none"> ✓ The Sri Lankan ✓ The Indian Elephant ✓ The Sumatran Elephant
Appearance	<ul style="list-style-type: none"> ✓ Smaller than their African counterparts, Asian elephants are easily recognized by their “small” rounded ears. ✓ They often have a hump on their back, a double-domed head with two humps, and a single “finger” on their body for grasping.

Distribution In India	<ul style="list-style-type: none"> ✓ The Asian elephant was once widespread throughout the country, including states such as Punjab and Gujarat. ✓ They currently exist in four fragmented populations in South, North, Central and Northeast India.
IUCN Status	Endangered
Threats	<ul style="list-style-type: none"> ✓ Loss of habitat ✓ Human-animal conflict ✓ Illegal wildlife trade

Can SMRs Help India Achieve Net Zero?

Context: The world’s quest to decarbonise itself is guided, among other things, by the UN Sustainable Development Goal 7: “to ensure access to affordable, reliable, sustainable and modern energy for all”.

- Since the world still depends on fossil fuels for 82% of its energy supply, decarbonising the power sector is critical; the share of electricity in final energy consumption will also increase by 80%-150% by 2050.
- The recent uptick in coal consumption in Europe, despite the increase in solar and wind power, suggests that reliable, 24/7 low-carbon electricity resources are critical to ensure the deep decarbonisation of power generation, along with grid stability and energy security.
- Small modular reactors — a type of nuclear reactor — can be helpful to India in this regard.

THE GIST

- Conventional nuclear power plants often suffer from time and cost overruns. As an alternative, several countries are developing small modular reactors (SMRs) — nuclear reactors with a maximum capacity of 300 MW — to complement conventional NPPs.
- Studies have found that SMRs can be safely installed and operated at several brownfield sites that may not meet the more stringent zoning requirements for conventional NPPs.
- Most land-based SMR designs require low-enriched uranium, which can be supplied by all countries that possess uranium mines and facilities for such enrichment if the recipient facility is operating according to international standards. Since SMRs are mostly manufactured in a factory and assembled on site, the potential for time and cost overruns is also lower.

What Are The Challenges Of Decarbonisation?

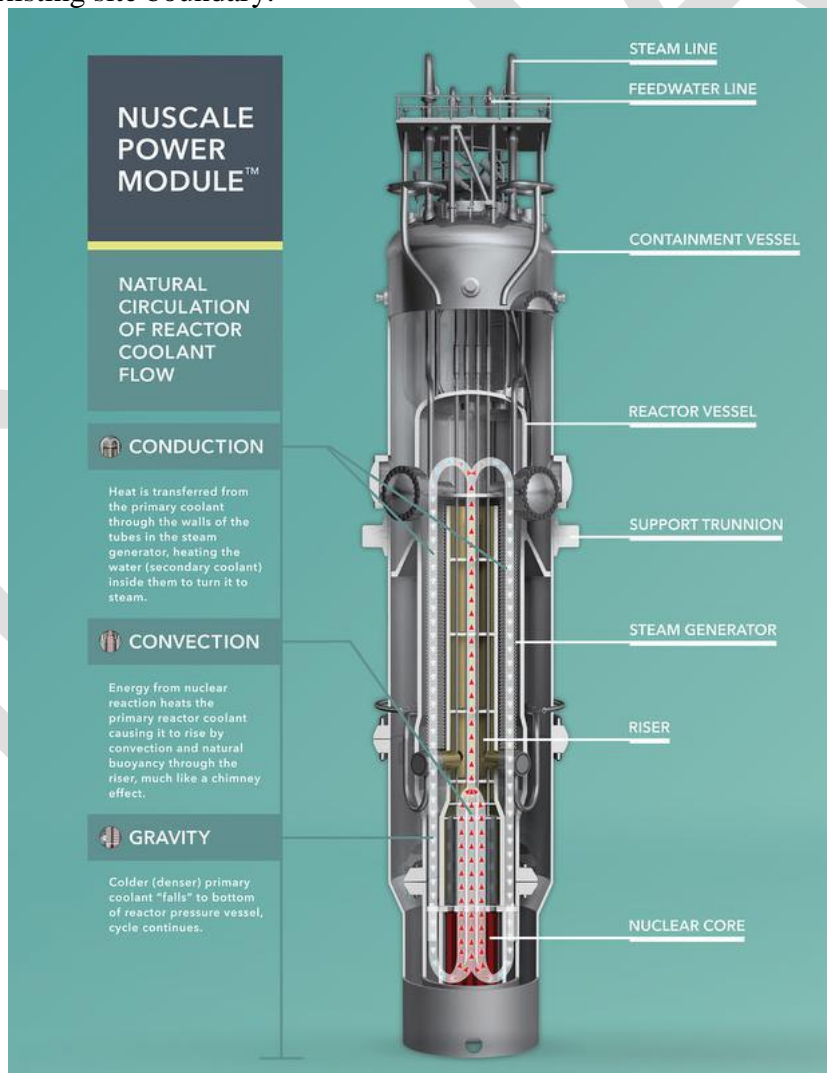
- The **transition from coal-fired power generation to clean energy** poses major challenges, and there is a widespread consensus among policymakers in several countries that solar and wind energy alone will not suffice to provide affordable energy for everyone.
- In decarbonised electricity systems with a significant share of renewable energy, the addition of at least one firm power-generating technology can improve grid reliability and reduce costs.
- According to the International Energy Agency, the demand for critical minerals like lithium, nickel, cobalt, and rare earth elements, required for clean-energy production technologies, is likely to increase by up to 3.5 times by 2030.
 - This jump poses several global challenges, including the **large capital investments** to develop new mines and processing facilities.
- The **environmental and social impacts** of developing several new mines and plants in China, Indonesia, Africa, and South America within a short time span, coupled with the fact that the top three mineral-producing and mineral-processing nations control 50-100% of the current global extraction and processing capacities, pose **geopolitical and other risks**.

