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AIR BREATHING MAGNESIUM FUEL CELL

Researchers at the University of Kerala developed an Air-breathing Magnesium-Copper / Cupric Oxide (Mg-Cu/ CuO) Fuel Cell.

About Mg-Cu/CuO fuel cell

- It is a variation of the Mg-C fuel cell, but uses a copper-based cathode which can be reused unlike carbon-based in Mg-C fuel cell.
- It is operationally more stable than Mg-C fuel cell.
- It is an eco-friendly fuel cell that generates power mainly using air and seawater.
- During its operation, the cell **generates only electricity and heat, emitting only water as a byproduct.**
- Technology is expected to be as disruptive as Lithium-ion batteries.
- In this fuel cell, **semiconductor material has been used** for air cathode systems making the **cell cost effective** as compared to **use of expensive chemical element Platinum** around the world.

Fuel cell

A fuel cell is a device that **generates electricity through an electrochemical reaction**, not combustion.

In a fuel cell, hydrogen and oxygen are combined to **generate electricity, heat, and water.**

Advantages: Fuel cell systems are a **clean, efficient, reliable, and quiet source of power.** Fuel cells **do not need to be periodically recharged like batteries**, but instead **continue to produce electricity as long as a fuel source is provided.**

Applications: Providing power to homes and businesses, keeping critical facilities like hospitals, grocery stores, and data centers up and running, and moving a variety of vehicles including cars, buses, trucks, forklifts, trains, and more.

HYDROGEL

Indian Institute of Science (IISc) researchers have designed a **sustainable hydrogel to remove microplastics** from water, addressing their threat to human health and the environment.

- **Hydrogel** has a unique intertwined polymer network that can bind the microplastic and degrade them using Ultraviolet (UV) light irradiation.
 - The hydrogel was highly efficient, removing about 95% and 93% of two different types of microplastics in water at near-neutral pH (~6.5)
 - It consists of **three different polymer layers** – chitosan, polyvinyl alcohol and polyaniline.
 - These polymers are combined with the nanoclusters [copper substitute polyoxometalate (Cu-POM)].
 - Nanoclusters act as a catalyst that can use UV light for degradation.
 - It showed high efficiency during research.

Microplastics

- Small plastic fragments typically less than 5 millimeters long.

Categories of microplastics:

- **Primary:** Tiny particles designed for commercial use (for e.g., microbeads in cosmetics, toothpaste etc.), microfibers shed from clothing and other textiles, such as fishing nets.
- **Secondary:** These are particles that result from the breakdown of larger plastic items, such as water bottles. This breakdown is caused by exposure to environmental factors, mainly the sun's radiation and ocean waves.

Impacts

- Environment: Can be mistakenly consumed by marine organisms (toxic for them) and will disturb whole food chain.
- It has reached to the remote areas like Antarctica.
- Human Health: Gastrointestinal issues, Endocrine disruption, Respiratory problems, allergy etc.

Initiative Taken

Global

- Global Partnership on Plastic Pollution and Marine Litter (**GPML**), launched at the United Nations Conference on Sustainable Development (Rio+20) Summit, 2012
- International Convention for the Prevention of Pollution from Ships (**MARPOL**), adopted by International Maritime Organization in 1973

India

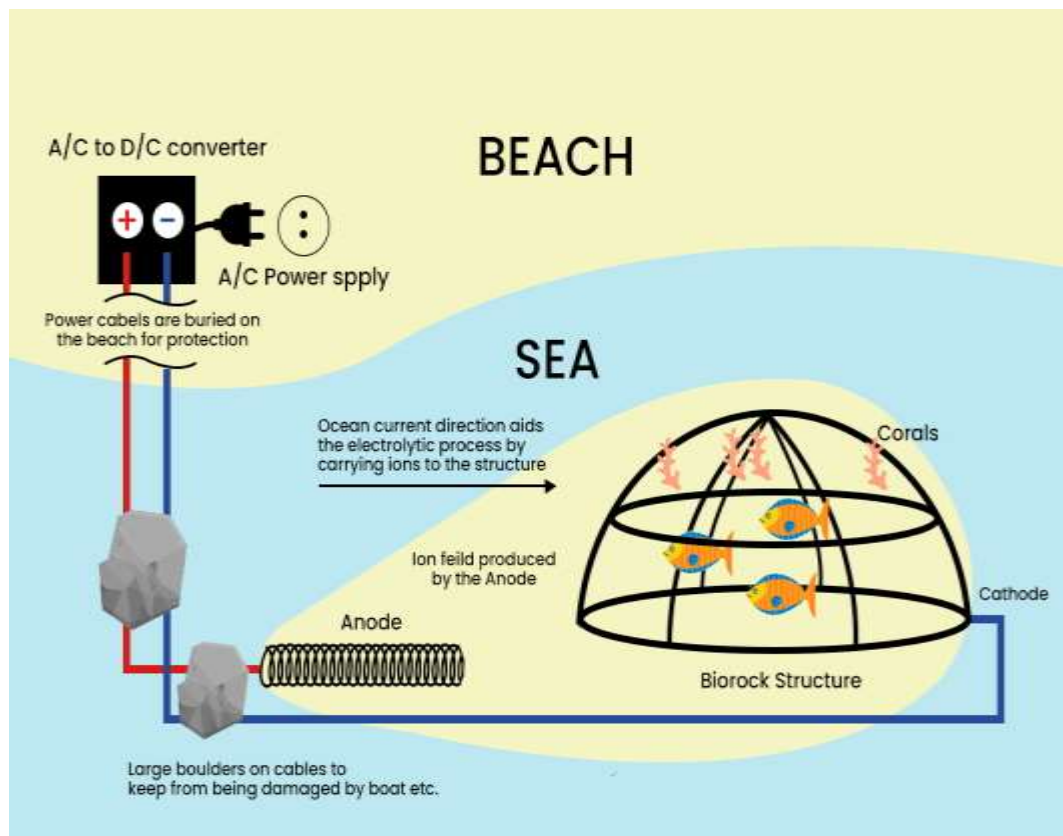
- **Single-use plastics ban with effect from 2022.**
- **Extended Producer Responsibility (EPR)** for plastic under Plastic Waste Management Rules, 2016
- Un-Plastic Collective, co-founded by the Confederation of Indian Industry (CII), UNEP and WWF-India

