

DAILY CURRENT AFFAIRS (DCA)

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Table of Content

- La Niña Affect on India's climate
- One Candidate, Multiple Constituencies
- India Sri Lankan Take up Regional Security Issues
- India-Iran-Armenia Trilateral Meet
- RBI Increases Collateral-Free Agricultural Loan Limit
- Black Holes & Echoes

NEWS IN SHORT

- Birhor Tribe
- Moldova Joins International Solar Alliance
- Kerch Strait
- Charak
- Idiopathic Pulmonary Fibrosis
- Manganese in Water is Causing Cancer
- Apiculture
- Diamond Cooling Technology
- Science and Heritage Research Initiative (SHRI)
- Olive Ridley Turtles
- Urban Heat Island Effect

LA NIÑA AFFECT ON INDIA'S CLIMATE

Context

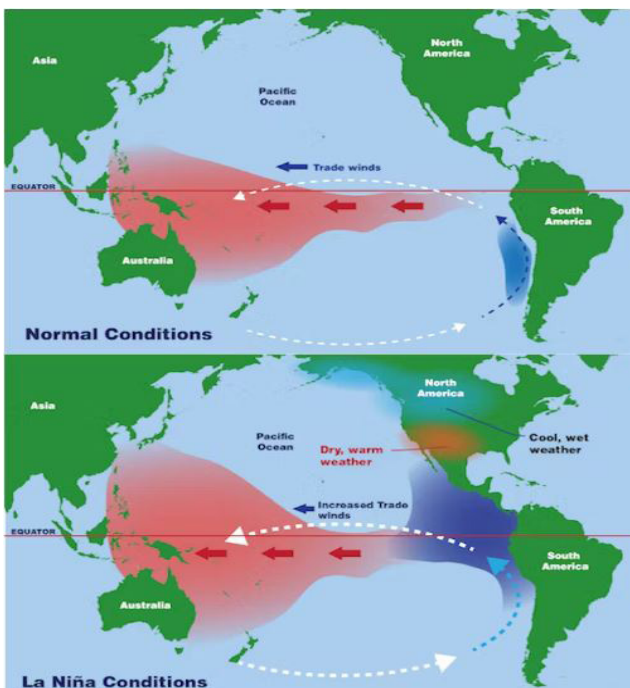
- The India Meteorological Department expects a La Niña to set in by late 2024 or early 2025, plus a milder winter due to this delay.

Emergence of La Nina

- Historically, the La Niña has usually formed during the monsoon or the pre-monsoon period, and it has formed **only twice between October and December since 1950**.
- Predicting La Nina: The oceanic Niño index (ONI)** compares the three-month average sea surface temperatures in the East-Central Tropical Pacific with the 30-year average.
 - When the difference between the two is 0.5°C or higher, it is an El Niño,
 - and when it is -0.5°C or lower, it is a La Niña.
- Currently, it is around -0.3°C . To be classified as a full-fledged La Niña or El Niño, ONI values **need to exceed the thresholds at least five times consecutively**.

What is La Nina?

- It means **Little Girl** in Spanish. La Niña is also sometimes called El Viejo, anti-El Niño, or simply “a cold event.”
- The **trade winds become stronger than usual**, pushing more **warmer waters towards the Indonesian coast**, and making the **eastern Pacific Ocean colder than normal**.



Impact on Weather Patterns:

- North America:** La Niña is often associated with colder winters in the northern U.S. and Canada and warmer, drier conditions in the southern U.S. (such as in the southwestern states).
- South America:** La Niña often causes droughts in countries like Peru and Ecuador while bringing more rain to Brazil.
- Asia and Oceania:** La Niña tends to bring increased rainfall and a higher risk of flooding to countries like Indonesia, Australia, and parts of Southeast Asia.

Impact on India

- More rainfall** in most regions, leading to a stronger monsoon.
- Increased risk of flooding** and waterlogging in many parts of the country.
- Cooler temperatures** during the post-monsoon and winter months.
- More cyclones** in the Indian Ocean, increasing risks for coastal areas.
- Possible agricultural disruptions** due to heavy rainfall, floods, and delayed harvesting.

What is El Nino?