Nuclear Power Plants

- Nuclear power plants (NPPs) generate 10% of the world's electricity and help it avoid 180 billion cubic metres of natural gas demand and 1.5 billion tonnes of CO₂ emissions every year.
 - Any less nuclear power could make the world's journey towards net-zero more challenging and more expensive.
- NPPs are efficient users of land and their grid integration costs are lower than those associated with variable renewable energy (VRE) sources because NPPs generate power 24x7 in all kinds of weather.
- Nuclear power also provides valuable co-benefits like high-skill jobs in technology, manufacturing, and operations.

This said, conventional NPPs have generally **suffered from time and cost overruns**. As an alternative, several countries are developing small modular reactors (SMRs) — nuclear reactors with a maximum capacity of 300 MW — to complement conventional NPPs.

- SMRs can be installed in decommissioned thermal power plant sites by repurposing existing infrastructure, thus sparing the host country from having to acquire more land and/or displace people beyond the existing site boundary.



What Are The Advantages Of SMRs?

SMRs are designed with a smaller core damage frequency (the likelihood that an accident will damage the nuclear fuel) and source term (a measure of radioactive contamination) compared to conventional NPPs.

They also include enhanced seismic isolation for more safety.

SMR designs are also simpler than those of conventional NPPs and include several passive safety features, resulting in a lower potential for the uncontrolled release of radioactive materials into the environment.

The amount of spent nuclear fuel stored in an SMR project will also be lower than that in a conventional NPP.

Studies have found that SMRs can be safely installed and operated at several brownfield sites that may not meet the more stringent zoning requirements for conventional NPPs.

The power-plant organisation can also undertake community work, as the Nuclear Power Corporation did in Kudankulam, Tamil Nadu, before the first unit was built.

Accelerating the deployment of SMRs under international safeguards, by implementing a coal-to-nuclear transition at existing thermal power-plant sites, will take India closer to net-zero and **improve energy security because uranium resources are not as concentrated as reserves of critical minerals.**

- Most land-based SMR designs require low-enriched uranium, which can be supplied by all countries that possess uranium mines and facilities for such enrichment if the recipient facility is operating according to international standards.
- Since SMRs are mostly manufactured in a factory and assembled on site, the potential for time and cost overruns is also lower.
- Further, serial manufacture of SMRs can reduce costs by simplifying plant design to facilitate more efficient regulatory approvals and experiential learning with serial manufacturing.
- Since SMRs are designed to operate for more than 40 years, the levelised cost of electricity is \$60-90 per MWh.
 - The figure is expected to drop rapidly after 2035, by when the SMRs ordered by a number of east-European countries from NuScale and GE Hitachi are expected to come online.
 - The costs will decline steepest for India when reputed companies manufacture SMRs.
 - This at least was the reason SMRs were included in the U.S.-India joint statement after Prime Minister Narendra Modi met U.S. President Joe Biden in June 2023.

