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4TH MASS CORAL BLEACHING

As per the US National Oceanic and Atmospheric Administration (NOAA), the fourth global mass coral bleaching event has been triggered by extraordinary ocean temperatures.

- Mass bleaching of coral reefs, since early 2023, has been confirmed in at least 53 countries, territories, and local economies including Australia's Great Barrier Reef.
- It is second such event in the past 10 years with earlier event lasting from 2014 to 2017.

About corals:

- Corals are invertebrate animals belonging to a large group of animals called **Cnidaria**.
- Generally classified as "hard coral" (reef building corals having rock-like calcareous skeleton) or "soft coral".
- Coral reefs are formed by **polyps of hard corals**, which establish symbiotic relationship with microscopic algae, called **zooxanthellae**, which give them their characteristic colours.
- **Growth Conditions for Coral Reefs:** Warm (23–29°C), salty (32-42 ppt), clear, shallow marine waters with stable temperatures and abundant sunlight.
- **Significance of reefs:** Often called rainforests of the ocean due to high biodiversity and productivity, support around 25% of marine life, minimize storm impact, promote tourism, act as carbon sink etc.

Coral Bleaching: When corals are stressed by changes in conditions such as temperature, light, or nutrients, they expel symbiotic algae, causing them to turn completely white.

Factors Responsible: Increased Ocean temperature due to climate change, runoff and pollution, extreme low tides, Ocean acidification etc.

Measures Taken for conserving coral reefs

- Global: ICRI, Global Fund for Coral Reefs, Global Coral Reef
- Monitoring Network (GCRMN), Coral Triangle Initiative (CTI), etc.
- **Coral Triangle** is a marine area located in the western Pacific Ocean. It includes the waters of Indonesia, Malaysia, Philippines, Papua New Guinea, Timor Leste and Solomon Islands.

- India: Marine Protected Areas (MPAs), Integrated Coastal Zone Management (ICZM) and coral restoration through Biorock technology, etc.

RENEWABLE ENERGY

India's RE increased 21% from previous year, primarily driven by solar installations of 12.78 GW and wind energy of 2.27 GW.

- Installed RE capacity has increased from 76.37 GW in 2014 to 178.98 GW in October 2023, i.e. an increase of around 2.34 times.

India and Renewable Energy

- India, the world's third-largest emitter of greenhouse gases, is making significant strides in its transition to renewable energy.
- The country's efforts are not only crucial for global climate change mitigation but also for addressing domestic energy needs.

RE targets in India

- India aims reaching a non-fossil fuel energy capacity of 500 GW by 2030 and
- Fulfilling at least half of its energy requirements via RE by 2030.

Steps Taken

- Setting up of **Ultra Mega Renewable Energy Parks**, to provide land and transmission to RE developers on plug and play basis.
- Schemes: **PM-KUSUM**, PLI Scheme under 'National Programme on High Efficiency Solar PV Modules, **National Bioenergy Programme** etc.
- Promoting RE through Green Energy Open Access Rules 2022.
- **Wind-Solar Hybrid Policy 2018**.

Challenges

- Variability and unpredictability of RE sources.
- High Costs.
- Need to develop new infrastructure.
- Poor financial condition of power distribution companies.
- Transmission and grid integration issues.
- Unequal geographical adoption of renewables.

Installed capacity for Renewables (accounting 41.4% Of India's total energy mix)

- wind power: 45.15 GW
- Solar Power: 75.57 GW
- Biomass/Co-generation: 10.2 GW
- Small Hydro Power: 4.99 GW
- Waste To Energy: 0.58 GW
- Large Hydro: 46.92 GW

SOIL ACIDIFICATION

A recent study has raised concerns about the **significant loss of soil inorganic carbon (SIC) due to soil acidification in India**, where over **30% of cultivable land carries acidic soil**.

Key findings

- Over 30% of cultivable land in India is said to carry acidic soil, impacting plant growth.
 - Acidic soils are those that have a pH value of less than 5.5.
- Soil acidification might lead to loss of **Soil Inorganic Carbon (SIC)** from topsoil.
 - SIC includes mineral forms of carbon like calcium carbonate produced by weathering of parent material or from reaction of soil minerals with atmospheric carbon dioxide (CO₂).
- Soil Acidification is a process by which soil pH decreases over-time.

Factors Accelerating Soil Acidification

- Leaching of nitrogen released from ammonium-based fertilizers.
- Organic residues on decomposition release organic acids.
- Roots, during active growth stages, release CO₂ into soil resulting in formation of carbonic acid.

Impacts of Soil Acidification

- **Loss of SIC:** SIC is mostly carbonate. Low pH levels dissolve carbonate and remove it either as CO₂ gas or release it directly into water.
- **Loss of Microbes:** Bacteria cannot survive in acidic conditions.

- **Aluminium Toxicity:** When soil pH drops, aluminium becomes soluble, and its amount in soil solution increases which is toxic to roots of sensitive plant species.
- **Other Impacts:** Rise in Pathogenic fungi, Decreased Nutrients availability etc.

Note: Soil organic carbon (SOC) comes from plants, animals, microbes, leaves and wood, mostly found in the first metre or so.

- Soil organic carbon is a **measurable component of soil organic matter**. Organic matter makes up **just 2–10% of most soil's mass** and has an important role in the physical, chemical and biological function of agricultural soils.
- Organic matter contributes to **nutrient retention** and turnover, **soil structure, moisture retention and availability**, degradation of pollutants, and carbon sequestration.
- **Soil organic matter** is composed mainly of **carbon, hydrogen and oxygen**, and has small amounts of other elements, such as nitrogen, phosphorous, sulfur, potassium, calcium and magnesium contained in organic residues

MARINE CLOUD BRIGHTENING

Recently, scientists are testing a geoengineering technique called marine cloud brightening.

About **Marine cloud brightening:**

- Marine cloud brightening is a scientific initiative that explores how altering atmospheric particles (aerosols) can impact cloud reflectivity.
- By releasing tiny aerosol particles into the atmosphere, researchers aim to enhance cloud brightness, leading to increased sunlight reflection.
- Aerosols of the right size and concentration could significantly increase the reflectivity of specific types of clouds.
- This phenomenon is visible in satellite images of clouds brightened by ship emissions (known as “ship tracks”).

Goals of the Marine Cloud Brightening Program:

- Better understanding of the present-day effects of pollution aerosols on clouds.

- Investigate whether aerosol particles made from sea salt could be used to intentionally reduce near-term climate warming while greenhouse gas concentrations are brought down to safer levels.
- Understand the benefits, risks, and efficacy of the intentional use of aerosols to reduce warming through different implementations of marine cloud brightening.

Geoengineering refers to a set of emerging technologies that could manipulate the environment and partially offset some of the impacts of climate change.

