

ENVIRONMENT

MICROALGAE
HEAT WAVES
GROUNDWATER LEVELS
30 YEARS OF UNCCD
EL-NINO AND LA-NINA
ENVIRONMENTAL DNA

POLITY

73RD CONSTITUTIONAL AMENDMENT
CHILD LABOUR
SURVEY ON AYUSH

ECONOMY

GENERAL ANTI-AVOIDANCE RULE (GAAR)
TAX DEVOLUTION TO STATES
PM-KISAN

SCIENCE AND SPACE TECHNOLOGY

ADITYA-L1
INTERNATIONAL YEAR OF QUANTUM SCIENCE AND TECHNOLOGY
COOLING OF SUPERCOMPUTER
MARS RECONNAISSANCE ORBITER
MULTI-DRUG RESISTANT PATHOGENS
TRADITIONAL MEDICINE
PREVENTION OF ARMS RACE IN OUTER SPACE PAROS

INTERNATIONAL RELATIONS

EAST ASIA SUMMIT
CHINA-PAKISTAN ECONOMIC CORRIDOR IN 2ND PHASE
IORA

HEALTH

NEW CRISPR GENE EDITING PLATFORM
XYLITOL

DEFENCE

VIDYUT RAKSHAK
JIMEX
KARGIL WAR
NAGASTRA-1

MISC

GLOBAL GENDER GAP REPORT 2024
GLOBAL ECONOMIC PROSPECTS 2024
ENERGY PROSPECTS REPORT 2024
VETERINARY COUNCIL OF INDIA

PLACES IN NEWS

SUBANSIRI RIVER
PANTANAL WETLAND
JAGANNATH TEMPLE
JYOTIRMATH

PERSONS IN NEWS

RAMPRASAD BISMIL

BIRSA MUNDA

TARAKNATH DAS

SPECIES IN NEWS

SNOW LEOPARD

GREATER ADJUTANT STORK

SEA CUCUMBERS

CAMEL

MICROALGAE

CSIR-Indian Institute of Chemical Technology (IICT) has identified **microalgae** as a promising **protein supplement for food and feed**.

- The Research highlights the **Chlorella Growth Factor (CGF)**, a protein-rich extract from the algae, which offers **high-quality protein** and essential **amino acids** that surpass those in commercially available soy meal.
- CGF is beneficial for human and animal health, promoting overall well-being and immunity.

About Microalgae

- Diverse group of single-cell photosynthetic organisms, both prokaryotes and eukaryotes.
- These are groups of autotrophic microorganisms that live in marine, freshwater, and soil ecosystems.

Significance

- **Nutrition:** These are rich in nutrients and biologically active substances, such as proteins, vitamins, etc.
- **Carbon cycle:** They absorb carbon dioxide and produce oxygen through photosynthesis.
- **Food Chain:** Phytoplankton, which forms the base of the food chain, includes microalgae.

HEAT WAVES

Heatwave events have reopened discussions on inclusion of heatwave as notified disasters under the Disaster Management (DM) Act, 2005.

About Notified Disasters

- DM Act 2005 provides for allocation and utilization of resources from the National Disaster Response Fund (NDRF) and State Disaster Response Fund (SDRF).
- Money in these funds can be utilized only for response and management of notified disasters.
- Presently, there are 12 Notified Disasters including Cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloud burst, pest attack, frost & cold wave.
- In 2020, government treated Covid-19 as notified disaster as a special one-time dispensation

GROUNDWATER LEVELS

The severity of GW drought increased 22 times during the pre-monsoon season from 1996 to 2016.

- GW drought is a condition when water tables drop below their normal levels.
- Affected Regions: Large parts of North India, including major cities such as Delhi-NCR, Jaipur, and Lucknow.

About Groundwater

- Global abundance: 30% of the world's freshwater is groundwater.

- India's Usage: India is the largest groundwater user in world (more than 25% of global total).
- Contribution of GW is nearly 62% in irrigation, 85% in rural water supply and 50% in urban water supply.
- Major Basins: Indo-Ganga-Brahmaputra plains possess 60% of the country's groundwater resources.
- High Utilization States: Punjab, Haryana, Rajasthan, and Tamil Nadu
- Extraction level: As per Dynamic Groundwater Resource Assessment 2023 by the CGWB, of the assessed GW units: 11% are overexploited (i.e., extraction exceeding annually replenishable groundwater recharge) 3% are critical (i.e., extraction is between 90-100 % of annual extractable resources available).

Causes of Groundwater Depletion

- Excessive use of groundwater for agricultural and industrial purposes due to rising population.
- Shifting climate patterns affecting water availability.
- Unsustainable urbanisation (like encroachment of water bodies, concretisation).
- Subsidies facilitating low-cost pumping technologies, free electricity, etc.