What Are The Legal And Regulatory Changes Required?

- The Atomic Energy Act will need to be amended to allow the private sector to set up SMRs.
- To ensure safety, security, and safeguards, control of nuclear fuel and radioactive waste must continue to lie with the Government of India.
- The government will also have to enact a law to create an independent, empowered regulatory board with the expertise and capacity to oversee every stage of the nuclear power generation cycle.
- The security around SMRs must remain under government control, while the Nuclear Power Corporation can operate privately-owned SMRs during the hand-holding process.
- Finally, the Department of Atomic Energy must improve the public perception of nuclear power in India by better disseminating comprehensive environmental and public health data of the civilian reactors, which are operating under international safeguards, in India.

Flying Fox Bats

Context: India's largest species of bats, named after a canine fabled to be sly, spends 7% of its day-roosting time being environmentally vigilant, a new study has said.

Key Highlights of Study

The study, focussing on the environmental and social vigilance of one of two subspecies of the Indian flying fox, found space in Behavioral Ecology and Sociobiology, a peer-reviewed international journal.



- ✓ The study describes vigilance behaviour as an individual scanning its surroundings for both competition and predation risk.
- ✓ Vigilance is social if an individual looks directly at another close-by individual approaching or likely to fight while vigilance of the environmental kind is gazing elsewhere, primarily watching for any signs of danger.
- ✓ The Indian flying fox roost gregariously and externally in tree canopies.
 - In such conditions, hierarchy and competition for preferred roosting positions may result in the social structuring of animal aggregation.
 - Vigilance is a manifestation of competition in canopy roosting bats, which can vary temporally.
- ✓ Most bats forage at night and spend more than half of their lives roosting during the day in camps or colonies.
- ✓ The flying foxes studied spent 82% of their roosting time sleeping but remain alert to their surroundings. Dependence on auditory perception gives the added advantage of not sacrificing sleep entirely.

About Flying Fox

Important facts

- ✓ The **nectar and fruit-eating** flying fox (*Pteropus giganteus*) is generally considered a **vermin** as they raid orchards.

	✓ It is a keystone species causing seed dispersals of many plants in tropical systems.
Wildlife (Protection) Act of 1972 Status	Schedule II list
IUCN Status	Least concern
Appearance	Reddish-brown coat, characteristically long snout as well as large eyes. It also resembles a little fox with wings.
Distribution	It is native to the Indian subcontinent. These bats are endemic to South Central Asia, found from Pakistan and China to the Maldives Islands.
Lifestyle	<ul style="list-style-type: none"> ✓ It is highly social creatures, forming large roosts of several hundred animals. ✓ These bats live in a 'vertical', male-dominated hierarchy system, where higher-ranked individuals occupy higher spots of the tree, while lower-ranked individuals remain on lower spots.
Threat	<ul style="list-style-type: none"> ✓ Being external roosters, the flying fox is exposed to predators and disturbances apart from environmental indicators such as heat and light. <ul style="list-style-type: none"> • The biggest threat to the flying fox is from humans. Hunting for meat and medicine and probable threats like the felling of roost trees have contributed to the dramatic decrease in the population of the species.

AGRICULTURE

Is India's Sugar Surplus Leading To A Crisis?

Context: India became the world's top sugar producer in 2021-2022, surpassing Brazil with a record of 359 lakh tonnes. However, the extensive use of resources in sugar production is depleting rapidly, leading to a potential crisis in the future.

- Over-cultivation of sugarcane has caused a sugar surplus and high exports, impacting groundwater negatively.
- To prevent the risk of agricultural collapse, addressing groundwater overuse in the sugar industry is crucial.

Why Is There Excess Sugar Production?

- India is the world's largest consumer of sugar, and thus has to produce enough to meet its huge domestic demand.
- But the excess production stems from policies and measures that make farmers favour sugarcane cultivation.
- The Central government offers a fair and remunerative price (FRP) scheme, which mandates a minimum price that sugar mills have to pay to sugarcane farmers, ensuring that farmers always get fair profits for their crop.
- State governments also offer heavy subsidies to incentivise sugarcane cultivation.

The resulting sugar surplus has led to higher exports, with a record of 110 lakh tonnes exported in 2021-2022.

THE GIST

India became the world's top sugar producer in 2021-2022, surpassing Brazil, but the extensive use of resources in sugar production is depleting rapidly, leading to a potential crisis in the future.