Types of Geoengineering:

- **Solar Radiation Management:** It reflects sunlight back into space. E.g. using orbiting mirrors, modifying clouds, etc.
- **Carbon Dioxide Removal:** In it, techniques suck carbon out of the atmosphere using a combination of biological and mechanical methods. E.g. Seeding Ocean with iron pellets to create plankton blooms.
- **Earth Radiation Management:** It allows heat to escape into space from Earth. For instance, by thinning cirrus clouds.

Concerns associated with Geoengineering:

- Aerosol particles in the stratosphere could have implications for recovery of ozone layer.
- Repercussions for weather patterns in the lower atmosphere.
- Creating a “moral hazard”, providing stakeholders with an excuse to not reduce the use of fossil fuels.

GLOBAL FOREST WATCH (GFW)

Recently, the latest data from the **Global Forest Watch (GFW)** monitoring project has revealed that India has lost 2.33 million hectares of tree cover since the year 2000. This is equivalent to a 6% decrease in tree cover during 2001-2023.

- Tree cover is an estimated area comprising of tree patches, which are less than 1 hectare and isolated trees outside the recorded forest.
- Whereas, Forest cover is defined as an area more than 1 hectare in extent and having tree canopy density of 10% and above.

Other Key Findings

- **Total Loss:** The GFW data reveals that India lost a staggering 4,14,000 hectares of humid **primary forest** (approximately 4.1% of the total tree cover) between 2002 and 2023.
- Five states, Assam followed by Mizoram, Arunachal Pradesh, Nagaland and Manipur, accounted for 60% of all tree cover loss between 2001-2023.
- Between 2001-22, Net Carbon Sink of 89.9 million tons has been observed.
- Lakshadweep has largest relative plantation area at 76%.

Drivers of Tree cover loss

- Deforestation caused 3.3% of tree cover loss occurred from 2001 to 2022.
- Climate Change fuels extreme heat thereby increase in wildfires and loss of tree cover.
 - As per GFW, Tree cover loss due to fires has been highest in Odisha followed by Arunachal Pradesh (2001-22).

India's initiatives to improve Tree cover

- Green India Mission to increase Forest/Tree Cover to the extent of 5 mha and improve quality of forest/ tree cover on another 5 mha of forest/non-forest lands.
- Nagar Van Yojana to enhance green cover in urban and peri-urban areas

RINGWOODITE

Scientists have made a ground-breaking discovery of a gigantic ocean lying 700 kilometres beneath the Earth's surface, hidden within a rock called ringwoodite.

- This subterranean reservoir, three times the volume of all the planet's surface oceans combined, was revealed through studies of seismic activity.
- Ringwoodite's unique properties allow it to **trap water like a sponge**.
- This discovery suggests a whole-Earth water cycle and sheds light on the abundance of liquid water on the planet's surface.
- Ringwoodite **is a mineral that** forms in the Earth's mantle at high temperatures and pressures.
- It's a water-rich mineral that can contain iron and hydrogen.

NATIONAL HUMAN RIGHTS COMMISSION (NHRC) MEETING

Recently, **NHRC** convened a meeting of all seven **national commissions** to discuss protecting the rights of **vulnerable sections**, aiming to share best practices and collaborate on implementation strategies

- The objective of the meeting was to discuss the issue of ensuring the protection of the rights of the vulnerable and marginalized sections.
- The seven bodies include **National Commission for Women (NCW)**, **National Commission for Scheduled Castes (NCSC)**, **National Commission for Scheduled Tribes (NCST)**, **National Commission for Protection of Child Rights (NCPCR)**, **National Commission for Minorities (NCM)**, **National Commission for Backward Classes (NCBC)**, and **Office of Chief Commissioner for Persons with Disabilities**.

About NHRC

- Established in 1993 as a Statutory body under the Protection of Human Rights Act (PHRA), 1993 as amended by the
- Protection of Human Rights (Amendment) Act, 2006.
 - Its establishment is aligned with the Paris Principle (sets out the international minimum standards for national human rights institutions).
- **Composition:** A Chairperson, five full-time Members and seven deemed Members.
 - Deemed Members include Chairpersons of other key National commissions such as National Commission for Scheduled Caste etc.
 - Protection of Human Rights (Amendment) Act, 2019 provided that Judge of the Supreme Court can be appointed as chairperson in addition to the person who has been the Chief Justice of India.
- **Tenure:** Three years or till the age of seventy years for both the Chairperson and Members.

Power and Functions of NHRC

- It has all the powers of a civil court while trying a suit under the Code of Civil Procedure, 1908.

- Inquire into any violation of human rights or negligence in the prevention of such violation by a public servant, either suo motu or on a petition.
- Intervene in proceeding w.r.t. allegation on violation of HRs pending before a court.

IRDAI'S - 25TH ANNIVERSARY

Insurance Regulatory and Development Authority of India (IRDAI) celebrated its 25th Anniversary

About IRDAI

- **Genesis:** Formed based on Malhotra Committee recommendations.
 - Constituted as an autonomous body in 1999 and incorporated as a statutory body in 2000 (Under Insurance Regulatory and Development Authority Act, 1999).
- Head Office – **Hyderabad.**
- Composition – **10-member body** with a Chairman, 5 full-time members, and 4 part-time members appointed by the Government of India.
- **Objectives:** speedy and orderly growth of insurance industry, speedy settlement of genuine claims, effective grievance redressal mechanism, etc.
- Ministry: Ministry of Finance

Duties and Responsibilities

- Certify insurance companies.
- Protect the interest of the policyholders.
- Adjudication of disputes.

Significance of IRDAI in transforming the Insurance sector

- Growth:
 - Insurance penetration (percentage of insurance premium to GDP) at 4.2% in 2021-22 compared to 2.71% in 2001-02.
 - Insurance Density (ratio of premium to population) at \$91 in 2021-22 compared to \$11.5 in 2001-02.
- Increased Employment: new intermediaries have started operating in the market, like corporate agents, Bancassurance (selling insurance products through banks), on-line sales, etc.

- Modernization: The digital transformation accelerated by the authority's guidance on e-KYC, paperless policies, digital payments, etc

Initiatives of IRDAI

- Integrated Grievance Management System
- Saral Jeevan Bima: a standard term life insurance product
- Saral Pension: an immediate annuity plan
- Bima Sugam: one stop digital platform

ADVANCE PRICING AGREEMENTS (APAS) IN FY 2023-24

The **Central Board of Direct Taxes (CBDT)** has achieved a remarkable milestone by signing 125 **Advance Pricing Agreements (APAs)** during the fiscal year 2023-24.

- This marks the highest ever APA signings in any financial year since the launch of the APA programme (2012).
- 125 APAs includes 86 Unilateral APAs (UAPAs) and 39 Bilateral APAs (BAPAs).