Steps Taken:

- **Atal Bhujal Yojana (ATAL JAL):** To improve the management of groundwater resources in 7 states (Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh).
- **"Catch The Rain" Jal Shakti Abhiyan:** To promote Rainwater harvesting & water conservation
- Mahatma Gandhi National Rural Employment Guarantee Scheme (**MGNREGS**): The natural resource management component includes water conservation and water harvesting structures.
- Financial assistance to States: Financial assistance under the 15th Finance Commission tied grants can be utilized for rainwater harvesting.
- **Master Plan for Artificial Recharge to Groundwater (2020):** Prepared by the Central Ground Water Board (CGWB).

30 YEARS OF UNCCD

UNCCD is one of the three global agreements known as the Rio Conventions (1992), alongside the UN Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD).

About UNCCD

- Established in 1994, UNCCD is the sole legally binding international agreement linking environment and development to sustainable land management.
- **Members:** 196 countries and the European Union.
- **Objectives**
 - To protect and restore land and ensure a safer, just, and more sustainable future.
 - It's committed to a bottom-up approach, encouraging the participation of local people in combating desertification.
- **Report:** Global Land Outlook.

Flagship initiatives:

- In 2015, Land Degradation Neutrality (LDN) target setting programme (LDN TSP): Parties were invited to formulate voluntary targets to achieve LDN.
 - LDN: It refers to the sustainable management of land resources to support ecosystem services and food security.
 - India committed to restore 26 million hectares by 2030.
- In 2017, the Strategic Framework 2018–2030: It urged nations to incorporate desertification/land degradation and drought concerns into national policies.
- Other initiatives: the Great Green Wall (2007), The Changwon Initiative (2011), International Drought Resilience Alliance (2022), G20 Global Land Initiative.

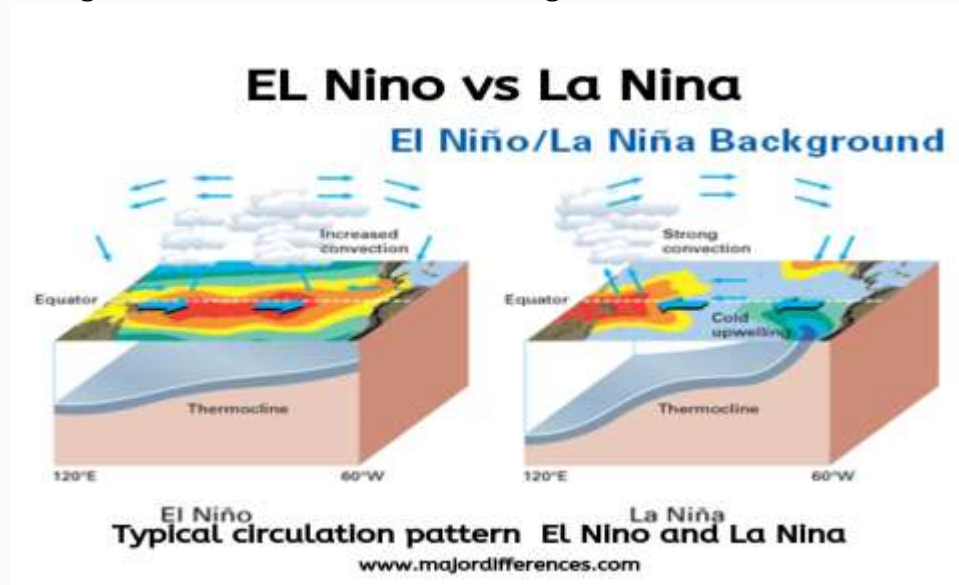
EL-NINO LA-NINA

National Ocean and Atmospheric Administration (NOAA), a US body, announced that the El Nino conditions prevailing since mid-2023 had ended and were replaced by El Nino Southern Oscillation (ENSO) neutral phase.

- ENSO is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean.
- Occurs in irregular cycles of 2–7 years.
- El Nino (warm phase) and La Nina (cold phase) are extreme phases of the ENSO cycle; between these two phases is a third phase called ENSO-neutral.
- In the neutral phase, tropical Pacific sea surface temperatures (SST) are generally close to average.

About El Nino

- El Nino (the Christ Child) is a climate pattern associated with the warming of the ocean surface temperatures in the central and eastern tropical Pacific Ocean.
- Key Impacts: It suppresses rainfall over India during monsoon.
- It brings rain to South America and droughts to Indonesia and Australia.



About La Nina

- La Nina refers (Little Girl) to the periodic cooling of ocean surface temperatures in the central and east-central equatorial Pacific.

- Key Impacts: It has the opposite effect of El Nino.
- It is associated with a strong monsoon and above average rains and colder winters in the subcontinent

ENVIRONMENTAL DNA

Researchers have shown the potential of freshwater biodiversity monitoring using eDNA.