The sugar surplus and high exports are a result of policies favouring sugarcane cultivation, such as the fair and remunerative price (FRP) scheme and State government subsidies.

India's top sugarcane-growing states rely heavily on groundwater for irrigation, leading to concerns over groundwater depletion.

- In fact, Brazil, Australia, and Guatemala filed a complaint with the World Trade Organization (WTO) against India for violating international trade rules by offering excessive export subsidies and domestic support to farmers to outcompete other countries in the global sugar market. The WTO ruled against India and India also lost its appeal.

What Efforts Have Been Made To Address This Issue?

To deal with the sugar surplus, the Indian government considered diverting it to the production of ethanol, an organic compound made by fermenting sugarcane molasses or sugar.

ETHANOL

Ethanol is the active ingredient in alcoholic beverages and is also used in the chemicals and cosmetics industries.

- ✓ In the transport sector, the use of ethanol-blended petrol (EBP) significantly reduces harmful emissions, such as carbon monoxide and various hydrocarbons, from vehicles.
- ✓ The government launched the EBP programme in 2003 to reduce crude oil imports and curtail greenhouse gas emissions from petrol-based vehicles; it has been fairly successful.
- ✓ It started with the modest goal of achieving a blending rate of 5%, but the target set for 2025 is 20%.
- ✓ The government also reduced the Goods and Services Tax on ethanol from 18% to 5% in 2021.
- ✓ In the same year, of the 394 lakh tonnes of total sugar produced, about 350 lakh tonnes were diverted to produce ethanol, while India achieved a blending rate of 10% months ahead of the target.

Excessive Sugarcane Cultivation & Groundwater

Sugarcane cultivation is a water-intensive cultivation.

- Sugarcane requires 3,000 mm of rainfall, but top-growing States get 1,000-1,200 mm, relying heavily on groundwater from confined aquifers, a limited resource.
- 100 kg of sugar needs two lakh litres of groundwater for irrigation, raising concerns as these States are already drought-prone and groundwater-stressed, as per a 2022 CGWB report.

Solutions

- ✓ While the environmental implications of excess sugar production should be clear, surplus production and export have enormous financial gain, amounting to lakhs or crores of rupees a year.
- ✓ A better and more sustainable way would be to assess and then correct incentives that skew in favour of sugarcane over other crops, leading to a consistent surplus.
- ✓ Introducing fair and comprehensive subsidy schemes for a variety of crops can help farmers diversify as well as distribute cultivation evenly, prevent monocultures, and ensure an equitable income.
- ✓ The availability of a wider range of profitable and less resource-intensive crops can lower the strain on vital natural resources.
- ✓ This must be complemented by environmentally responsible sugarcane cultivation practices that prioritise groundwater, such as drip irrigation, to tackle the issue in the long run.
- ✓ In drip irrigation, water is allowed to drip slowly but directly to the roots of sugarcane plants, reducing water consumption by up to 70% relative to the current flood irrigation method.
 - This method has already been made mandatory in many parts of India, and the government has also offered subsidies to farmers for setting up the system. Next, India needs to invest in overall water-saving and management systems.

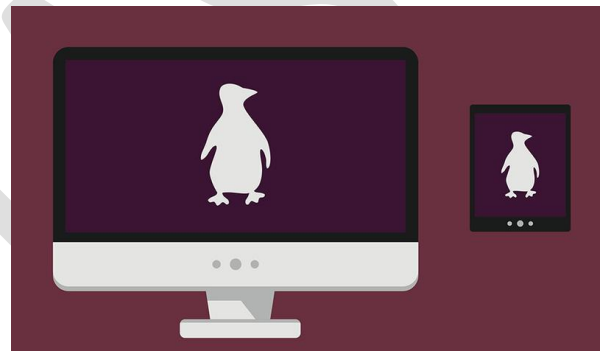
- Concerted efforts to adopt cleaner practices such as rainwater harvesting, wastewater treatment, and canal irrigation networks, will help minimise stress on groundwater reservoirs as other water sources become available for irrigation.
- Although the CGWB conducts significant research and generates valuable data, many aspects of groundwater availability and distribution remain poorly understood and/or mapped. Investment in groundwater research, therefore, needs to be considered seriously.

As India continues to become more of a global frontrunner in the agricultural sector, it must put sustainability at the centre.