ARTIFICIAL REEFS

India's second-ever installation of artificial reefs (after Pondicherry) to boost marine life is being deployed near Worli Koliwada, Mumbai

- The artificial reefs, **composed of recycled cement and steel**, will **increase the sea surface area by 50-60 square feet per module.**
- These are structures built by humans through **biorock technology** and **placed on the seabed** in freshwater or saltwater environments.
 - **Biorock technology** was invented by **Wolf Hilbertz**. In this technology, a **low electrical current** is passed through the water using electrodes placed near a steel structure.
 - This current acts like a **magnet, attracting dissolved minerals**, particularly calcium and carbonate ions, forming a **calcium carbonate (CaCO₃) layer** similar to natural coral reefs.
- These reefs offer **crucial hard surfaces** to which **algae, barnacles, corals, and oysters** can firmly attach themselves.
- These reefs will create **habitats for fish, absorb carbon dioxide, and benefit local fishing communities.**
- They are expected to **attract small and large native species, acting as a habitat and breeding ground.**
- An **artificial reef is a human-made structure designed to replicate some characteristics of natural reefs.** These structures include submerged shipwrecks, oil and gas platforms, bridges, and other offshore installations.
- Materials used in their construction range from rocks and cinder blocks to limestone, steel, and concrete.
- They attract marine life, making them popular destinations for fishing, diving, and snorkelling, thus offering economic benefits to local communities.

BIO ROCK FORMATION:



HOME VOTING

Election Commission of India for the first time provides facilities of home voting in coming 2024 election. The step is in line with Election Commission (EC) motto 'No voter is left behind'.

Home Voting Facility:

- Under this, voting from home takes place with involvement of a full contingent of polling staff and security personnel with secrecy of voting diligently maintained.

Beneficiaries:

- Persons with disabilities (PwDs) meeting 40% benchmark disability.
- Senior citizens aged above 85 years.

Other Steps by EC to make voting inclusive:

- Ease of voting by abolishing Form-M for kashmiri migrants residing at Jammu and Udhampur.

- SVEEP (Systematic Voter's Education and Electoral Participation) to engage PwDs and also sensitise their friends, families, polling officials, etc.
- Proposed Multi-Constituency **Remote Electronic Voting Machine (RVM)**: It would enable migrant voters to exercise their vote from their current place of residence.
- **Postal ballot**: It allows votes being sent by post. following Persons are entitled to vote by post:
 - special voters.
 - service voters.
 - voters on election duty and.
 - electors subjected to preventive detention
- **Proxy voting**: It allows registered elector to delegate his voting rights to a representative he nominates. Available for service voters

Service voters include:

- Member of armed forces;
- Member of police force of a State, who is serving outside that State;
- Person who is employed under Government of India, in a post outside India.
- Member of a force to which Army Act, 1950 is applicable.

CURATIVE PETITION

Supreme court (SC) quashes arbitral award against Delhi Metro Rail Corporation.

Curative Petition:

- **Objective:** It aims to prevent **miscarriage of justice and deter abuse of the legal process.**
- It's last constitutional remedy available to a person whose review petition (Art.137) has been dismissed by SC.
- Given shape in Rupa Ashok Hurra v. Ashok Hurra & Anr case.
- The curative power of the Court flows from Article 142 (power to do complete justice).
- Curative petition is entitled, if petitioner establishes-Violation of principles of natural justice;
- Judge failed to disclose his connection with the subject- matter.
- There is an apprehension of bias and judgement adversely affects petitioner

Review and Curative Powers:

- Article 145 gives the Supreme Court authority, with the **President's approval, to make rules for regulating the practice and procedure of the Court**, including rules for persons practising before the Court, hearing appeals, enforcing rights, and entertaining appeals.
- It also includes rules for reviewing judgments, determining costs, granting bail, staying proceedings, and conducting inquiries.

LAND CONFLICT WATCH

Recently, **Land Conflict Watch**, a data research agency, tracking land-related conflicts in India, has noted a significant correlation between **land conflicts and the enforcement of the Forest Rights Act (FRA)**.

- Scheduled Tribes and Other Traditional Forest Dwellers (Recognition Of Forest Rights) Act, popularly known as FRA was enacted in 2006.
- As per the FRA, the state governments / UT administrations are responsible for the implementation of various provisions of the Act.
- According to the Ministry of Tribal Affairs, 23.43 lakh land titles have been distributed (individual and community rights) across States.

Features of the Act

- The act recognizes individual rights (Rights of Self-cultivation and Habitation) and community rights (Grazing, Fishing, access to Water bodies, etc.)
- **Role of Gram Sabha**- identification of beneficiaries, permission for the diversion of forestland for non-forest purposes, etc.
- **Forest land** means land of any description falling within any forest area including unclassified forests, existing or deemed forests, protected forests, etc.
- Rights can be claimed by any member or community that has for at least three generations (75 years) before the 13th day of December 2005 lived in the forest.
- **Issues:** Slow Implementation, limited grievance redressal mechanisms, predominantly focused on individual rights, etc

SUVIDHA PORTAL

Over 73,000 applications received on Suvridha portal since the announcement of Lok Sabha elections.

Suvidha Portal

- **Developed by Election Commission of India** to ensure a level playing field upholding the democratic principles of free, fair, and transparent elections.
- It streamlined the process of obtaining and acting upon requests for permissions and facilities from political parties and candidates during election period.
- Caters to permissions for organizing rallies, helicopters, vehicle permits, temporary party offices etc.
- The portal can help to scrutinize election expenditures, contributing to greater accountability and integrity in the electoral process
- Additionally, **Suvidha's companion app** allows applicants to track their requests' real-time status, enhancing **convenience and** transparency.

REPRESENTATION OF THE PEOPLE ACT, 1951

The Election Commission (EC) has issued a directive to crackdown on anonymous political hoardings, requiring the disclosure of the names of their publishers and printers for traceability and accountability.