- El Niño means **Little Boy** in Spanish. South American fishermen first noticed periods of unusually warm water in the Pacific Ocean in the 1600s.
 - It is a climate phenomenon characterized by the periodic warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean.
 - During El Niño, **trade winds weaken**. Warm water is pushed back east, toward the west coast of the Americas and as a result **cold water is pushed towards Asia**.

Impact of El Nino

- Low Rainfall:** El Niño often correlates with below-average monsoon rainfall in India, leading to droughts in many parts of the country.
- Increased Temperature:** El Niño also leads to an increase in temperatures across various parts of India.
- Forest Fires:** The drier conditions associated with El Niño increase the risk of forest fires, particularly in regions with dense vegetation.
- Water Scarcity:** Decreased rainfall during El Niño events lead to water scarcity in many parts of India.
- Impact on Fisheries:** Changes in sea surface temperatures and ocean currents disrupt fish migration patterns and lead to fluctuations in fish populations.

Conclusion

- **Climate change** may increase the frequency and intensity of both La Niña and El Niño events, as rising sea and land temperatures disrupt the Pacific's balance.
- Thus it would be a welcome development if a La Niña forms now or early next year and continues until the monsoon season. This would mean a **less intense summer and more rains for India.**

Source: TH

ONE CANDIDATE, MULTIPLE CONSTITUENCIES

Context

- Amidst all the political debates, an important issue has escaped attention – the practice of One Candidate Contesting from Multiple Constituencies (OCMC) for the same office.

Background

- The Constitution empowers Parliament to regulate the conduct of elections in India.
- **The Representation of the People Act (RPA), 1951** governs electoral contests under which;
 - ♦ **Until 1996**, there was no limit on the number of constituencies a candidate could contest from in a single election.
 - ♦ **Parliament amended the Act**, allowing candidates to contest from a maximum of two constituencies.
- Despite these changes, **the practice persists**, particularly in State Legislative Assembly elections.
 - ♦ Around 44 by-elections were held for State Assemblies in November 2024 due to legislators vacating seats.

Arguments against OCMC

- **Increased Taxpayer Burden:** The administrative cost of elections is substantial. By-elections, triggered by seat vacation, add further costs. This burden ultimately falls on taxpayers.
- **Advantage to the Ruling Party:** By-elections within six months disproportionately benefit the ruling party. Resources, patronage, and state machinery can be leveraged, creating an uneven playing field for the Opposition.
- **Financial Pressure on Opponents:** By-elections impose additional financial burdens on already defeated candidates and their parties, compelling them to spend resources on repeat contests.

- **Undermining Democratic Principles:** Contesting multiple constituencies becomes a hedging mechanism for leaders, focusing on political gains rather than public interest.
- **Voter Discontent:** Winning candidates vacating a seat disrupt voters' expectations of representation. This causes voter dissatisfaction and erodes trust.
- **Against fundamental right to freedom of speech and expression under Article 19(1)(a):** A petition in **Ashwini Kumar Upadhyay vs Union of India, 2023**, argued that vacating a seat after winning violates voters' trust and creates a constitutional anomaly.

Arguments in favour of OCMC

- **Safety Net for Candidates:** Contesting from multiple constituencies serves as a safeguard in tightly contested elections, ensuring candidates have a backup option.
- **Global Precedent:** Countries like Pakistan and Bangladesh also allow candidates to contest multiple constituencies, albeit with conditions to relinquish all but one seat.

Recommendations for Reform by Election Commission of India (ECI)

- **Amend Section 33(7) of RPA, 1951** to ban candidates from contesting multiple constituencies.
 - ♦ The **255th Law Commission Report (2015)** also proposed the same.
- **Recover Costs of By-elections:** Impose the full cost of by-elections on candidates vacating a seat.

Concluding remarks

- By-elections **consume significant financial and administrative resources**, which could be redirected toward developmental priorities.
- While the concept of One Candidate, One Constituency (OCOC) aligns with core democratic principles like **“one person, one vote,”** its implementation requires political will and support from major parties.

Source: TH

INDIA SRI LANKAN TAKE UP REGIONAL SECURITY ISSUES

Context

- Sri Lankan President Anura Kumara Dissanayake met PM Modi during his first foreign visit after assuming office.