Advance pricing agreements:

- APA is an agreement between the Tax Authority and any person (taxpayer), which determines, in advance, the arm's length price or specifies the manner of the determination of arm's length price (or both), in relation to an international transaction.
- Arm's length price refers to a deal in which parties act independently without one party influencing the other.
- APAs allow businesses to reduce the risk of their transaction prices being challenged by tax authorities.

Key Features of APA:

- Signed under the Income-tax Act, 1961.
- Voluntary in nature.
- Duration: Maximum of 5 future years (further, can be extended for 4 more proceedings years).

Types of APAs:

- Unilateral: Involves only the taxpayer and the tax authority of the country where the taxpayer is located.

- Bilateral: Involves the taxpayers, the tax administration of the host country and the foreign tax administration.
- Multilateral: Involves the taxpayers, the tax administration of the host country and more than one foreign tax administrations.

Key Benefits:

- Supplements Double Taxation Avoidance Agreement (DTAA) mechanism for resolving transfer pricing dispute.
- Promotes ease of doing business, especially for Multi National Enterprises

Central Board of Direct Taxes (CBDT)

- A statutory body, established as per the Central Board of Revenue Act, 1963.
- Ministry: Works under the Department of Revenue, Ministry of Finance.
- Functions: Formulating policies concerning the assessment and collection of direct taxes.

STATE FINANCES

Recently, Karnataka approached SC to seek relief against Centre in matters related to release of financial assistance from National Disaster Response Fund (NDRF) for drought management.

- Earlier, Tamil Nadu also approached SC for non-disbursal of funds by centre under NDRF to deal with calamities of cyclone Michaung and unprecedented floods.

Status of State Finance

- States finance only 58 % of their revenue expenditure from their revenue sources.
- Debt-GDP ratio of states stands at 27.5 % (March 2023)

Measures taken to improve State Finance

- Scheme for Special Assistance to States for Capital Expenditure provides 50-year interest-free loans to States.
- 15th Finance Commission recommended performance-based additional borrowing space of 0.50% of State GDP to States in power sector.

Constitutional provisions related to states finances

Article 275: Parliament may by law provide to certain states, grants- in-aid charged on Consolidated Fund of India.

Article 282: Enables Union (and states) to make discretionary grants, for any 'public purpose'.

Article 293: Confers power on States to borrow money within limits prescribed by State legislature.

GROSS FIXED CAPITAL FORMATION (GFCF)

Private investment in India, measured by Gross Fixed Capital Formation (GFCF) as a percentage of GDP, has seen a decline since 2011-12.

- Despite government efforts like corporate tax cuts, private investment hasn't picked up.

What is GFCF?

- Gross Fixed Capital Formation, measures the growth in fixed capital in an economy, including assets like buildings and machinery.
- It serves as an indicator of private sector investment willingness and includes government investment.
- GFCF is important because fixed capital boosts economic growth by increasing productivity and living standards.
- Developed economies tend to have more fixed capital per capita compared to developing ones.
- Historically, private investment surged after the 1990s economic reforms but dropped post-2008 financial crisis.
- It peaked at 27% of the economy in 2007-08 but declined after 2011-12, reaching a low of 19.6% in 2020-21.
- **Reasons for Decline:** Private investment decline is attributed to low consumer spending, poor government policies and uncertainty

SHRINKFLATION

Shrinkflation, the reduction in product sizes while maintaining prices, is resurfacing in the fast-moving consumer goods (FMCG) industry due to rising input costs.

- Brands like Clear, Frooti, and Smooth are introducing smaller packaging at the same or slightly reduced prices to cope with inflation.

- The trend is attributed to various factors, including rising prices of commodities like crude oil, palm oil, coffee, cocoa, and sugar, alongside global supply chain disruptions and geopolitical tensions.

Shrinkflation refers to the practice employed by manufacturers wherein the size or quantity of a product is reduced while keeping its price the same or slightly adjusted.

Causes for Shrinkflation:

- **Cost Management:** It helps companies manage rising production costs, such as raw materials or labor, without sacrificing profitability.
- **Market Competition:** In competitive markets, companies may use shrinkflation to maintain their market share by keeping their prices competitive.

Effects of Shrinkflation:

- **Consumer Perception:** If consumers notice the change, it can lead to negative perceptions of the brand, loss of trust, and reduced customer loyalty.
- **Accuracy of Inflation Measurement:** Shrinkflation complicates accurate measures of inflation since the price remains constant while the quantity decreases.

Limitations: Companies can only implement shrinkflation discreetly and for a limited number of times before consumers become aware and react negatively. Overuse can damage brand reputation.

CROWDFUNDING

Gujarat high court sought details on regulations around crowdfunding.

Crowdfunding is solicitation of funds (small amount) from multiple investors through web-based platform or social networking site for specific project, business venture or social cause.

- Traditional fundraising consists of asking for a sum from limited set of sources.
- **Securities and Exchange Board of India (SEBI) regulates Crowdfunding in India.**

SEBI guidelines on Crowdfunding :

- Only “Accredited Investors” may invest i.e.

- Companies incorporated under Companies Act, 2013 with minimum net worth of Rs 20 crore,
- High Net Worth Individual with minimum net worth of Rs 2 crore,
- Eligible Retail Investors who have a minimum annual gross income of Rs. 10 Lacs.

SPECIAL RUPEE VOSTRO ACCOUNT (SRVA)

India has simplified the payment mechanism for **traders importing pulses from Myanmar**, requiring them to use the Rupee/Kyat direct payment system through the **Special Rupee Vostro Account (SRVA)** through the Punjab National Bank.

What is SRVA?

- SRVA is an account that domestic banks hold for foreign banks in the former's domestic currency, the rupee, which allows domestic banks to provide international banking services to their clients who have global banking needs without having to be physically present abroad.
- The SRVA is an additional arrangement to the existing system that uses freely convertible currencies and works as a complimentary system.

It has three important components:

- All exports and imports must be denominated and invoiced in domestic currency (e.g. Rupee)
- The exchange rate between the currencies of the trading partner countries would be market-determined
- The final settlement also takes place in domestic currency (e.g. Rupee)

This mechanism aims to streamline trade transactions and reduce costs associated with currency conversions.

Note:

1. Vostro Accounts:

- Named from the Latin word "vostro," meaning "yours."
- Represents a domestic bank's account held by a foreign bank in the local currency (e.g., INR in India).
- Allows foreign banks to manage local currency transactions on behalf of their clients.
- For example, a foreign bank holding an account in an Indian bank in Indian Rupees (INR) for facilitating transactions within India.

2. Nostro Accounts:

- Derived from the Latin word "nostro," meaning "ours."