- This move aims to regulate campaign financing and ensure accountability if the content violates the Model Code of Conduct or statutory provisions.
- This decision follows representations received by the EC regarding hoardings lacking identification of printers or publishers.
- **Section 127A of the Representation of the People Act, 1951**, mandates the prominent display of the name and address of the printer and publisher on election-related material.
- This directive holds printers, publishers, and licensees/contractors of urban local bodies accountable for political advertisements published on outdoor media.

NOTE:

Articles 324 to 329 of Part XV of the Indian Constitution provides for the country's electoral system. The Constitution confers upon the Parliament the power to enact laws for all matters connected with elections to the Parliament and the State Legislature.

DRUGS AND MAGIC REMEDIES ACT 1954

Supreme Court is hearing a case of “misleading” claims in advertisements by an Ayurveda-related company.

- Misleading claims are prohibited under the Drugs and Magic Remedies (Objectionable Advertisements) Act of 1954.
- **Section 4** of the Act prohibits advertisements that give false impressions regarding the true character of the drug.
- also prohibited ads curing, diagnosing, or preventing diseases or conditions in the included schedule
- Originally included a list of 54 diseases and conditions.
- **Section 5** prohibits the Advertisement of Magic Remedies for treatment.
- **magic remedies** are defined as any charm (talisman, mantra, kavacha etc.), alleged to possess miraculous powers for diagnosis, cure, mitigation etc.

GAS BASED ECONOMY

Government of India has set a target to increase the share of gas **in the energy mix up to 15% in 2030 to make India a Gas-based economy**

- The government has directed Gas-Based Generating Stations under Section 11 of the Electricity Act, of 2003.
- It allows the government to order a generating company to operate and maintain a generating station in exceptional circumstances.
- Similarly, the government has been promoting a gas-based economy to ensure energy security.
- Natural gas is a fossil fuel energy source.
- The largest component of natural gas is methane.

Need for gas-based economy

- Reduce Greenhouse gas emissions: As per International Energy Agency, on average Coal-to-gas switching reduces emissions by 50% when producing electricity.
- Backup to Renewables: Natural gas plants start quickly and can fill the electricity grid gap when renewables aren't producing enough.
- Meeting international commitment: contribute towards achieving net zero by 2070 and meeting the targets of Nationally Determined Contribution targets.

Challenges related to gas-based economy

- Small share in energy mix: It was just above 6% in 2022.
- High import dependence: India imported 48.2% of its natural gas in FY22.
- The fertilizer sector has the largest share in the overall consumption of natural gas which is highly subsidized

Government initiatives to promote gas-based economy

- **National Gas Grid for pipeline infrastructure.**
- City Gas Distribution Networks: Involves Compressed Natural Gas (CNG) for use as auto-fuel, and Piped Natural Gas (PNG) for use in domestic, commercial, and industrial segments.
- The Government has been persistent in developing a conducive ecosystem in order to promote sustainability for all actors of the **Triple Bottom Line (environment, society and economy).**
- Sustainable Alternative Towards Affordable **Transportation (SATAT)**: to extract economic value from biomass waste in the form of Compressed Bio Gas (CBG) and bio-manure

INDIA MAURITIUS TAX TREATY

India has signed a protocol amending the **Double Taxation Avoidance Agreement (DTAA)** with Mauritius to **plug treaty abuse for tax evasion or avoidance.**

Key highlights:

- Amendment included Principal Purpose Test (PPT) to avail tax benefits under the DTAA to plug the abuse of treaty for tax evasion and avoidance.
- PPT lays out the condition that the tax benefits under the treaty will not be applicable if obtaining that duty benefit was the principal purpose of any transaction or arrangement.
- Protocol to amend DTAA is aimed at making it compliant with Base Erosion and Profit Shifting (BEPS) Minimum Standards.
- DTAA is an agreement between two countries/territories with an objective to avoid double taxation on same declared asset in two different countries/territories.

- DTAA between India and Mauritius was first signed in 1982 and amended in 2016.
- The amended pact has included the **Principal Purpose Test (PPT)**, which **essentially lays out the condition that the tax benefits** under the treaty will not be applicable if it is established that obtaining that duty benefit was the principal purpose of any transaction or arrangement.
- Mauritius has been a **preferred jurisdiction for investments in India** due to the non-taxability of capital gains from the sale of shares in Indian companies until 2016.
- Mauritius remains **India's fourth largest source of FPI investments**, after the US, Singapore, and Luxembourg. FPI investment from Mauritius stood at **Rs 4.19 lakh crore** at the end of March 2024.

Benefits of Double Taxation Avoidance Agreement (DTAA):

- **Deduction:** Taxpayers can claim the taxes paid to foreign governments as a deduction in the country of residence.
- **Exemption:** Tax relief under this method can be claimed in any one of the two countries.
- **Tax credit:** Tax relief under this method can be claimed in the country of residence.

Significance:

The recent amendment India Mauritius Tax Treaty reflects **India's intent to align with global efforts** against treaty abuse, particularly under the **BEPS framework**

CREDIT DEPOSIT RATIO

Indian banks are battling the worst deposit crunch in 20 years and at 80%, the credit-deposit ratio is at its highest since 2005.

About Credit- deposit ratio:

- The credit-deposit ratio is a financial metric used to assess the relationship between a bank's lending activities (credit) and its deposit base.
- It is calculated by dividing the total loans extended by the bank by its total deposits.

- The ratio indicates how much of a bank's deposits are being used to provide loans.
- A higher credit-deposit ratio suggests that a larger portion of the deposits is being lent out as credit, while a lower ratio indicates that more deposits are being held in reserve or invested in other assets.
- It is an important measure of a bank's liquidity and lending capacity.
- It is the ratio of how much a bank lends out of the deposits it has mobilised.
- A higher CDR suggests that a significant portion of the bank's resources are allocated to loans.
- It could potentially stimulate economic growth but also implies higher risk.
- Regulators often monitor CDR to ensure banks maintain a prudent balance between lending and risk management.

ZAPORIZHZHIA NUCLEAR POWER PLANT (UKRAINE)

A drone attack damaged the **Zaporizhzhia Nuclear Power Plant in Ukraine**, with three hits on the main reactor containment.