Key Outcomes of the Meeting

- **Strategic and Defence Cooperation:** Sri Lanka assured India that its territory would not be used for activities inimical to India's interests, ensuring regional stability.
 - ♦ This assurance reflects Sri Lanka's balancing act amid China's growing presence in the region.
- **Capacity Building:** India will provide focused training for **1,500 Sri Lankan civil servants** over the next five years.
 - ♦ There will be collaboration on capacity building through knowledge-sharing platforms like India's Aadhaar, PM Gati Shakti, and DigiLocker.
- **Energy Development:** The leaders agreed to take steps towards the implementation of the solar power project in **Sampur**.
 - ♦ Cooperation amongst **India, Sri Lanka and UAE** to implement a multi-product pipeline from India to Sri Lanka for supply of affordable and reliable energy.
- **People-Centric Digitization:** Agreement to fast-track the implementation of the **Sri Lanka Unique Digital Identity (SLUDI)** project, modeled after India's Aadhaar.
 - ♦ Collaboration to roll out **Digital Public Infrastructure (DPI)** in Sri Lanka to improve government service delivery and digital transactions.

India and Sri Lanka Relations

- **Trade Relations: India-Sri Lanka Free Trade Agreement (ISFTA)** in 2000 contributed significantly towards the expansion of trade between the two countries.
 - ♦ India has traditionally been among **Sri Lanka's largest trade partners** and Sri Lanka remains among the largest trade partners of India in the SAARC.
 - ♦ India is also one of the largest contributors to **Foreign Direct Investment** in Sri Lanka.
- **Cultural relations:** The Cultural Cooperation Agreement signed in **1977** forms the basis for periodic Cultural Exchange Programmes between the two countries.
- **Tourism:** India has traditionally been Sri Lanka's top inbound tourism market, followed by China.
 - ♦ As per latest data from the Sri Lanka Tourism Development Authority, India is the largest source for tourists in **2023**.

- **Maritime Security and Defence Cooperation:** In 2011, a decision was taken to establish the **Colombo Security Conclave** which aims to further promote maritime security in the Indian Ocean Region.
 - ♦ India and Sri Lanka conduct a joint Military exercise named '**Mitra Shakti**', Trilateral Maritime Exercise "**Dosti**", and a Naval exercise named **SLINEX**.
- **Connectivity Projects:** Recently, the two sides adopted a vision document to enhance maritime, energy and people to people connectivity.
 - ♦ There are plans to develop ports and logistics infrastructure at **Colombo, Trincomalee, and Kankesanthurai** to consolidate regional logistics and shipping.
 - ♦ There are plans to develop a land bridge to provide India land access to the ports of **Trincomalee and Colombo**.
- **Multilateral Forum Collaboration:** India and Sri Lanka are member nations of the **South Asian Association for Regional Cooperation (SAARC)**, South Asia Co-operative Environment Programme, South Asian Economic Union and **BIMSTEC**, working to enhance cultural and commercial ties.

Areas of Concern

- **The Fishermen Issue:** Sri Lanka's proximity to Indian territorial waters has often blurred the line for fishermen on both sides in pursuit of fish stock.
- **Indian Ocean Geopolitics:** In recent years, subtle geo-political and strategic competition in the IOR between the US, China and India has been recognised by Sri Lanka as a possible threat to its security interest in the region.
- **Rise of China:** China's increasing strategic investments in vital maritime ports in the IOR has been an area of concern.
- **The fear of Indian dominance** over the territory of Sri Lanka among the Sri Lankans has been a reality since its independence.

Way Ahead

- India's proactive engagement with Sri Lanka highlights its role as a reliable partner in ensuring regional security and economic stability.
- The reaffirmed assurance from Sri Lanka to safeguard India's security interests is a crucial step in countering external influences in the Indian Ocean Region.

Source: TH

INDIA-IRAN-ARMENIA TRILATERAL MEET

In News

- The **second India-Iran-Armenia Trilateral Consultations** were held in New Delhi.