CYBER SECURITY

Defence Ministry To Switch To Locally Built OS

Context: In the face of increasing cyber and malware attacks on defence as well as critical infrastructure across the country, the Defence Ministry has decided to replace the Microsoft Operating System (OS) in all computers connected to the Internet with a **new OS, Maya, based on open-source Ubuntu developed locally.**



- **Maya** has the interface and all functionality like Windows and users will not feel much difference as they transition to it.
 - Maya OS has been named after the **Sanskrit word Maya which means “illusion.”**
- To begin with, the direction is to install Maya on all computers connected to the Internet in South Block before August 15.
- In addition, an ‘**end point detection and protection system**’, ‘**Chakravyuh**’, is also being installed in these systems.
 - Chakravyuh is derived from the **ancient Indian military formation** that was used to trap enemies in a circular maze.
- Currently, Maya is being installed only in Defence Ministry systems and not on computers connected to the networks of the three Services.
- Maya was developed by government development agencies within six months. Maya would prevent malware attacks and other cyberattacks which had seen a steep increase, the official noted.

DEFENCE & SECURITY

Malabar Multilateral Exercise

Context: The 31st edition of the Malabar multilateral exercise comprising India, Australia, Japan and the U.S. will be held off Sydney from August 11 to 21, as Australia hosts the war games for the first time this year. Australia has also invited India for the Sea Power conference that it is hosting from November 7 to 9.

- The exercise will take place in a large designated area, the East Australian exercise area, spread over a couple of hundred miles off Sydney and will have a harbour and sea phase.

- Exercise Malabar will be followed by AUSINDEX, the India-Australia bilateral naval exercise. In the past, officials have termed Malabar as the most complicated naval exercise that India does.

Malabar Exercise

The exercise started in 1992 along the Malabar Coast as a bilateral exercise between India and the United States. It was expanded in 2007 with the participation of Japan, Singapore and Australia. Japan became a permanent partner in 2015.

- The aim of the exercise is to increase interoperability between the naval forces.
- The exercise is also designed to deepen the partnership for the Indo-Pacific, for shared aspiration, for a free, open and resilient Indo-Pacific.

HEALTH

Nutrition Support Prevents TB, Related Deaths

Context: A large trial undertaken in India has underscored the role of nutritional supplementation in sharply cutting down tuberculosis (TB) disease rate in the household contacts of an index patient, and mortality reduction in people diagnosed with active pulmonary TB.

- The trial was conducted in four districts in Jharkhand between August 2019 and August 2022.
- The results of the study were published on August 9 in The Lancet and The Lancet Global Health.
- In the randomised controlled trial involving household contacts of patients with pulmonary TB, nutritional support led to 39-48% reduction in TB disease in the intervention group compared with the control arm.
- The 39% reduction in TB disease included all forms of TB (pulmonary and extra-pulmonary), while the 48% reduction was in microbiologically confirmed pulmonary TB.

In 2017, the World Health Organization had estimated that undernutrition is responsible for twice the number of TB cases than HIV globally. Any attempt to end/eliminate TB in India by 2025 will become possible only if undernutrition among people is addressed. As per conservative estimates, 40% of new TB cases annually in India are due to undernutrition.

Undernutrition & TB

Many new cases of TB are attributable to five risk factors says the WHO Global TB report 2022:



- In TB-endemic countries such as India, undernutrition is the most widely prevalent risk factor, accounting for the “highest population attributable risk for TB in India”.
- It is also responsible for increased TB disease severity, higher mortality and poor treatment outcomes.

- A study in India found that severe undernutrition at diagnosis was associated with a two-fold higher risk of death.
- As per a 2016 paper by NIRT researchers, undernutrition is an important risk factor for progression of latent TB infection to TB disease.
- It increases the risk of drug toxicity, TB relapse and mortality. For each unit reduction in BMI, the risk of TB increases by about 14%.
- Undernourished patients also tend to have poor bioavailability of drugs such as rifampicin, leading to treatment failure and development of multidrug resistance.

Nutritional Support's Effect

- Each adult family member in the intervention arm received monthly nutritional support for six months — 5 kg of rice, 1.5 kg of split pigeon peas (tur dal), and a micronutrient pill; each child below 10 years received 50% of the adult nutrition support.
- Those in the control arm did not get any nutritional supplementation and were on a usual diet.
- The trial also provided nutritional supplementation to all 2,800 people with active pulmonary TB undergoing treatment.