- The International Atomic Energy Agency **confirmed the damage but stated that nuclear safety remains intact**.
- **Zaporizhzhia, the largest nuclear plant in Europe**, is located in southeast Ukraine, on the banks of the **Dnipro or Dnieper River (which drains into the Black Sea)**. It is currently under the **control of the Russian forces**.
- The Zaporizhzhya Nuclear Power Plant in Ukraine faces several risks to its safety and operation. The **plant has VVER-1000 reactors** and incorporates safety enhancements implemented after the Chornobyl and Fukushima accidents.



Note: The **International Atomic Energy Agency (IAEA)**, the global nuclear watchdog, provides technical assistance to the plant and conducts inspections to ensure compliance with international safety standards

TSAT-1A

Tata Advanced Systems Ltd and Satellogic announced successful deployment of TSAT-1A into space.

About TSAT (Tata Satellite) -1A

- **Launch Vehicle:** SpaceX's Falcon 9 rocket
- **Mission Name:** Bandwagon-1
- It is India's first indigenously developed and built satellite capable of sub-meter resolution optical imaging.
- It is equipped with both multispectral and hyperspectral imaging capabilities.
- This technology allows TSAT-1A to collect data across wide range of wavelengths within electromagnetic spectrum, providing deeper understanding of land, water, and various natural resources.
- Data collected by satellite has potential to drive progress in crucial sectors like Agriculture, Disaster Management, Urban Planning and Environmental Monitoring.

LIGO DETECTED MERGER BETWEEN NEUTRON STAR AND AN OBJECT

Merger is officially known as GW230529, detected by the LIGO-Virgo-Kagra collaboration in 2023. The GW came from a merger of two objects:

- Neutron Star (formed when a massive star runs out of fuel and collapses) Mystery object whose mass lies in the 'mass gap'.
- Mass gap is the range of mass between the heaviest known neutron star and the lightest known black hole.
- GWs are 'ripples' in space-time caused by some of the most violent and energetic processes in the Universe that propagate in all directions away from the source.
- Predicted in Einstein's General Theory of Relativity (1916).

Its key Features includes:

- Travel at the speed of light.

- Produced by: Cataclysmic events such as colliding black holes, stars exploding at the end of their lifetimes, colliding neutron stars, etc.
- GWs' first detection: In 2015 and detected at the Laser Interferometer Gravitational-Wave Observatory (LIGO).

GWs' significance: It carries information about their origins; clues to the nature of gravity itself; information about the universe that cannot be observed with electromagnetic waves etc.

About LIGO

- Consists of two interferometers, each with two 4 km long arms arranged in the shape of an "L". These instruments act as 'antennae' to detect GWs.
- Comprises stable high-power lasers, precisely figured mirrors, ultraquiet vibration isolation systems, and sophisticated hierarchical feedback systems.
- LIGO-India: It will be built by the Department of Atomic Energy (DAE) and the Department of Science and Technology (DST), in Maharashtra

SPACE ECONOMY IN INDIA

According to a recent report from the **World Economic Forum (WEF)**, the **global space economy will reach a value of \$1.8 trillion by 2035**, nearly identical to the **scale of the world semiconductor industry**

- Space's impact will increasingly go beyond space itself, e.g., benefits to non-traditional players such as ride-hailing apps etc.
- Five industries will generate more than 60% of increase in space economy by 2035.
- These are: supply chain and transportation; food and beverage; state-sponsored defence; retail, consumer goods and lifestyle; and digital communications:
- Space's return on investment will be more than financial, e.g., mitigating world challenges, such as disaster warning & improved humanitarian response etc.

Main drivers of increasing Space prevalence

- Decrease in launch costs: fell by over 10- fold over last 20 years.
- Commercial innovation (e.g., components and software)

- Diversification of investment and applications, with private sector participation.
- Cultural awareness and enthusiasm

India's Space economy

- Current size: Around \$8.4 billion (around 2-3% of global space economy).
- Target: About 44 billion USD by 2033.
- FDI: 100% allowed.

Recent initiatives

- **Indian Space Policy 2023** was announced.
- Indian National Space Promotion and Authorization Centre (**IN-SPACE**) was created as independent nodal agency under Department of Space.
- **New Space India Limited** was created, for private sector participation.

GUJCOST

The Gujarat Council on Science and Technology (GUJCOST) has been appointed as the Nodal Centre for the Indian Space Research Organisation's (ISRO) 'Space Science and Technology Awareness Training (START)' programme.