Key Discussion Points

- Connectivity Initiatives:** The consultations emphasized the importance of fostering close cooperation under the International **North-South Transport Corridor (INSTC)**.
 - The role of **Chabahar Port** in facilitating this initiative was highlighted.
- Multilateral Engagement:** The three nations discussed their engagement in multilateral fora, aiming to enhance their collective influence on the global stage.
- Regional Developments:** The consultations covered regional developments, with a focus on promoting peace and stability in the region.
- Trade, Tourism, and Cultural Exchanges:** The delegations explored ways to promote trade, tourism, and cultural exchanges while strengthening people-to-people ties.
- Armenia's Connectivity Initiative:** Armenia briefed the participants on its connectivity initiative, "**The Crossroads of Peace**," which aims to enhance regional connectivity.
 - It aims to connect the **Caspian Sea to the Mediterranean Sea** and the **Persian Gulf to the Black Sea** through easier and more efficient transportation links.

Do you know ?

- The **International North-South Transport Corridor (INSTC)** is a 7,200-km-long multi-mode transport project for moving freight among India, Iran, Afghanistan, Armenia, Azerbaijan, Russia, Central Asia and Europe.
- The **Chabahar port**, located in Iran's Sistan-Balochistan province on its southern coast, is being developed by India and Iran to enhance connectivity and trade. India is particularly focused on using the port to improve regional trade, especially with Afghanistan.

Importance

- The second India-Iran-Armenia Trilateral Consultations underscore the growing partnership between these nations, aimed at fostering regional cooperation and development.

- The discussions held during this meeting are expected to pave the way for enhanced collaboration in various sectors, contributing to the overall prosperity and stability of the region.

Future Plans

- The three sides reaffirmed their commitment to continued cooperation under the trilateral format.
- It was agreed that the next round of consultations would be held in Iran at a mutually convenient date and time.

Source: TH

RBI INCREASES COLLATERAL-FREE AGRICULTURAL LOAN LIMIT

Context

- In a significant move to bolster the agricultural sector, the Reserve Bank of India (RBI) has announced an increase in the **collateral-free agricultural loan limit from ₹1.6 lakh to ₹2 lakh per borrower**, effective from **January 1, 2025**.
 - Banks are instructed to implement the revised guidelines expeditiously and provide widespread publicity to ensure maximum outreach.

Agricultural Credit to Farmers

- According to the Economic Survey 2023-24, Agricultural credit in India was **1.5 times increased** from Rs 13.3 lakh crore in FY21 to Rs 20.7 lakh crore in FY24.
- It provides farmers with the necessary financial resources to invest in their farms, improve productivity, and ensure food security.

Importance of Agricultural Credit

- Enhancing Productivity:** Access to credit allows farmers to purchase high-quality seeds, fertilizers, and modern equipment, leading to increased agricultural productivity.
 - It is particularly beneficial for small and marginal farmers, who constitute over 86% of the agricultural sector.
- Risk Management:** Credit facilities help farmers manage risks associated with crop failures, natural disasters, and market fluctuations.
- Sustainable Farming:** Financial support enables farmers to adopt sustainable farming practices and invest in long-term agricultural projects.

Institutional Framework/Initiatives for Credit Flow to Agriculture Sector

- **National Bank for Agriculture and Rural Development (NABARD):** Established in 1982, NABARD is the apex development bank responsible for promoting and regulating credit and other facilities for agriculture and rural development.
 - ♦ It provides refinance support to rural financial institutions and implements various development programs.
- **Primary Agricultural Credit Societies (PACS):** These are grassroots-level cooperative institutions that provide short-term and medium-term credit to farmers.
 - ♦ PACS are crucial in ensuring that credit reaches small and marginal farmers.
- **Kisan Credit Card (KCC):** It aims to provide farmers with timely access to credit for their cultivation needs.
 - ♦ It covers expenses related to crop production, post-harvest activities, and maintenance of farm assets.
- **Pradhan Mantri Fasal Bima Yojana (PMFBY):** It helps farmers mitigate the risks associated with crop failure due to natural calamities.
 - ♦ It ensures that farmers can repay their loans even in adverse conditions.
- **Interest Subvention Scheme:** It provides short-term crop loans at subsidized interest rates.
 - ♦ Farmers can avail loans up to 3 lakh at an interest rate of 7%, with an additional 3% subvention for timely repayment.

Challenges and Solutions

- **Access to Credit:** Small and marginal farmers often face difficulties in accessing institutional credit due to lack of collateral and complex loan procedures.
 - ♦ Simplifying the loan application process and enhancing financial literacy can help address this issue.
- **High Indebtedness:** Many farmers rely on non-institutional sources of credit, such as moneylenders, which charge exorbitant interest rates.
 - ♦ Strengthening the reach of institutional credit and promoting financial inclusion are essential to reduce farmers' dependence on informal lenders.