- Refers to a foreign bank's account held by a domestic bank in the foreign currency (e.g., USD in the United States).
- Enables domestic banks to handle foreign currency transactions for their clients.
- For instance, an Indian bank holding an account in a U.S. bank in U.S. Dollars (USD) to facilitate international transactions in the U.S. currency.

3. Loro Accounts:

- From the Italian word "loro," meaning "their."
- Represents an account held by one foreign bank in another foreign bank's currency.
- Facilitates interbank transactions between two foreign banks without converting currencies into a domestic currency.
- For example, if a bank in India holds an account in a bank in the United States in USD (U.S. Dollars) to facilitate transactions between those two banks

NATIONAL INVESTMENT AND INFRASTRUCTURE FUND (NIIF)

NIIF has invested \$200 million in iBUS Network and Infrastructure Pvt Ltd.

About NIIF (2015)

- A Sovereign-linked Alternative Asset Manager, established by the Government of India (having a share of 49%).
- It is a collaborative investment platform for international and Indian investors.
- It operates in two distinct and attractive asset classes:

Indian Infrastructure and Growth Equity.

- It was established as an Alternative Investment Fund (AIF), registered with Securities and Exchange Board of India (SEBI).
- Its governing council is headed by Finance Minister.
- Key Funds under NIIF: Master Fund, Strategic Opportunities Fund (SOF) etc.

UNCTAD REPORT 2024

UN Trade and Development (UNCTAD) in its recently released report noted that Indian economy grew by 6.7% in 2023 and is expected to expand by 6.5% in 2024

- Report highlights challenges to global merchandise trade, impact of developed economies' monetary policy and global debt crisis.

Status of Indian Economy:

- **Strong Investment:** The report highlights that investment in South Asia, particularly in India remains strong and India maintains its position as one of the fastest-growing major economies.
- **India as manufacturing base:** The report highlights a significant trend of multinational companies setting up manufacturing in India to diversify their supply chains away from China, which is expected to boost Indian exports.
- **Impact on Imports:** Setting up manufacturing bases in India would moderate the prices of commodities and would benefit India's import bill.

United Nations Conference on Trade and Development

- It is a permanent intergovernmental body and the leading institution of UN dealing with trade and development,
- Established: By the United Nations General Assembly in 1964 and headquartered in Geneva, Switzerland.
- Objective: It aims to maximize the benefits of globalization and liberalization while reducing the costs to the weaker economies.
- UNCTAD's work focuses on four main areas: trade and development, investment and enterprise, technology and innovation, and macroeconomics and development policies.
- It supports vulnerable economies by helping them integrate beneficially into the global economy.
- UNCTAD also focuses on improving the competitiveness and economic diversification of these economies.
- **Reports published by the UN Trade and Development**
 - Trade and Development Report
 - World Investment Report
 - The Least Developed Countries Report

ORGAN DONATION IN INDIA

The Ministry of Health and Family Welfare has initiated an investigation into organ transplants involving foreign nationals following concerns about potential commercial dealings.

- National Organ & Tissue Transplant Organization (NOTTO) data shows a significant rise in foreign nationals receiving organ transplants from private hospitals, with reports suggesting unauthorized “commercial dealings.”

What is Organ transplantation?

- Organ transplantation is the surgical procedure of removing an organ from one person and implanting it into another person’s body.

Laws regarding Organ Transplantation in India:

- The primary law governing organ transplants in India is the Transplantation of Human Organs Act (THOA), 1994.
- India ranks third globally in the number of transplants conducted. Overall, organ transplants, including both deceased and living donors, increased from 4,990 in 2013 to 15,561 in 2022.
- **Eligibility:**
 - Organ donation eligibility is primarily based on the donor’s physical condition (and not age), with both living (above 18 years) and deceased individuals being eligible.
 - Consent from the family is required for deceased organ donation.
 - According to the latest guidelines, individuals above 65 years can receive organs for transplantation from deceased donors, and the requirement of state domicile for patient registration was removed.

Measures to be taken:

- **Compliance with THOTA:** Authorities should ensure compliance with the Transplantation of Human Organs & Tissues Act (THOTA), 1994, investigating any breaches and taking appropriate action.
- **Unique ID:** Health authorities must ensure the generation of a unique NOTTO-ID for both organ donors and recipients in all transplant cases to enhance transparency and traceability.
- **Data Sharing:** Ensure regular collection and sharing of transplant data, including cases involving foreigners, with NOTTO to enhance transparency and accountability.

National Organ and Tissue Transplant Organization (NOTTO)

- It is a **national level organisation** set up under the **Directorate General of Health Services, Ministry of Health and Family Welfare**.
- It functions as the **apex centre** for all India activities of coordination and networking for procurement and distribution of organs and tissues and registry of organs and tissues donation and transplantation in the country.
- It has following **two divisions**:
 - **National Human Organ and Tissue Removal and Storage Network**
 - **National Biomaterial Centre**
- **Mandate**:
 - To **establish a network** for organ procurement and distribution.
 - To **maintain a national registry** on organ donation and transplantation

SLEEPING GIANT BLACK HOLE

Astronomers have discovered the most massive known stellar black hole nicknamed “Sleeping Giant” in the Milky Way galaxy, named Gaia BH3, **located** 1,926 light-years away in the Aquila constellation.

- Its mass is **nearly 33 times that of the sun**, making it the second-closest black hole on Earth.
- This discovery was made through observations from the Gaia space telescope, detecting a wobble in space caused by the gravitational influence of Gaia BH3 on its companion star.
- The **study offers insights into the** formation of such massive black holes and their connection to metal-poor stars.

INTER-AGENCY SPACE DEBRIS COORDINATION COMMITTEE (IADC) ANNUAL MEETING

In the meeting, the ISRO Chief announced that India aims to achieve debris-free space missions by 2030.

- Space debris refers to all non-functional, artificial objects, in Earth's orbit or re-entering into Earth's atmosphere.

Need for mitigating space debris

- **Threat to space exploration**: Collisions with debris can disable an operational spacecraft, smaller debris can scour components like optics and solar panels, etc.

- **Kessler syndrome:** Uncontrolled growth of debris can lead to an escalating cascade of collisions, known as the Kessler syndrome
- **Risk to life on Earth:** Large space debris that re-enter the atmosphere in an uncontrolled way can survive re-entry to reach Earth's surface, creating risk to the population on the ground.

Initiatives for space debris mitigation

By ISRO

- **ISRO System for Safe and Sustainable Space Operations Management (IS4OM)** for efficient information on on-orbit collision, fragmentation, etc.
- **Project NETRA** (Network for Space Objects Tracking and Analysis) for establishing a space surveillance and tracking network with RADARS and Optical Telescopes.