Results

- Treatment was successful in nearly 94% (2,623) of TB patients.
- There were only about 4% (108) deaths during the six-month follow-up.
- The trial was conducted on 2,800 people with pulmonary TB (1,979 men and 821 women). Over 80% of the participants had a BMI less than 18 and nearly 49% had a BMI less than 16 (severely underweight).

How do schemes like Nikshay Poshan Yojana and Ni-kshay Mitra help?

- ✓ Nikshay Poshan Yojana is a direct benefit transfer (DBT) scheme for nutritional support to TB patients. It was launched in 2018.
 - All notified TB cases are provided with a financial incentive of ₹500 per month.
 - According to the 2022 India TB report, seven million TB patients have benefited between 2018 and 2022, and ₹2,089 crore has been disbursed during this period.
- ✓ Also, as of March 9, 2023, 9.55 lakh consented TB patients across India adopted by Ni-kshay Mitras will receive nutritional support.

POLITY

Jan Vishwas Act, 2022

Context: The controversial Jan Vishwas Act, 2022 which was recently enacted into law by Parliament, has been touted by the government as a landmark piece of legislation aimed at improving “ease of doing business” in India by either decriminalising or making “compoundable” offences across 42 legislations.

- The legislation has mostly replaced criminal imprisonment with penalties, it has transferred the power to impose these monetary penalties from the judiciary to the bureaucracy.

The larger question is whether giving the bureaucracy, rather than the courts, the power to not just adjudicate a factual dispute but also penalise or order compensation, goes against the constitutional scheme of separation of powers.

What is the Jan Vishwas Bill about?

The Jan Vishwas (Amendment of Provisions) Bill, 2022 amends 42 laws, across multiple sectors, including agriculture, environment, and media and publication and health.

- The Bill converts several fines to penalties, meaning that court prosecution is not necessary to administer punishments.
- It also removes imprisonment as a punishment for many offences.
- Covered under the Jan Vishwas (Amendment of Provisions) Bill, 2023 are changes in the Drugs and Cosmetics Act, 1940, the Food Safety and Standards Act, 2006 and the Pharmacy Act, 1948.
 - This has evoked heated debate about its pros and cons among health care activists, experts in the field of pharmacy and patient-welfare groups.
 - Among these, the changes proposed to the Drugs and Cosmetics Act, 1940 have been the most contentious. The Act regulates the import, manufacture, distribution and sale of drugs and cosmetics in the country.
 - Currently, the Act defines four categories of offences— adulterated drugs, spurious drugs, mislabelled drugs, and Not of Standard Quality drugs (NSQs) — and lays out degrees of punishment (a combination of prison time and fine) based on the degree of offence.
- The Jan Vishwas Act amends the Environmental (Protection) Act, 1986 and the Air (Prevention and Control of Pollution) Act, 1981 to replace imprisonment as a punishment for certain offences with penalties of up to ₹15 lakh that can be imposed by designated bureaucrats (Joint Secretaries).
- Under amendments to the Indian Forest Act, 1927 forest officers have the power to not just conduct an inquiry to determine the “damage done to the forest” by anybody but also order the offender to pay a hitherto uncapped “compensation” for said damage.

THE GIST

- The Jan Vishwas (Amendment of Provisions) Bill, 2023 proposes to amend 183 provisions to be decriminalised in 42 Central Acts administered by 19 Ministries/Departments.
- Among these, the changes proposed to the Drugs and Cosmetics Act, 1940 have been the most contentious. The Act regulates the import, manufacture, distribution and sale of drugs and cosmetics in the country.
- Activists fear that the government, under the guise of ease of doing business, have proposed the amendments which seek to dilute the punishment by doing away with prison terms for a lot of offences and converting fines to penalties.

What are the Pros and Cons of the Amendments?

The amendments have brought in sharp criticism from health activists. It is said that the Bill is detrimental to public health on two counts.

- First, it allows manufacturers of Not of Standard Quality Drugs (NSQ) drugs to escape significant penalties despite the fact that these drugs can have an adverse effect on the patient.
- Second, the Bill also reduces penalties for owners of pharmacies who violate the terms of their licence.

Mines and Minerals Bill 2023

Context: On August 2, Parliament passed the Mines and Minerals (Development and Regulation) Amendment Bill, 2023, in a bid to attract private sector investment in the exploration of critical and deep-seated minerals in the country.