- ♦ Enhancing financial literacy among farmers to make them aware of the available credit facilities.
- **Climate Risks:** Agriculture in India is highly vulnerable to climate change and extreme weather events.
 - ♦ Expanding the coverage of crop insurance schemes and promoting climate-resilient farming practices can help mitigate these risks.

Source: PIB

BLACK HOLES & ECHOES

Context

- The researchers presented a new method to **measure the properties of black holes** by using the effects they have on light flowing around them (Light Echo).

What is a Black Hole?

- A black hole is an extremely dense object whose gravity is so strong that nothing, not even light, can escape it.
- It does not have a surface, like a planet or star. Instead, it is a region of space where **matter has collapsed in on itself**.
 - ♦ This catastrophic collapse results in a **huge amount of mass being concentrated in an incredibly small area**.
- **Formation:** A black hole is formed when a **really massive star runs out of fuel** to fuse, blows up, leaving its core to implode under its weight to form a black hole.
 - ♦ The centre of a black hole is a **gravitational singularity**, a point where the general theory of relativity breaks down, i.e. where its predictions don't apply.
 - ♦ A black hole's great gravitational pull emerges as if from the **singularity**.

Light Echo

- **A light echo** is a phenomenon in which light from a distant astronomical source (such as a star, supernova, or active galactic nucleus) reflects off nearby structures, such as interstellar dust clouds, **and returns to Earth after a delay**.
- **Significance:**
 - ♦ Thus, according to the study, **scientists can use light echoes as a new and independent way** to the masses and spins of black holes.

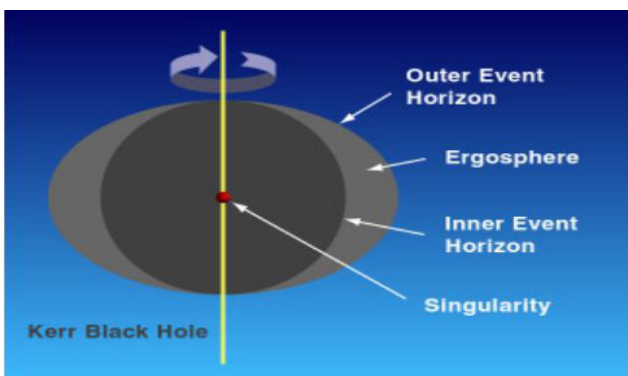
- ◆ The task of measuring a black hole's mass and spin is quite tedious because all the matter, hot gases, and the radiation swirling around the object complicate observations and make signals harder to extract from the noise.
- ◆ Light is affected differently and light echoes could offer a **better signal-to-noise ratio**.

Do You Know?

- Known black holes fall into **two classes**:
 - ◆ **Stellar mass**: around 20 times the Sun's mass or more;
 - ◆ **Supermassive**: 100,000 to billions of times the Sun's mass;
 - ◆ **Middleweight** black holes may exist between these classes, but none have been found to date.
- **Spaghettification**: As objects approach the event horizon of a black hole, they're horizontally compressed and vertically stretched, like a noodle.
- **Sagittarius A***: Sagittarius A* is more than 25,000 light years from Earth – nearest supermassive black hole, with an estimated mass millions of times that of the Sun.
 - ◆ Often abbreviated by researchers to Sgr A* (pronounced "Sagittarius A star"), it sits in the constellation of Sagittarius at the heart of the Milky Way.

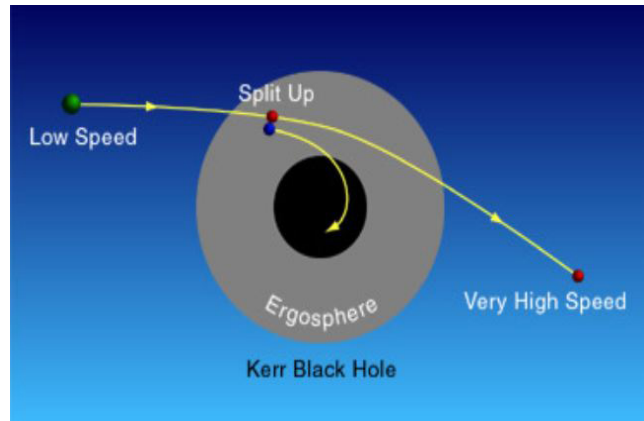
Rotating Black Hole

- A rotating black hole is also called a **Kerr black hole**.