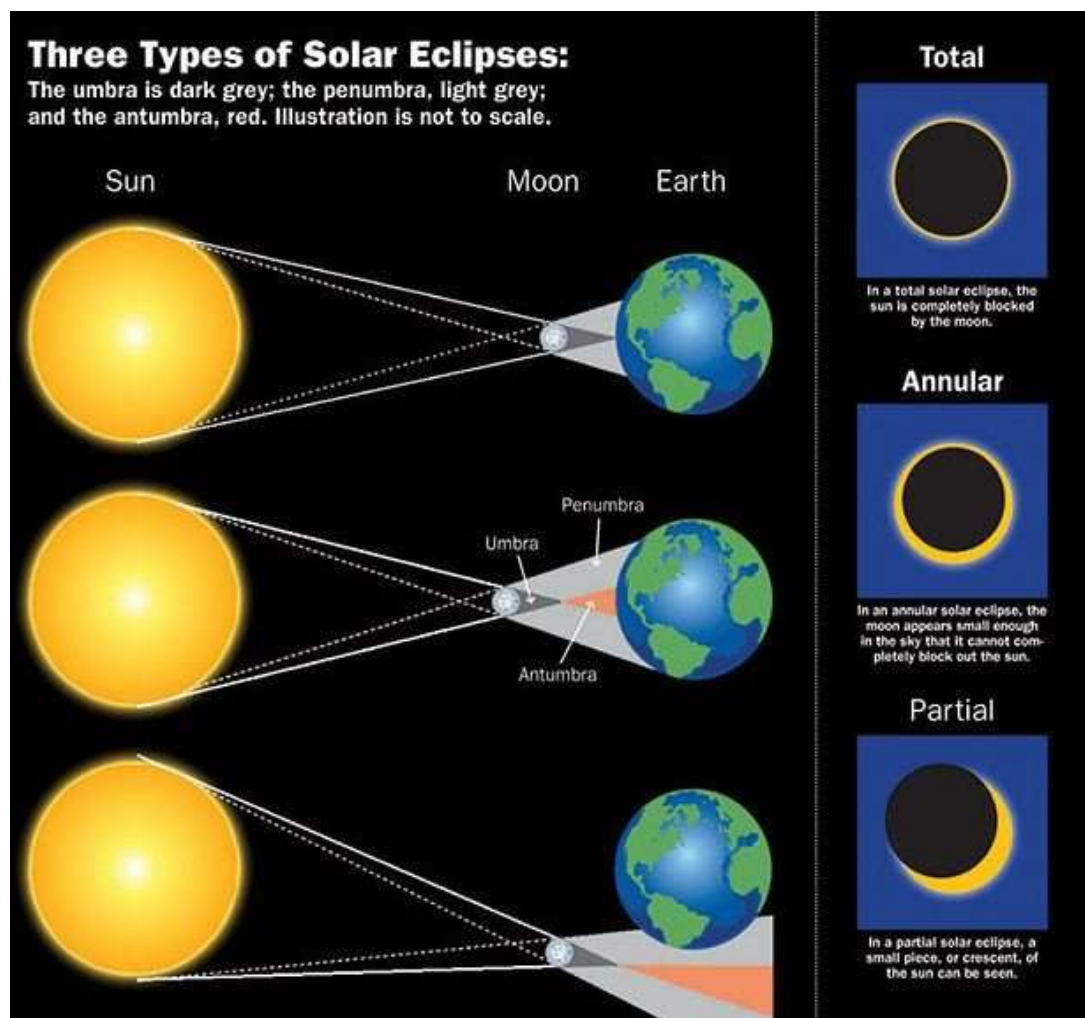
- **This initiative, conceived by ISRO,** aims to provide introductory-level online training **in various areas of space science research,** such as planetary exploration, astronomy, and atmospheric science.
- Under the START programme, GUJCOST will hold live classes and serve as the focal point for knowledge dissemination.
- Four Regional Science Centres in Rajkot, Patan, Bhavnagar, and Bhuj will also help to facilitate the programme and broaden its impact throughout the region.

Note: The Space Science and Technology Awareness Training (START) is a free, introductory online training program for undergraduate and postgraduate students in India interested in space science and technology.

TOTAL SOLAR ECLIPSE

A total solar eclipse will **cross North America, passing over Mexico, the United States, and Canada.** This type of solar eclipse is a **rare event for any particular spot.**

- According to Royal Museums Greenwich, **once a place on Earth witnesses a total solar eclipse, it will be about 400 years before that part sees the next one.**
- Consequently, a specific location on Earth may **witness a total solar eclipse only once every 400 years.**



- A **total solar eclipse** is a rare event because it occurs when the **Moon passes directly between the Earth and the Sun**, casting a shadow on the **Earth's surface.**

- Total solar eclipses are **infrequent because the Moon's orbit is tilted with respect to the Earth's orbit around the Sun, causing the Moon's shadow to usually pass above or below the Earth.**
- Additionally, the umbra, or **the darkest part of the Moon's shadow where a total eclipse is visible, covers only a small portion of the Earth's surface during each event.**

MERCENARY SPYWARE

Apple issued threat notifications to **iPhone users in India and 91 other countries**, warning of **potential attacks by mercenary spyware**, including Israel's Pegasus spyware.

- The notifications, sent via **email, highlighted the possibility of specific targeting due to the user's identity or activities.**
- While Apple didn't attribute the attack to any entity, it **emphasized the seriousness of the warning and the rarity and sophistication of mercenary spyware attacks.**

About Mercenary Spyware:

- Mercenary spyware attacks are **exceptionally rare** and highly sophisticated compared to regular **cybercriminal activity** or consumer malware.
- Unlike common cyber threats, mercenary spyware aims to **gain unauthorised access** to a user's device.
- This type of spyware **can infiltrate devices such as smartphones and computers, allowing the attacker to monitor communications**, track location, access files, and gather sensitive information remotely.
- Mercenary spyware attacks are **typically highly advanced** and difficult to detect, posing significant threats to individual privacy, security, and human rights.
- **Examples of mercenary spyware include Pegasus**, developed by the NSO Group in Israel, which has been implicated in various surveillance scandals targeting journalists, activists, politicians, and other high-profile individuals worldwide

ISEULT- MRI SCANNER

Iseult' is currently the world's most powerful MRI scanner, developed by France's Atomic Energy Commission (CEA).

- It aims to offer a deeper understanding of the brain and diseases affecting it.

- Iseult' can help refine our understanding of anatomy of brain.
- It could also shed light on diseases like Alzheimer's or psychological conditions like depression or schizophrenia.

About Iseult

- Iseult has power of 11.7 teslas which enables it to scan images with 10 times more precision than commonly used MRIs.
- **Tesla** is a measure of strength of magnetic field that surrounds a patient when they're in MRI machine.

Magnetic resonance imaging (MRI) Technology

- MRI is non-invasive medical imaging test that produces detailed images of almost every internal structure in human body.
- They use large magnet and radio waves. No ionizing radiation is produced during an MRI exam, unlike X-rays.
- Magnetic field inside works with radio waves and hydrogen atoms in body to create cross-sectional images.

Applications

- Images produced by an MRI scan can show organs, bones, muscles and blood vessels.
- MRI is widely used in medical diagnosis and treatment planning for brain disorders, cardiovascular diseases, cancer, etc.
- **Functional MRI (fMRI)**, a special type of MRI produces images of blood flow to certain areas of brain which help in brain surgery.

DOXXING

Incidents of Doxxing are increasing over internet.

- The term "**doxxing**" is derived from phrase "dropping dox (documents)".
- It **refers to** collection of a user's private information, across multiple platforms (including social media) by an unauthorized individual and then publishing the information in an attempt to shame or embarrass user.
- Conducted by researching public databases, hacking, or through social engineering.
- **Prevention:** Adjust social media settings, use strong passwords, report through National Cyber Crime Reporting Portal, etc.