Global

- REMOVEDEBRIS to perform key active debris removal (ADR) technology demonstrations.
- UN Liability Convention (Convention on International Liability for Damage Caused by Space Object), 1972
- UN Registration Convention (Convention on Registration of Objects Launched into Outer Space), 1976

About IADC

- **Genesis:** Established in 1993 as an international forum for space agencies, organizations, and governmental bodies.
- It is **not a regulatory organization**

Purpose:

- Exchange information on space debris research activities between member space agencies.
- Facilitate opportunities for cooperation in space debris research.
- Identify debris mitigation options.
- **Function:** IADC provides technical recommendations to the world space communities. It is not a regulatory organization.
- **Members:** Space agencies of 13 countries including India (ISRO), US (NASA), Russia, France, UK, EU, China, Germany, Japan, Canada, South Korea, Ukraine, and Italy.

India in IADC –

- India participates in IADC-activities with regard to space debris management, undertaking SOPA (Space Object Proximity Awareness and COLA (Collision Avoidance) Analysis.
- India aims to achieve debris-free space missions by 2030

ARTEMIS ACCORDS

Sweden becomes 38th country to sign NASA's Artemis Accords for moon exploration.

- Artemis Accords was established in 2020 by NASA, in coordination with the US Department of State, together with seven other founding member nations.

About Artemis Accords

- Grounded in Outer Space Treaty (OST) of 1967, these are a non-binding set of principles designed to guide civil space exploration and use in the 21st century.
- It represents multilateral leadership in civil space diplomacy and brings together a diverse set of nations with a shared vision of peaceful space cooperation.
- India is a signatory to the Artemis Accords.
- Commitment of Signatories under the Accords
- Broad dissemination of national space policies and scientific information resulting from their activities.
- Recognize development of interoperable and common exploration infrastructure and standards such as communication systems, landing structures, etc.
- Implement MoUs between governments or agencies as per the Outer Space Treaty 1967.
- Preserve outer space heritage, including historic landing sites and evidence of activity on celestial bodies.
- Mitigate orbital debris and induce safe and timely disposal of spacecraft at the end of missions.

International Treaties Governing Outer Space

- Outer Space Treaty (1967): Provides basic framework for international space law.
- Rescue Agreement (1968): To rescue and assist astronauts in distress.

- Liability Convention (1972): Provides that launching State shall be absolutely liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft.
- Registration Convention (1976): Registration of objects launched into outer space.
- Moon Agreement (1979): Provides that the Moon and its natural resources are the common heritage of humankind.

Note: India has ratified all these treaties, except the Moon Agreement of 1979. India, however, is a signatory to Moon Agreement.

INDIGENOUS TECHNOLOGY CRUISE MISSILE (ITCM)

Defence Research and Development Organisation (DRDO) conducted test from the Integrated Test Range (ITR), Chandipur on the eastern coast.

About ITCM

- Developed by the Aeronautical Development Establishment (ADE) of DRDO.
- It is a long-range subsonic cruise missile powered by an indigenous propulsion system.
 - The propulsion system is developed by Gas Turbine Research Establishment.
 - Cruise missiles are unmanned vehicles that remain within the atmosphere and can fly as low as a few meters off the ground.
 - Subsonic cruise missile flies at a speed lesser than that of sound (around 0.8 MACH)

Reasons for Missile and Satellite launch from the Eastern coast

- A satellite launched from the sites near the equator towards the east direction gets an initial boost equal to the velocity of Earth's surface.
 - It helps in cutting down the cost of rockets used to launch the satellites.
- In case of the failure of satellite/missile, the Bay of Bengal provides a safe corridor that does not fall on built-up hinterland.
- Does not have major international maritime or airline routes crisscrossing testing.
 - During test launches, the few existing routes can be closed temporarily without causing much disruption.

Aeronautical development establishment ADE

- Located: Bengaluru
- About: It is a key Aeronautical Systems Design House involved in the design and development of state-of-the-art Unmanned Aerial Vehicles (UAV) and Aeronautical Systems and technologies.

Major activities:

- ABHYAS: High-speed Expendable Aerial Target (HEAT).
- Rustom-1: the first Indian Remotely Piloted Aircraft System to have conventional take-off and landing capabilities.
- Provided state-of-the-art inertial and Global Navigation Satellite System sensors for the UAV flight control and guidance.

GPS SPOOFING

Israel reportedly used GPS jamming to confuse Iran's missile targeting teams ahead of Iran's direct attack on Israel.

- This technique, similar to what the US allegedly did during India's Kargil war in 1999, can hinder military operations by degrading GPS signals.
- The US initially employed "selective availability" to degrade GPS accuracy for India during the Kargil war, prompting India to develop its own navigation system called NavIC.
- In the recent incident, Israeli locals found their GPS showing them in Cairo or Beirut, causing confusion about throwing off Iran's missiles.

About GPS Spoofing:

- GPS spoofing, also known as GPS simulation, involves manipulating or tricking a GPS receiver by broadcasting false GPS signals.
- This leads the receiver to believe it is located somewhere it is not, resulting in inaccurate location data.
- This cyber-attack undermines the reliability of GPS data, critical for navigation, time synchronization, and more.
- While initially a theoretical threat, GPS spoofing has become a practical concern due to affordable software and hardware capable of transmitting fake signals.
- This evolution poses risks and security challenges for industries, governments, and individuals.

FDI IN THE SPACE SECTOR

The **Ministry of Finance** has notified Foreign Direct Investment (FDI) regulations in the space sector under the Foreign Exchange Management Rules, allowing Indian space start-ups to access global capital.

- **74% FDI for satellite manufacturing, up to 49% for launch vehicles, and up to 100% for component and system manufacturing.**
- Investment beyond 49% for spaceports requires government approval.
- A foreign direct investment is a substantial, lasting investment made by a company or government into a foreign concern.
- FDI investors typically take controlling positions in domestic firms or joint ventures and are actively involved in their management.

SATELLITE CALLS

Chinese scientists have developed the world's first satellite that enables smartphones to make direct calls through it, bypassing mobile towers.

- This innovation aims to address communication challenges during emergencies, such as natural disasters.
- The satellite, part of the **Tiantong Project**, symbolizes China's commitment to enhancing communication resilience.
- The **Tiantong-1 series, involving three satellites**, orbits synchronously at 36,000 kilometres altitude, potentially revolutionizing communication across the Asia-Pacific region.
- In September 2023, Huawei Technologies launched the world's first smartphone supporting satellite calls, connecting directly to Tiantong satellites, followed by similar models from other companies.
- Chinese consumers have embraced these products, with Huawei alone selling tens of millions of units, surpassing SpaceX's Starlink satellite service with over 2 million global customers.