- There are two **event horizons**, the **outer and the inner**.
- The region of **space in-between the two horizons is the ergosphere**.
 - ◆ Anything inside the ergosphere will be dragged by the black hole and rotate with it but it can still escape.

- ◆ However, anything inside the inner event horizon can never escape.
- **Scientific Significance**: We can extract **rotational energy** from a rotating black hole.
 - ◆ If something is sent inside of the ergosphere, and split it up into two parts, one goes in the black hole while the other comes out.
 - ◆ The part coming out can be made to have a much higher speed, hence higher energy.



Source: TH

NEWS IN SHORT

BIRHOR TRIBE

In News

- Jharkhand's Birhor tribe participated in the movement against child marriage.

About Birhor Tribe

- Birhor is a **Particularly Vulnerable Tribal Group (PVTG)**.
 - ◆ PVTGs are a sub-classification of Scheduled Tribes (STs) identified as being more vulnerable and marginalized than other tribal groups.
- They are **semi-nomadic and depend on forest resources** for survival. They are skilled rope makers, using fibers from the bark of the 'chota nagpur' tree.
- They speak **Birhor**, a language from the Munda group of the **Austroasiatic language family**. Their language is similar to **Santali, Mundari, and Ho languages**.
- They are mainly found in Jharkhand, but also in parts of Odisha, Chhattisgarh, and West Bengal.

Source: TH

MOLDOVA JOINS INTERNATIONAL SOLAR ALLIANCE

In News

- Moldova has officially joined the International Solar Alliance (ISA) by signing its Framework Agreement.

The International Solar Alliance (ISA)

- It is a joint initiative between India and France, established at COP21 in Paris in 2015 to combat climate change through solar energy solutions. Following a 2020 amendment, all UN member states can now join
- Over 100 countries are signatories, with 90+ ratifying full membership.
- Its mission is to secure US\$1 trillion in solar investments by 2030, reduce technology and financing costs, and promote solar energy use in agriculture, health, transport, and power generation.

Do you know ?

- Moldova is a landlocked country in the northeastern Balkan region of Europe, bordered by Ukraine and Romania.
- Its capital is Chisinau.
- The country is drained by rivers such as the Prut, Dniester, and Danube, and lies east of the Carpathian Mountains, with a well-developed network of streams and rivers flowing into the Black Sea.

Source: Air

KERCH STRAIT

In News

- A violent storm in Russia's Kerch Strait caused significant damage to two oil tankers, leading to a spill.

Kerch Strait

- The Kerch Strait, situated between mainland Russia and Crimea
- It is a connection between the Black Sea and the Sea of Azov.
- It also separates the Kerch and Taman Peninsulas.
- It is a key route for exports of Russian grain and is also used for exports of crude oil, fuel oil and liquefied natural gas.

Source :TOI

CHARAK

Context

- Northern Coalfields Limited (NCL) has rolled out 'CHARAK'- "Community Health: A Responsive Action for Koylanchal".

About Charak

- **Aim:** Providing free treatment for identified Life-Threatening diseases belonging to Economically Weaker Sections of Singrauli region in Madhya Pradesh.
- **Diseases covered:** Malignancy, TB, HIV and related complications, Cardiovascular diseases, Organ Transplant, Liver disorders, sudden hearing loss, Acute Surgical Emergencies, Neurological Disorders, Accidental trauma, etc.

Northern Coalfields Limited

- It is a subsidiary of Coal India Limited (CIL), the largest coal-producing company in the world.
- It was established in **1985** with the objective of managing and operating the coal mines in the Singrauli region.
- NCL's operations are primarily located in the Singrauli coalfields, which span across the states of Madhya Pradesh and Uttar Pradesh.

Source: PIB

IDIOPATHIC PULMONARY FIBROSIS

In News

- Zakir Hussain, tabla maestro and five-time Grammy Award winner, passed away recently due to **idiopathic pulmonary fibrosis (IPF)**.

What is Idiopathic Pulmonary Fibrosis?