- The Bill puts six minerals, including lithium — used in electric vehicle batteries and other energy storage solutions — into a list of “critical and strategic” minerals.
- The exploration and mining of these six minerals, previously classified as atomic minerals, were restricted to government-owned entities.

How Much of India’s Critical Minerals are Imported?

The lack of availability of some minerals or the concentration of their extraction or processing in a few geographical locations leads to import dependency, supply chain vulnerabilities, and even disruption of their supplies.

- For instance, China has majority ownership of cobalt mines in the Democratic Republic of Congo, where 70% of the world’s cobalt is mined.
- China also has by far the largest amount of reserves of REEs of any country in the world, followed by Vietnam, Brazil and Russia.
- India is 100% import-dependent on countries including China, Russia, Australia, South Africa, and the U.S. for the supply of critical minerals like lithium, cobalt, nickel, niobium, beryllium, and tantalum.
- Also for deep-seated minerals like gold, silver, copper, zinc, lead, nickel, cobalt, platinum group elements (PGEs) and diamonds, which are difficult and expensive to explore and mine as compared to surficial or bulk minerals, India depends largely on imports.

- For instance, in 2022-23, India imported close to 12 lakh tonnes of copper (and its concentrates) worth over ₹ 27,000 crore as per official figures.

THE GIST

- The Mines and Minerals (Development and Regulation) Amendment Bill, 2023, passed by India’s Parliament, aims to attract private sector investment in exploring critical and deep-seated minerals in the country.
- Six minerals, including lithium, have been reclassified as “critical and strategic” minerals, making them eligible for exploration and mining by private entities. Previously, these minerals were restricted to government-owned entities.
- India’s dependency on imports for critical and deep-seated minerals has been a concern, leading to supply chain vulnerabilities and import dependencies from countries like China, Russia, and Australia.
- The lack of private sector participation in mineral exploration has hindered India’s ability to discover and develop economically viable reserves.

A variety of minerals, besides those used in creating fuel, are crucial to a country’s manufacturing, infrastructure, and advancement.

- ✓ The clean energy transitions of countries including India, seeking to meet their net-zero emission goals, are contingent on the availability of critical minerals such as lithium, which has also been called ‘white gold’, and others including cobalt, graphite, and rare earth elements (REEs).
- ✓ These are also crucial for the manufacture of semiconductors used in smart electronics; defence and aerospace equipment; telecommunication technologies and so on.

Mineral Exploration

The primary step to discovering mineral resources and eventually finding economically viable reserves is mineral exploration, which comes in various stages before mining. The stages of exploration are divided as per the United Nations Framework for Classification of Resources into G4 (Reconnaissance), G3 (Prospecting), G2 (General Exploration), and G1 (Detailed Exploration).

Why Is Private Sector Vital For Critical Minerals Exploration?

Studies by organisations such as the Atomic Minerals Directorate for Exploration and Research and the Centre for Social and Economic Progress (CSEP) note that **India's unique geological and tectonic setting is conducive to hosting potential mineral resources** and that its geological history is similar to the mining-rich regions of Western Australia and Eastern Africa.

- Notably, it is estimated that India has explored just 10% of its Obvious Geological Potential (OGP), less than 2% of which is mined and the country spends less than 1% of the global mineral exploration budget.
- Not many significant mineral discoveries have taken place in the country in the last couple of decades.
- A **majority of exploration** projects have been carried out by the **government agency** Geological Survey of India and other Public Sector Undertakings (PSUs) like Mineral Exploration Corporation Limited (MECL), with **very little private sector participation**.
- India's mining policy had kept Greenfield exploration of minerals out of the purview of private-sector explorers for some years which meant they could only get licences to further prospect and mine resources that had been explored by a government entity.
- Union Minister of Mines pointed out that while Indian PSUs were in a relatively better position to explore surficial and bulk minerals like coal and iron ore, they had not fared well when it came to deep-seated and critical minerals owing to the high expenditure and long duration of risky projects while being under pressure to increase the supply of bulk minerals.
- The new Bill seeks to bring exploration processes in India at par with that of developed countries by getting private sector capacity into exploration, giving the example of Australia.