MENINGITIS VACCINE

Nigeria has made history by being the **first country globally to introduce the Men5CV vaccine**, a groundbreaking step in combating meningitis.

- It offers protection against five strains of meningococcus bacteria in a single shot.
- Meningococcal ACWY Vaccine is the one available in India.

About Meningitis

- It is inflammation of surrounding tissues of brain and spinal cord.

- Caused by bacteria, viruses, fungi and parasites.
- Mostly transmitted from person to person.
- Although it affects all ages, young children are most at risk.
- Symptoms are neck stiffness, fever, confusion, headaches, nausea.

CHAGAS DISEASE (AMERICAN TRYPANOSOMIASIS)

The World Health Organisation (WHO) observes World Chagas Disease Day every April 14th to raise awareness about the little-known disease that affects millions of people, especially in Latin America

- This year's theme is "time to integrate Chagas disease into primary health care".

About Chagas Disease

- Life-threatening illness caused **by protozoan parasite** *Trypanosoma cruzi*.
- **Found mainly in Latin American countries, where it is mostly vector-borne.**
- Transmitted by triatomine bug (vector-borne), and orally (food-borne), during pregnancy or birth (congenital), through blood/blood products, organ transplantation.
- Often called "silent disease" because of no symptoms either during acute or chronic phases of infection until damage is too advanced to be reversed.
- Disease is clinically curable if treatment is initiated at early Stage.
- There are currently no vaccines available for Chagas disease, but antiparasitic medicines Benznidazole and Nifurtimox can treat the disease. They have a 100% efficacy rate if administered at the onset of the acute stage.
- Preventive measures have been put in place by countries to eliminate the bugs or reduce infections.
- Universal screening of blood donors and blood products is done by all Latin American countries and other countries reporting new cases.

EUVICHOL-S

World Health Organization (WHO) has prequalified the Euvichol-S vaccine for Cholera.

- It's a simplified formulation of the oral cholera vaccine (OCV) Euvichol-Plus.

- Uses fewer ingredients, is cheaper, and can be made more quickly than old version.

About Cholera:

- It's an acute diarrheal illness caused by infection of the intestine with *Vibrio cholerae* bacteria.
- It's transmitted through ingestion of contaminated food or water.
- Highest numbers of cases are reported in the Middle East and Africa
- India reported 132 cases in 2023 (till July)

INDIA'S FY24 PULSES IMPORTS HIT 6-YEAR HIGH

India's **pulses imports skyrocketed 84%** in fiscal 2024, reaching a **six-year high**. This jump follows **lower production** and the government's **decision to waive import duties** on red lentils and yellow peas.

- This happened due to lower production that prompted India to import red lentils and yellow peas.

Why does India import pulses?

- To ensure stable supplies in domestic market and keep prices under check.
 - Pulses inflation was at 17% in March 2024.
- Shortfall in domestic output following deficit rainfall in growing areas.
 - Ministry of Agriculture estimates pulses production in 2023-24 will be at 234 lakh tonnes, lower than last year production (261 lakh tonnes).
- Pulses sowing area has reduced by 16% from 2021-22 to 2023-24.

India's Status with respect to Pulses

- India is largest producer (25 % of global production), consumer (27 % of world) and importer (14% of pulses) of Pulses in world.
- India imported 4.65 million metric tons of pulses in FY2023-24.
- Major producing states: Punjab, Haryana, Western Uttar Pradesh, etc.
- Major import countries: Canada, Australia, Mozambique, Tanzania, Brazil etc.

About Pulses

- Type of leguminous crop that are harvested for dry seed. E.g. Chickpeas, pigeon peas etc.
- Grown in both Kharif and Rabi seasons.
- Rabi pulses contribute more than 60% of total production.

Significance of Pulses

- Major sources of protein.
- Nitrogen-fixing properties of pulses improve soilfertility, which increases productivity of farmland.

Initiatives taken to promote Pulses

- National Food Security Mission (NFSM) to increase the production of rice, wheat and pulses.
- Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM- AASHA) Scheme to ensure Minimum Support Price to farmers.
- Under it, procurement of Pulses and Copra shall be done under Price Support Scheme

EXERCISE DUSTLIK

Indian Army contingent departed for the 5th edition of **India-Uzbekistan joint military Exercise DUSTLIK**, scheduled from 15th to 28th April 2024 in Termez, Uzbekistan.

- It is joint military exercise between Indian and Uzbekistan Army, conducted every year



BRAHMOS CRUISE MISSILES

India delivers first batch of brahmos cruise missiles to the Philippines.

- The supply was made in accordance with the USD 375 million agreement that the two nations agreed in 2022.
- Also, India recently delivered two Dornier 228 aircraft to Guyana, spreading export linkages to Caribbean nations as well.
- These are seen as major developments in defence exports from India.

Defence Export of India

- India is currently exporting military hardware to around 85 countries.
- Major export items include missiles, artillery guns, rockets, armoured vehicles, etc.
- In FY 2023-24, exports reached an all-time high of Rs. 21,083 crore.

Key Opportunities:

- Strategic Leverage (bolster relationship with nations)
- Enhances Self-reliance in defence by increasing defence manufacturing capabilities, etc.

Key Challenges: Delays in export clearances decreasing competitiveness of Indian defence products, historical perception of inconsistency in the quality etc.

Initiatives

- The Draft Defence Production & Export Promotion Policy: It has set the goal of achieving a turnover of Rs 1,75, 000 crore (\$25 billion) in the defence sector.
- Simplification of Export Procedures: India Defence Mart (an online platform) has been launched for companies to apply for export licenses and track their applications.
- Other: Scheme for Promotion of Defence Exports (SPDE), Innovation for Defence Excellence (iDEX), Defence Acquisition Procedure (DAP 2020) etc.

About Brahmos

- Developed under the joint venture agreement between India and Russia.
- It is a two stage Supersonic Cruise Missile (travels at a speed of around 2-3 Mach).
- Cruise Missile is propelled by jet engines.

Key Features:

- Fire and Forget principle of operation.
- Long flight range (290km) with varieties of flight trajectories.
- Low radar signature.

DURGA-2 (DIRECTIONALLY UNRESTRICTED RAY GUN ARRAY)

Recently, the **Defence Research and Development Organisation (DRDO)** has sought USD 100 million from the Ministry of Defence to develop a high-power laser weapon, named **Directionally Unrestricted Ray-Gun Array (DURGA) II**, a lightweight directed energy weapon (DEW).

About DURGA-2:

- It is a directed energy weapon (DEW).
- It's to be integrated with land, sea and air-based platforms.