- It is a **chronic and progressive lung disease** that affects the tissue surrounding the air sacs (alveoli) in your lungs.
- In IPF, this lung tissue becomes thick and stiff for unknown reasons. Over time, these changes cause **permanent scarring (fibrosis) in the lungs**. This makes it progressively harder to breathe and get enough oxygen into your bloodstream.
- **Symptoms:** Shortness of breath (especially during exercise), Fatigue, Unexplained weight loss, Chest discomfort etc
- **Treatment:** There's no cure for IPF but Antifibrotic drugs like pirfenidone and nintedanib slow the disease progression.

Source: IE

MANGANESE IN WATER IS CAUSING CANCER

Context

- A recent study highlighted that Manganese (Mn) contamination of water is causing cancer in the Gangetic plains of Bihar.

About

- Manganese** is the **fifth-most abundant metal** on earth that exists in the form of oxides, carbonates and silicates.
 - It is a **hard, brittle, silvery metal** and is present in food, water, soil, and rock as a naturally occurring component.
- Essential Trace Element:** Manganese plays a vital role in maintaining body homeostasis by supporting metabolic processes, enzyme functions, and bone health.
- Toxicity Concerns:** Excess consumption can cause severe health issues, including neurological disorders and cancer.
 - According to the **Bureau of Indian Standards (BIS)**, the acceptable limit for manganese in drinking water is **0.1 milligrams per liter (mg/L)**, and the permissible limit is **0.3 mg/L**.

Source: DTE

APICULTURE

Context

- Assam is emerging as a favored destination for migratory beekeepers due to its extensive mustard cultivation and low competition.

What is Apiculture?

- Apiculture refers to the **scientific study and management of bees and their colonies** for the production of honey and other bee-derived products.
- It involves **keeping bees in artificial structures** like wooden boxes with mesh screens to separate the hive, ensuring their safety and optimal productivity.
- Bees are valuable not only for their products but also for their critical role in **pollination**.

Benefits of Apiculture

- Crop Productivity:** Bees play a significant role in pollinating crops, improving the yield and quality of crops like mustard, coconut, areca nut, lychee, and mango.

- Biodiversity Conservation:** Bees support the reproduction of wild plants, which in turn sustains ecosystems and promotes biodiversity.
- Economic Opportunities for Farmers:** Migratory beekeeping offers additional income sources for farmers.

Honey bees in India

- India hosts more than **700 bee species**, including four indigenous honey bees:
 - Asiatic honey bee (*Apis cerana indica*),
 - Giant rock bee (*Apis dorsata*),
 - Dwarf honey bee (*Apis florea*),
 - The stingless bee (sp. *Trigona*).
- Western honey bees** (*Apis mellifera*) were introduced in India in **1983** to increase the country's honey yield.

Waggle dance and circle dance

- Bees use **two kinds of dances** to communicate information: the waggle dance and the circle dance.
- The purpose of either dance is for some honey bees to **communicate to others the location of a flower patch** with more nectar or pollen.
 - One bee dances while the others watch it to figure out the directions.

Source: TH

DIAMOND COOLING TECHNOLOGY

Context

- Akash Systems has signed a \$27 million (Rs 2.25 billion) contract with NxtGen Datacenter and Cloud Technologies, India's largest sovereign cloud provider.

What is Diamond Cooling Technology?

- The technology **involves using diamond**, the most thermally conductive material known, to manage and **dissipate heat** in electronic devices.
- Diamonds efficiently **pull heat away** from critical components, improving performance and **energy efficiency**.
- This advanced cooling mechanism outperforms conventional cooling systems, such as bulky heat sinks or liquid cooling, enabling **compact designs and sustainable operation**.

Applications

- AI servers:** The technology can reduce GPU hotspot temperatures by **10°–20°C** and slash GPU fan energy consumption by 90%.

- **Satellite communications:** Diamond cooling technology can lead to five to ten times faster data rates, increased reliability, and a 50% smaller form factor.
- **High-Power Electronics:** Used in devices with **Gallium Nitride (GaN)**-based components for efficient heat dissipation in power electronics, radar systems, and electric vehicles.

Source: IE

SCIENCE AND HERITAGE RESEARCH INITIATIVE (SHRI)

In News

- Recently five years of the Science and Heritage Research Initiative (SHRI) was celebrated.