Mines and Minerals Bill 2023 & Private Players

- The Bill omits at least six previously mentioned atomic minerals from a list of 12 which cannot be commercially mined.
 - Being on the atomic minerals list, the exploration and mining of these six — lithium, beryllium, niobium, titanium, tantalum and zirconium, was previously reserved for government entities.
- The Act prohibits pitting, trenching, drilling, and sub-surface excavation as part of reconnaissance, which included mapping and surveys. The Bill allows these prohibited activities.
- The Bill also proposes a new type of licence to encourage reconnaissance — level and or prospective stage exploration by the private sector.
 - This exploration licence (EL), for a period of five years (extendable by two years), will be granted by the State government by way of competitive bidding.
 - This licence will be issued for 29 minerals specified in the Seventh Schedule of the amended Act, which would include critical, strategic, and deep-seated minerals.
 - It also specifies the maximum area for exploration; activities in up to 1,000 sq km will be allowed under a single exploration licence.
 - It also states that the licensee will be allowed to retain up to 25% of the originally authorised area after the first three years after submitting a report to the State government stating reasons for retention of the area.

- While most auctions are reserved for State governments in the Act, the Bill also reserves the conduct of auctions for composite licence and mining lease for specified critical and strategic minerals for the central government.

Amendment to New Drugs and Clinical Trial Rules (2023)

Context: India takes first step to remove animals from drug-testing. An amendment to the New Drugs and Clinical Trial Rules (2023), recently passed by the Indian government, aims at avoiding the use of animals in research, especially in drug testing.

- The amendment authorises researchers to instead use non-animal and human-relevant methods, including technologies like 3D organoids, organs-on-chip, and advanced computational methods, to test the safety and efficacy of new drugs.

Current Drug-Development Pipeline

Every drug in the market goes through a long journey of tests, each designed to check whether it can treat the disease for which it was created and whether it has any unintended harmful effects.

- For a long time, the first step of this process has been to test the candidate molecule in at least two animal species: a rodent (mouse or rat) and a non-rodent, such as canines and primates.
- However, humans are more complex creatures, and biological processes and their responses often vary from person to person as well, based on factors such as age, sex, pre-existing diseases, genetics, diet, etc. – and a lab-bred animal species reared in controlled conditions may not fully capture the human response to a drug.

This **‘mismatch’ between the two species** is reflected in the famously high failure-rate of the drug development process.

Despite increasing investment in the pharmaceutical sector, **most drugs that cleared the animal-testing stage fail at the stage of human clinical trials**, which come towards the end of the pipeline.

Alternative Testing Modes

**Organoids” Or “Mini-
Organs**

Organ-on-a-chip

Inkjet Bioprinter

3D Bioprinter

- In the last few decades, several technologies have been developed using human cells or stem cells. These include millimetre-sized three-dimensional cellular structures that mimic specific organs of the body, called **“organoids” or “mini-organs”**.
- Another popular technology is the **“organ-on-a-chip”**: they are AA-battery-sized chips lined with human cells connected to microchannels, to mimic blood flow inside the body.
 - These systems capture several aspects of human physiology, including tissue-tissue interactions and physical and chemical signals inside the body.
- Researchers have also used **additive manufacturing techniques** for more than two decades.
 - In 2003, researchers developed the first **inkjet bioprinter** by modifying a standard inkjet printer.
 - Several innovations in the last decade now allow a **3D bioprinter** to ‘print’ biological tissues using human cells and fluids as ‘bio-ink’.

Such technologies, researchers say, are bringing us closer to recreating a human tissue or organ system in the laboratory.

Science Challenges: Is India Ready To Exploit This Technology?

Multidisciplinary knowledge

Training and human-resource building

Centre for excellence' in india

Resources needed for research

- One problem is that developing an organ-on-a-chip system typically requires **multidisciplinary knowledge**.
 - This means expertise in cell biology to recreate the cellular behaviour in the lab;
 - Materials science to find the right material to ensure that the chip does not interfere with biological processes;
 - Fluid dynamics to mimic blood flow inside the microchannels;
 - Electronics to integrate biosensors that can measure ph, oxygen etc.in the chip;
 - Engineering to design the chip;
 - Pharmacology and toxicology to interpret action of the drugs in the chips.
- It's a truly interdisciplinary endeavour and needs focused **training and human-resource building**, which is lacking in the country at present.
- To enable this crosstalk between different disciplines, technology developers in academia and industry have proposed creating a '**Centre for Excellence' in India**, akin to the Wyss Institute, to bring together scientists and others with a wide range of expertise to build preclinical human models.
- Another important problem concerns the **resources needed for research**.
 - Most of the reagents, cell-culture related materials and instruments for these technologies are currently imported from the U.S., Europe, and Japan.