RADIATION THERAPY FACILITY

Delhi's Lady Hardinge Medical College opens Radiation Therapy facility.

- Radiation therapy, or radiotherapy, is a type of cancer treatment in which cancerous cells are killed by exposing them to ionizing radiations, such as X-rays, gamma rays, high-energy electrons or heavy particles.

Types of Radiation therapy

- **External (Teletherapy):** Uses a linear accelerator and radiations are sent from a distance to target cells.
- **Internal (Brachytherapy):** Source of radiation is put inside the body.
- **Significance:** Highly effective and well-established treatment for brain, breast, head and neck, cervical cancers, etc., while minimizing damage to healthy tissues from high doses of radiation.
- **Potential side-effects of Radiotherapy:** Fatigue, Nausea, Hair loss, Loss of appetite, etc.
- Proton therapy is an advanced and highly precise radiation treatment for cancerous cells. Compared with traditional methods, it focuses more energy on cancerous cells itself with less radiation to surrounding healthy tissues.

Parameters	Traditional Radiation Therapy	Proton Therapy
Potential for Harm to Adjacent Healthy Cells	Minimal	Extremely Minimal
Suitability for Treatment Near Sensitive Organs (e.g., eyes, brain, spine)	Not Recommended	Highly Recommended
Expense	More Affordable	Higher Cost
Severity of Side Effects	Generally Severe, Can Impact Daily Life	Typically Mild, Less Likely to Disrupt Normal Activities

INDIA HAS ELIMINATED KALA-AZAR

India has successfully achieved its target to **eliminate visceral leishmaniasis**, commonly known as kala-azar, according to data from the **National Centre for Vector Borne Diseases Control (NCVBDC)**

- This achievement comes after persistent efforts and government interventions over the years.
- As per the WHO, in 2020, India accounted for 18 per cent of the global burden of kala-azar.
- Kala-azar, a vector-borne disease, has posed a significant health challenge for decades, particularly in states like Bihar, Jharkhand, West Bengal, and Uttar Pradesh

About Kala-azar:

- Kala Azar is a severe and potentially fatal parasitic disease caused by Leishmania parasites.
- It primarily affects the internal organs, particularly the liver, spleen, and bone marrow.
- Kala Azar is transmitted to humans through the bites of infected female sandflies.
- It is commonly known as Black Fever or Dumdum Fever.
- In India, Leishmania donovani is the primary parasite responsible for causing this disease.
- **Causes: Parasite:** Kala Azar is caused by protozoan parasites of the Leishmania genus, primarily Leishmania donovani and Leishmania infantum, with Phlebotomus argentipes being the primary vector in India.
- **Symptoms:** Irregular fever, weight loss, enlargement of the spleen and liver, and anaemia.
- **Prevention:** Avoid getting bitten by a sand fly.
- **Treatment:** The main drugs available are antimony, amphotericin, paromomycin and now the oral drug miltefosine.

WHOOPING COUGH

Number of cases of whooping cough have been rising in China, the Netherlands, Czech Republic.

About Whooping Cough

- It is highly contagious respiratory tract infection.

- Caused by: Bordetella pertussis bacteria. The bacteria attaches to cilia (tiny, hair-like extensions), part of upper respiratory system.
- It is only found in humans.
- Spread easily from person to person through the air.
- Symptoms: Runny nose, Nasal congestion Red watery eyes, Fever etc.
- **Treatment:** Diphtheria, tetanus, and pertussis (DTaP) vaccines.
- In India, Mission Indradhanush provides immunization protection against Whooping Cough.

C-DOME DEFENCE SYSTEM

The C-Dome is the naval version of Israel's Iron Dome missile defence system.

- It was deployed for the first time as a response to a "hostile aircraft" entering Israeli airspace near Eilat.
- Similar to the Iron Dome, which intercepts rockets fired from Gaza, the C-Dome uses radar to detect incoming threats and destroys them with its own missiles.
- Unlike the Iron Dome, the C-Dome is mounted on ships and integrated into the ship's radar it provides full-circular protection against maritime and coastal threats.
- The system was **tested on Sa'ar 6-class corvettes, German-made warships used by the Israeli Navy, and was declared operational in November 2022.**
- The C-Dome employs TAMIR interceptors, **a modular Vertical-Launch Unit (VLU), and a Command & Control (C2) component** to detect and track threats at sea.

Note: Iron Dome air defence system:

- Iron Dome is a **short-range anti-rocket, anti-mortar, and anti-artillery system** with an **intercept range of 4-70 KMS.**
- It is developed by the **Rafael Advanced Defence Systems of Israel.**
- Israel has put Iron Dome's **interception rate** at as high as **97%.**

OPERATION MEGHDOOT AND SAICHEN GLACIER

Indian Army and Indian Air Force marked 40th year of its presence on strategically-significant Siachen glacier under Operation Meghdoot.

- Operation Meghdoot was launched on 13 April 1984, when Indian Army and Indian Air Force (IAF) advanced to Siachen to secure heights dominating Northern Ladakh.

About Siachen Glacier

- Located at the height of 20,000 feet, in the Eastern Karakoram Range of the Himalayas.
- It is the second longest (75KM) non-polar glacier in the world, after Fedchenko Glacier in Tajikistan.
- Nubra river originates from the Siachen glacier.
- It is the highest militarized zone in the world.



INDIA POST IN ANTARCTICA

India Post opened a post office at its Bharati station in Antarctica.

- The inauguration coincided with the 24th Foundation Day of the National Centre for Polar and Ocean Research (NCPOR), Goa.
- Earlier, IP had set up post offices at Dakshin Gangotri Station in 1984 and another at Maitri Station in 1990.
- Letters intended for **Antarctica** will now be addressed with a **new experimental PIN code, MH-1718**, typical for a new branch.
- **Currently, Maitri and Bharati are the two active research stations** that India operates in Antarctica

About IP/department of post

- It comes under the Ministry of Communications.
- With more than 1,55,000 post offices, it has the most widely distributed postal network in the world.