Directed-Energy Weapons (DEWs)

- It is a type of weapon system that **emits highly focused energy**, typically in the form of **lasers, microwaves, or particle beams**, to incapacitate or destroy targets.
- Unlike traditional firearms or explosives which rely on **kinetic energy (physical impact)**, **DEWs use directed energy** to achieve their effects.
- DEW use concentrated electromagnetic energy to combat enemy forces and assets.
- These weapons include high energy lasers and other high power electromagnetics—such as millimeter wave and high power microwave weapons.
- They are going to be the future of anti-missiles, anti-drones or anti-aircraft warfare.

EXOSKELETON

DRDO organized the first international workshop on 'Emerging Technologies & Challenges for Exoskeleton' in Bengaluru.

What is Exoskeleton?

An exoskeleton is a **mobile machine resembling an insect's exoskeleton**, worn by a person. It's powered by motors, hydraulics, or pneumatics to aid limb movement. Applications include **aiding people with disabilities, assisting soldiers in carrying heavy loads**, and use in factories and assembly lines.



BOHAG/RONGALI BIHU

Bohag Bihu, also known as Rongali Bihu, marks the advent of the Assamese New Year and the arrival of spring

About Rongali/Bohag Bihu

- Celebrated in middle of April, it marks the beginning of Assamese New Year and onset of spring.
- There are 3 Bihu festivals in Assam. Other two- Kati Bihu and Magh Bihu are celebrated in October and January, respectively.
- It is a 7 day festival, where first day is called Goru Bihu followed by Manuh Bihu, Guxai Bihu etc.
- Similar festival in other states - Baisakhi (Punjab), Puthandu (Tamil Nadu), Vishu (Kerala), and Pohela Baisakh (West Bengal)

SHOMPEN TRIBE

Shompen cast their vote for the first time in Lok Sabha Election.

About Shompen Tribe

- One of the Particularly Vulnerable Tribal Groups.
- Reside in dense tropical rain forests of Great Nicobar Island.

- Belong to the Mongoloid group.
- According to Census (2011), estimated population of Shompen is 229.
- They are hunters and gatherers. They used to hunt wild pig, python, monitor Lizard, crocodile, etc.
- Live a semi-nomadic life and have not been colonised at one place in a defined reserve forest.

STATE OF WORLD POPULATION 2024 REPORT-UNFPA

Recently, the **United Nations Population Fund (UNFPA)** has released the **State of World Population report 2023**, which states that India will overtake China to become the **world's most populous country by the middle of 2023**

- Report is titled "Interwoven Lives, Threads of Hope: Ending Inequalities in Sexual and Reproductive Health (SRH) and Rights".
- Women's SRHR includes right to be free from torture, right to health, privacy, education, life, and prohibition of discrimination.

Key findings

- India leads globally with an estimated population of 144.17 crore, followed by China (142.5 crore).
 - India's population is estimated to double in 77 years.
- 68% of India's population belongs to age group of 15- 64 years, followed by 10-24 years group (26%), India's Total Fertility Rate i.e. births per woman in reproductive age is estimated at 2.0.
- In India, life expectancy at birth is estimated at 71 and 74 years for men and women respectively.
- Child marriage rates in India was 23% between 2006- 2023.
- Women with disabilities experience up to 10 times more gender-based violence than women without disabilities.
- 30 years (1994-2024) of progress in SRH has mostly ignored the most marginalized communities.

Initiatives taken to improve SRH

- India: Janani Suraksha Yojana, Surrogacy (Regulation) Amendment Rules, 2024 etc.
- Global: International Conference on Population and Development Programme of Action in Cairo, Egypt, 1994, Beijing Declaration and Platform for Action, 1995 Etc.

About UNFPA

- **HQ:** New York, USA
- **Genesis:** Created in 1969, it is the United Nations sexual and reproductive health agency.
- **Mandate:** Supports access to a wide range of sexual and reproductive health services – including voluntary family planning, maternal health care and comprehensive sexuality education.
- Its mandate is established by United Nations Economic and Social Council (ECOSOC).

WORLD CRAFT CITY

Srinagar is being considered for the prestigious World Craft City (WCC) title by the World Crafts Council International (WCCI).

About WCC:

- The World Craft City (WCC) initiative was launched in 2014 by the World Crafts Council International (WCCI), a Kuwait-based organization.
- It acknowledges the contributions of local authorities, craftspeople, and communities to cultural, economic, and social development worldwide.
- WCC aims to establish a network of craft cities globally, promoting the principles of the creative economy and preserving traditional crafts.

NOYYAL RIVER

Noyyal River of Tamil Nadu facing issues of pollution and choking by plastics and sewage.



Noyyal River

- **Origin: From** the Velliangiri hills (called as South-Kailash), a division of the Nilgiri Biosphere Reserve).
- **River basin:** Flows through Coimbatore, Tiruppur, Karur and Erode districts before joining the Cauvery River.
- **Historical significance:** Excavated remains of storage tanks, and check dams of the **Chalukya and Chola** periods have been discovered across the river.
- Restoration efforts: Central Government provided financial assistance from the National River Restoration Fund for its restoration.
- This fund is managed by the **Ministry of Jal Shakti**.

PADTA BET

Archaeological excavation reveals 5,200-year-old Harappan settlement at Padta Bet in Kachchh, Gujarat.

- It is near Juna Khatiya, an Early Harappan necropolis (mass burial site).
- Evidence of occupation from Early Harappan to Late Harappan periods:
- Pottery include Ceramic artefacts of novel kinds involving large storage jars, small bowls and dishes.
- Artefacts including semi-precious stone beads made of carnelian and agate, terracotta spindle whorls, copper, lithic tools etc.
- Remains of animal bones representing cattle, sheep or goat and edible shell fragments, thereby indicating animal domestication.

Juna Khatiya

- It is **one of the biggest Harappan burial sites** with the possibility of 500 graves.
- The burials discovered at this site date **from 3,200 BCE to 2,600 BCE**, predating Dholavira and several other Harappan sites in Gujarat.
- The site is important because others like **Dholavira** have a cemetery in and around the town, but no major habitation has been discovered near Juna Khatiya



NAGORNO-KARABAKH REGION

Russian peacekeepers have **commenced withdrawal from Nagorno-Karabakh following Azerbaijan's recapture** of the disputed territory last year.

The Nagorno-Karabakh conflict is an ethnic and territorial dispute between Armenia and Azerbaijan. It centres on the **Nagorno-Karabakh region, predominantly Armenian-populated but within Azerbaijan's borders.** A ceasefire mediated by Russia in 1994 left the region under Armenian control, though it's still recognized as part of Azerbaijan. The area is now governed by separatist Armenians and called the "Nagorno-Karabakh Autonomous Oblast."



ARAL SEA

Study has found that the desert which emerged due to the drying up of the Aral Sea has made Central Asia a much dustier place.