The Science and Heritage Research Initiative (SHRI)

- It is a program which focuses on heritage research, aimed at engaging experts from various fields to address cultural heritage issues through data capture, analysis, and technological solutions.
- Its **objectives** include building capacity in human resources, promoting scientific research and development (R&D) for heritage conservation, safeguarding cultural knowledge and practices, and applying advanced technologies in preservation.
- **Key focus areas** include the study of heritage materials, remote sensing for archaeological detection, non-invasive imaging techniques, innovations in textile conservation, and the development of new materials and tools for conservation.
 - ♦ The program also aims to advance research in tribal arts and conservation technologies.

Source: Air

OLIVE RIDLEY TURTLES

In News

- Carcasses of Olive Ridley turtles are found along Visakhapatnam coast.

About Olive Ridley Turtles

- **About:** They are the smallest and most abundant of all sea turtles found in the world.
- **Scientific name:** *Lepidochelys olivacea*; also known as the Pacific ridley sea turtle.
- **Major nesting sites in India:** Rushikulya rookery coast (Odisha), Gahirmatha beach (Bhitarkanika National park) and the mouth of the Debi River.

- **Presence:** Found in **warm waters** of the **Pacific, Atlantic and Indian oceans**.
- **Features:** Known for their unique **mass nesting called Arribada**, where thousands of females come together on the same beach to lay eggs.
 - ♦ These are **carnivores** and feed mainly on jellyfish, shrimp etc.
 - ♦ The eggs **hatch in 45 to 60 days**, depending on the temperature of the sand and atmosphere during the incubation period.
- **Threats:** Hunted for meat, shell and other anthropogenic factors like fishing trawlers etc.
- **Conservation Status:**
 - ♦ IUCN Red List: **Vulnerable**
 - ♦ Schedule I of the Indian Wildlife (Protection) Act, 1972
 - ♦ CITES Appendix I

Steps Taken

- **Operation Olivia** of the Indian Coast Guard
- Mandatory use of **Turtle Excluder Devices (TEDs)** to prevent accidental killing.

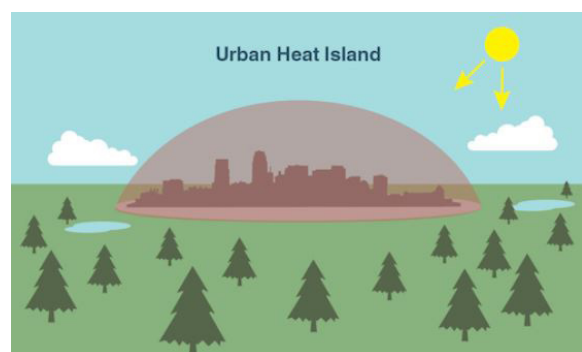
Source: TH

URBAN HEAT ISLAND EFFECT

Context

- Urbanization contributes significantly to warming in Indian cities.

What is an Urban Heat Island?



- An Urban Heat Island (UHI) is an area in which the **temperature is higher than in surrounding rural areas** due to human activities and infrastructure.
- UHI could lead to temperature differences of **up to six degrees centigrade** within a given area or neighbourhood.

Factors Responsible for Urban Heat Islands

- **Built Environment:** The materials used in urban construction, such as concrete and asphalt, absorb and retain heat, raising local temperatures.

- **Reduced Vegetation:** Urban areas typically have fewer trees and green spaces compared to rural areas, which reduces the cooling effect of shade and transpiration.
- **Human Activities:** Activities like transportation, industry, and energy consumption release heat into the environment, further elevating temperatures.
- **Altered Surface Characteristics:** Urbanization often involves replacing natural surfaces with artificial ones, which alters the surface reflectivity (albedo) and thermal properties, contributing to increased heat absorption.
- **Ecological Factors:** According to a 2014 Indian Institute of Science report, the ideal tree-human

ratio should be seven trees for every person. The lack of trees increases the risk of exposure to higher temperatures.

Concerns

- **Heat exhaustion and heatstroke,** particularly among vulnerable populations.
- **Energy Consumption:** Increased demand for cooling, which escalates energy consumption and associated greenhouse gas emissions.
- **Water Management:** UHIs disrupt local water cycles by altering evaporation rates and reducing groundwater recharge.

Source: PIB