INTERNATIONAL NARCOTICS CONTROL BOARD

India's Jagjit Pavadia was re-elected for a third term for five years from March 2025-2030 to the International Narcotics Control Board.

- Additionally, India was elected to **several key bodies at the United Nations**, including the **Commission on the Status of Women, the Executive Board of the United Nations Children's Fund, and the Executive Board of the United Nations Development Programme.**
- It consists of **13 members** who are elected by **the Economic and Social Council** and who serve in their capacity, not as government representatives.
- **Three members** with medical, pharmacological or pharmaceutical experience are elected from a list of persons **nominated by the** World Health Organization (WHO) and 10 members are elected from a list of persons nominated by Governments.

The **INCB, established in 1968**, monitors the **implementation of international drug control conventions** and aims to **ensure adequate drug supplies for medical and scientific** uses while preventing diversion to illicit channels.

KUCHIPUDI DANCE

Kuchipudi, one of the oldest dance forms of India, is now becoming obsolete among the younger generation. **Kuchipudi** is a **village** in the Krishna district in Andhra Pradesh.

- Kuchipudi, a traditional dance-drama performance, has evolved from being male-dominated to a classical dance form with the prominence of female dancers across India.
- It plays stories of **Hindu mythologies** and spreads its message among the people. **Kuchipudi is one of the 8 classical dance forms of India.**

However, in the village of Kuchipudi in Krishna district, Andhra Pradesh, the art form faces challenges, including a lack of interest among the younger generation and insufficient government support

IKSHVAKU-ERA COINS

Recently **around 3,730 lead coins** were unearthed in an **earthen pot at Phanigiri, a renowned Buddhist heritage site in Telangana.**

- The coins, bearing an **elephant symbol on the obverse and a Ujjain symbol on the reverse**, are **believed to belong to the Ikshvaku period**.
- **Phanigiri is considered an important Buddhist monastery located strategically on the hilltop**, along the ancient trade route connecting the west and east coast of the Deccan.

About the Ikshvaku era:

- The **Ikshvakus** emerged in the **Krishna-Guntur region** following the decline of **Satavahana power** in the **eastern part** of the peninsula.
- The **Ikshvaku dynasty (300 CE- 400 CE)**, is named after the legendary **King Ikshvaku**.
- Knowledge of the Ikshvakus comes primarily from **inscriptions, coinage, and archaeological excavations**.
- Evidence suggests that the dynasty emerged in the **Vijayapuri region** (modern Bellary district, Karnataka) around the 3rd century CE.
- Also known as **the Andhra Ikshvakus or the Ikshvakus of Vijayapuri**, they were Shaivites following **Vedic rituals**, but **Buddhism flourished during their reign**.
- They practised both **Buddhism and Brahminism, evident in their architectural projects**.
- The Ikshvakus were succeeded by **Pallavas**.

PLASTIC OVERSHOOT DAY REPORT 2024

- Released by Earth Action

Key Findings:

- Plastic Overshoot Day for 2024 is projected to occur on **September 5th**, indicating that by that date, the world will have generated more plastic waste than it can manage effectively.
- The projected global plastic waste generation for 2024 is 220 million tonnes, marking a 7.11% increase since 2021.
- Twelve countries are responsible for 60% of the world's mismanaged plastic waste, with China, **India**, and Russia leading the list
- Plastic Overshoot Day (similar to Earth Overshoot Day) marks when global plastic waste surpasses the world's capacity to manage it, leading to pollution.

Specific to India:

- India is classified as one of the Low-Waste-Producing Polluters, yet its Mismanaged Waste Index (MWI) is very high at 68.62%.
- India's annual per capita plastic waste production stands at 8 kg per capita per year.
- India's amount of plastic waste exported is lower than what it imports.
- **Causes of Plastic Waste in India:** Improper disposal leading to the release of microplastics, and the use of additives in plastic production and processing.
- **Recommendations for India:** Develop local waste management infrastructure, invest in waste management policies such as Extended Producer Responsibility.

GLOBAL HEPATITIS REPORT 2024

Released by WHO. India accounted for over 11% of the global burden of hepatitis B & C cases, ranking second after China.

- Hepatitis is liver inflammation caused by various factors, such as drugs, alcohol, and autoimmune disorders.
- Symptoms can range from jaundice and fever to chronic illness.
- The five main strains are A, B, C, D, and E, with B and C leading to chronic disease, liver cirrhosis, cancer, and death.
- **While a vaccine exists for type B, none is available for type C.**
- World Hepatitis Day, observed on July 28 each year, aims to raise awareness about viral hepatitis and its global impact.

Government initiatives to tackle hepatitis include:

- **The National Viral Hepatitis Control Program** (aiming to eliminate viral hepatitis as a public health threat by 2030 in India);
- **Universal Immunization Programme (UIP)** (provides free vaccination against hepatitis B and other vaccine-preventable diseases, including tuberculosis, polio, pneumonia, and measles, among others)

GLOBAL FINANCIAL STABILITY REPORT 2024

The **International Monetary Fund (IMF)** report titled "**Cyber Risk: A Growing Concern for Macrofinancial Stability**" presents a concerning

picture of the **increasing threats posed by cyber incidents to the financial sector.**

According to IMF's Global Financial Stability Report 2024,

- Risk of extreme losses from cyber incidents has increased to \$2.5 billion.
- Number of cyber-attacks has almost doubled since COVID-19 pandemic.
- Attacks on financial firms account for nearly one-fifth of total, of which banks are most exposed.
- **Surge in Card and Internet Fraud Cases:** According to a recent **Reserve Bank of India (RBI) report**, there is a surge in card and internet fraud cases in the first quarter of FY24, with total **damages reaching Rs. 630 crore**

World Cybercrime Index

- Index has been developed as a joint partnership between
- University of Oxford and UNSW Canberra.
- **India ranked number 10 in cybercrime**, with frauds involving people making advance fee payments being the most common type.
- **Russia topped the list** followed by Ukraine and China

Financial Stability Board (FSB)

- An international body that **monitors and makes recommendations about the global financial system.**
- **Mandate:** Promote coordination and information exchange among authorities responsible for financial stability.
- **Headquarters: Basel, Switzerland.**
- Its **decisions are not legally binding** on members.
- **India is a Member of the FSB.**

MT ETNA

VVR, also known as volcanic smoke rings, are generated when gas, predominantly water vapor, is released rapidly through a circular vent in the volcanic crater.