About Aral Sea

- It was once-large saltwater lake (an **endorheic lake**: a closed basin lake that retains water and does not have an outflow) of Central Asia.

- Lies on the boundary between Kazakhstan to the north and Uzbekistan to the south.
- It has drastically **shrunk due to human activities** like excessive irrigation
- Other important lakes that shrunk in last few decades:
 - Lake Urmia: Lies in the bottom of the large central depression of the Azerbaijan region in northwestern Iran.
 - Lake Hamoun: Freshwater Lake in Iran on Iran – Afghanistan border.



Note: It was once the **world's fourth-largest lake**. UNESCO has recognized the environmental tragedy of the Aral Sea by adding historical documents to its Memory of the World Register.

GOPI THOTAKURA (1ST INDIAN SPACE TOURIST)

Gopi Thotakura, an entrepreneur and pilot, is set to be the **first Indian space tourist** on the NS-25 mission by **Blue Origin** (an American Space startup, founded in 2000 by Jeff Bezos, the founder of Amazon).

- **Space tourism** is a burgeoning sector allowing individuals to experience space travel for recreational or business purposes. It encompasses:
 - **Suborbital space flights** (altitude of 100 km referred to as Karman Line)

- **Orbital Space Flights** (altitudes over 400 kilometres)
- **Lunar space tourism** (trips to the moon).
- Challenges facing space tourism include its **high cost, environmental concerns regarding rocket emissions, and safety issues.**
- Despite these challenges, the space tourism market is growing rapidly, with increasing interest from both tourists and industry players.

KANDUKURI VEERESALINGAM

He was remembered on his birth anniversary.

- Born in Rajahmundry, Andhra Pradesh, He was social reformer and nationalist, considered as Father of Telugu Renaissance movement.
- Worked for upliftment of Harijans, remarriage of widows etc.
- Started a girl's school in Dowlaiswaram.
- Constructed temple known as 'Brahmo Mandir' and 'Hithakarini School' in Andhra Pradesh.
- His novel Rajasekhara Charitramu is considered to be first novel in Telugu literature.
- Started Viveka Vardhini journal.

VASUKI INDICUS

Paleontologists have unearthed a giant predator snake in Gujarat's Panandhro Lignite Mine in Kutch named Vasuki indicus.

About Vasuki indicus:

- Likely lived 47 million years ago during the Middle Eocene Period.
- Length range: 36-49 feet.
- It's a member of the Madtsoiidae snake family that appeared roughly 90 million years ago but went extinct about 12,000 years ago.
- It spread from India through southern Eurasia and into north Africa after the Indian subcontinent collided with Eurasia around 50 million years ago

PINK BOLLWORM (PBW)

Cotton farmers in North India may shift to paddy, maize, and guar due to severe PBW infestation.

About PBW (*Pectinophora gossypiella*)

- The disease is common in cotton crops.

- PBW larvae burrow into developing fruits (bolls) of cotton plants, and damage affects both weight and quality of harvested bolls.
- Issue: Pink bollworms have developed resistance to genetically modified pest-resistant Bt cotton over time.

Management Strategies

- Adoption of highly productive short-duration hybrids that would escape PBW.
- Crop rotation to break lifecycle of PBW.
- PB Knot technology disrupts mating prospects of pest

BUMBLEBEES

According to a new study, **bumblebees demonstrate resilience to common pesticides.**

- Researchers exposed bumblebee colonies to individual and combined insecticides and fungicides, finding no negative effects on learning ability or flight activity.

About Bumblebees:

- Belongs to the genus *Bombus* and are important pollinator for many wildflowers.
- They are fuzzy insects with short, stubby wings.
- They are larger than honeybees, but they don't produce as much honey.
- They are known for **buzz pollination**.
- Their wings beating with high speed combined with their large bodies vibrate flowers until they release pollen.
- They use dance as a means of communicating 'food alert' signals to other members of their colony.
- **Threat:** Habitat fragmentation, disease transmission, etc.



TOOL USING FISH SPECIES FOUND

Recent findings indicate that **three fish species (Jansen's wrasse, checkerboard wrasse, moon wrasse)** in the **Laccadive Sea**, off the southwest Indian coast, **exhibit tool-use capabilities**.

- While primates, **birds, otters, octopuses**, and many other animals are known to be capable of using tools.
- The **use of tools by fish seems impossible**, as they lack hands, claws, or tentacles **to grasp and manipulate objects**. Since fishes lack hands, claws, or tentacles, they use a series of specialised behaviours for tool use.
- However, the three fish species use **live or dead coral structures as anvils** to break the hard shells of **sea urchins** so they can get to the edible bits inside.
- The Laccadive Sea, also known as the Lakshadweep Sea, is a **body of water that borders India, the Maldives, and Sri Lanka**.



ASIATIC WILD DOGS (DHOLE)

Mange outbreak reported among Asiatic wild dogs in Mudumalai.

- Mange is a skin disease that affects mammals caused by microscopic mites that burrow into skin.

About Dhole (*Cuon alpinus*)

- Distribution: India, Cambodia, Nepal, Bhutan, Thailand etc.
- In India, it inhabits Eastern and Western Ghats, Assam, Meghalaya, West Bengal, Ladakh etc.
- **Characteristics**
 - Carnivores that resemble a small wolf or domestic dog in size.
 - Hunt mainly in early morning or late evening.
- Threat: Habitat loss, disease threat etc.

- **Conservation status:**

- IUCN: Endangered
- Wildlife Protection Act 1972: Schedule I and II
- CITES: Appendix II

NITROPLAST

Scientists have discovered a new organelle, termed a nitroplast, within algae that can **convert nitrogen gas into a form usable for cell growth.**

- This ground-breaking finding challenges the conventional belief that only bacteria and archaea can perform nitrogen fixation.
- The nitroplast, found in the algae *Braarudosphaera bigelowii*, is considered the first nitrogen-fixing organelle in eukaryotes.
- It evolved from a symbiotic relationship between the algae and a bacterium called UCYN-A around 100 million years ago.

The study, published in *Science*, demonstrates that the nitroplast meets the criteria for an organelle, as it is inherited through generations and relies on host-provided proteins for its function.

GRAY SLENDER LORIS

A **Gray Slender Loris** was rescued by forest officials in **North Goa**.

About Gray Slender Loris:

- The gray slender loris (*Loris lydekkerianus*) is a small primate native to India and Sri Lanka that lives in subtropical and tropical forests.
- Gray slender lorises are nocturnal hunters and foragers that use their large, forward-facing eyes to detect prey.
- They are insectivores that eat mostly ants and termites, but also eat beetles, spiders, mollusks, and other small vertebrates.
- The Gray Slender Loris is listed on the Red List of the International Union for Conservation of Nature (IUCN) and is protected under the Wildlife Protection Act of 1972