- The **Mount Etna Smoke rings** are a rare phenomenon that scientists refer to as **volcanic vortex rings**, which are produced roughly in the

same way as the smoke rings that some cigarette smokers are able to blow out of their mouths

- **Mt Etna is the world's most active volcano**, located on the east coast of Sicily (Italy).
- **Also, it is the largest volcano of Europe.**
- **It lies in the highly active tectonic zone** of Mediterranean Sea region which is part of the Mid-continental Volcanic belt.
- The other important belt includes Circum pacific (ring of fire) and Mid-Atlantic belt.

MUDUMALAI TIGER RESERVE

In Mudumalai Tiger Reserve, Asiatic wild dogs are affected by mange disease, likely spread by feral dogs.

About Mudumalai Tiger Reserve

- **Mudumalai Tiger Reserve is located in the Nilgiris District of Tamil Nadu** state at the tri-junction of three states, viz, Karnataka, Kerala and Tamil Nadu.
- It is a part of the **Nilgiri Biosphere Reserve (1st Biosphere Reserve in India)**.
- The Reserve has tall grasses, commonly referred to as '**Elephant Grass**'.

Mange Disease

- **It is a skin disease caused by mite infestations**, leading to inflammation, itching, and hair loss.
- caused by **Sarcoptes scabiei mites**, which also cause **human scabies**.
- It affects various domestic animals and spreads through direct contact or contaminated objects.
- Treatment is available in most forms.

Asiatic wild dogs:

- **It is also called Indian wild dogs**, and are found in forests across central, south, and southeast Asia.
- known by various names like **red wolf or mountain wolf**.
- Found in India's Western and Eastern Ghats, central Indian landscape, and North East India.
- Status: **endangered according to the IUCN Red List**, protected under the Wildlife Protection Act 1972, and listed under CITES Appendix II

URAL RIVER

Rise in water level of Ural River due to snow melting affected over 10,000 Homes across Russia.

Ural River

- It is 2,428 km Long River that flows through Russia and Kazakhstan along the continental boundary between Europe and Asia.
- Originates in Ural Mountains and empties into Caspian Sea.
- It is **Europe's third-longest river after Volga and Danube rivers.**
- Melting snow constitutes about 60% to 70% of the river's water source

SENKAKU ISLANDS

Joint statement issued by Japan and USA recently opposed any attempt to unilaterally change the status quo of the Senkaku Islands by China.

- Japan and China have long-running dispute over these islands.

About Senkaku Island:

- Also known as Diaoyu in Chinese.
- Senkaku Islands are located in the East China Sea approximately 410 km west of Okinawa Island.
- Largest island: Uotsuri Island.



RICH CLABAUGH/STAFF

JYOTIBHA PHULE

Prime Minister paid tributes to Jyotiba Phule on his birth anniversary.

About Jyotiba Phule

- Born in Maharashtra, Phule was social reformer, writer, educationalist and champion of social justice.
- With help of his wife **Savitribai Phule**, both started first school for girls in 1848 in Pune.
- In 1873, he founded **Satyashodhak Samaj** ('Truth-seekers' society') to attain equal rights for people from lower castes.
- Literary work: **Tritiya Ratna, Gulamgiri, Shetkaryacha Aasud** etc.

MANGAL PANDEY

Legendary Sepoy Mangal Pandey was remembered on his death anniversary.

About Mangal Pandey

- He was a resident of Ballia (Uttar Pradesh).
- He joined 34th Bengal Native Infantry of the British East India Company.
- Influenced by example of his compatriots in Behrampur, he refused to use greased cartridges
- Broke into open mutiny on March 29, 1857, at Barrackpore near Calcutta, which also ignited fire of Revolt of 1857.
- Later, he was court-martialed and hanged at Barrackpore on April 8, 1857.

PETER HIGGS

Peter W. Higgs received Nobel Prize in Physics (2013) jointly with Francois Englert for theoretical discovery of mechanism influencing origin of subatomic particle mass.

- He theorized the existence of Higgs Boson in 1964. It was finally discovered in 2012 at Large Hadron Collider (LHC).
- **LHC is world's largest particle accelerator** located in European particle physics laboratory CERN, Switzerland.

Higgs Boson

- Higgs boson is the fundamental particle associated with Higgs field, a field that gives mass to other fundamental particles.

- Particle's mass depends upon their interaction with this Higgs field.
- Photons do not interact with this field and are thus massless.
- Particles like electrons and protons do interact and have masses.
- Higgs boson itself interacts with this field and thus has mass.
- Concept of Higgs field and Higgs particle are fundamental to our current understanding of way nature works.

Other fundamental Particles

- Fermions (12 in number)-They are building blocks of matter and are split into six quarks and six leptons.
- Bosons are particles that carry energy and forces throughout universe

EURASIAN OTTER

For the first time in India, Eurasian otter was radio-tagged in Satpura tiger Reserve (Madhya Pradesh).

- Other two otter species found in India – Smooth-coated otter and Asian small-clawed otter.

About Eurasian Otter (*Lutra lutra*)



Conservation Status:

- IUCN: Near threatened
- Wildlife Protection Act: Schedule I
- CITES: Appendix I

Distribution:

- Found in Europe, Asia, and Africa.
- In India, found in northern, northeast, and southern regions.

Characteristics: Brown Fur, adapted for aquatic lifestyle with webbed feet and ability to close small ears and nose under water.

ASHWAGANDHA

Ashwagandha is growing in popularity, both in India and abroad.

About Ashwagandha

- It is an evergreen shrub found in parts of India, Africa, and the Middle East.
- Used as a medicinal plant, especially in traditional Ayurvedic medicine.
- Contains several bioactive compounds, including withanolides, which have anti-inflammatory and antioxidant effects.
- Its supplements are often promoted for stress and anxiety, sleep, male infertility, athletic performance, etc