- eDNA is organismal DNA that is released in the environment from cellular material shed by organisms (via skin, excrement, etc.) into aquatic or terrestrial environments.
- eDNA is increasingly being used to detect the presence of species and assess biodiversity in an ecosystem.
- Unlike conventional methods, eDNA approach is reliable, and accurate, and can be done at a low cost.
- This information can be used to inform the IUCN Red List of Threatened Species and other conservation tools.

73RD CONSTITUTIONAL AMENDMENT

Policy Research Working Paper released by the World Bank Group analyzed the role of 73rd Constitutional Amendment in shaping India's democratic trajectory.

- Constitution (73rd Amendment) Act, 1992 induct certain basic and essential features of Panchayati Raj Institutions (PRIs) in the Constitution to impart certainty, continuity, and strength to them.

Key Findings of the Paper

- **Lack of Funds:** PRIs rely entirely on grants made by state and national authorities.
- **Lack of Functionaries:** Scarcity of Panchayat Secretaries. e.g., on average, 0.67 Panchayat Secretaries per Gram Panchayat, with the number falling to 0.33 in states like Uttar Pradesh.
- **Recentralisation Process:** Autonomy of local governments are being eroded due to MIS-based beneficiary selection, digital tracking of beneficiaries, etc.
- **Effects of reservation:** Reservation for women and castes changed profile of households that produce candidates.

Key Recommendations

- **Build local tax capacity:** Build better property records, give Panchayats more freedom to levy taxes, etc.
- **Strengthen Gram Sabhas:** Increase their frequency and expand their powers to encompass critical areas such as village planning and the selection of beneficiaries for public programs.
- **SHG-Panchayat linkages:** Creating more convergence and coordination between the two would also improve the functioning of Panchayats and balance their decisions more towards the needs of women.

CHILD LABOUR

Twenty fifth anniversary of International Labour Organisation (ILO) convention No.182

- It deals with "worst forms of child labour" and is the first ILO Convention to be universally ratified.

- India ratified it in 2017 along with convention No. 138 which deals with minimum age of employment.

Prevalence of Child Labour in India

- As per census 2011, 10.1 million children (3.9% of total child population) are working, either as 'main worker' or as 'marginal worker'.
- Uttar Pradesh, Bihar, Rajasthan, Maharashtra, and Madhya Pradesh constitute nearly 55% of total working children in India.
- Child labour mostly persists in agriculture, household industries, roadside dabas, etc.

Reasons for Child Labour in India

- Poverty forces families to rely on their children's labour to make their ends meet.
- Lack of quality education increases the likelihood of children entering the workforce prematurely.
- Disasters, conflicts and mass migration leads to economic instability and disrupts families exposing children to labour.
- Demand for Cheap Labour in various industries such as agriculture, domestic work.
- Lack of stringent legislation and enforcement of laws

Government measures to prevent child labour

Constitutional Provisions

- **Article 24** prohibits the employment of children below the age of 14 years in any factory, mine, or hazardous occupation.
- **Article 39(e)** requires the States to direct its policy towards ensuring that the health and strength of workers, men and women, and the tender age of children is not abused.
- Legal Framework
- **Child Labour (Prohibition and Regulation) Amendment Act, 2016** prohibits "the engagement of children (below 14 years) in all occupations and of adolescents (below 18 years) in hazardous occupations

SURVEY ON AYUSH

Survey was conducted by National Sample Survey Office (NSSO) from July 2022 to June 2023.

- Survey collects information on awareness of people about Ayush system of medicine and uses of Ayush for prevention or treatment of ailments.

Key findings

- Around 95% of rural population and 96% of urban population aged 15 years and above are aware of Ayush.
- Ayush is predominantly used for rejuvenation (preventive) purpose followed by therapeutic (curative) treatment.
- During 2022-23, use of Ayush and average expenditure incurred per person for prevention or treatment of ailments is more in urban areas than rural areas.

About AYUSH System

- It represents traditional system of healthcare, namely, Ayurveda, Yoga &

Naturopathy, Unani, Siddha, Sowa Rigpa and Homoeopathy.

- India is 2nd largest exporter of Ayurveda and alternative medicine globally.
- **Benefits of AYUSH:** Negligible side effects, Cost-effective treatment, Individualized personal care, complement modern medicine, etc.

Challenges before AYUSH

- Slower healing compared to allopathic treatment.
- Lack of qualitative graduation and post-graduation courses.
- Limited Research Centres of AYUSH in India.
- Raw material-related issues such as lower supplies, degrading quality, etc.
- Lot of infrastructure remains unutilized like hospital beds, health human resource, AYUSH hospitals and dispensaries, etc

Initiatives taken to promote Ayush

- **National Ayush Mission**, launched in 2014 as a Centrally Sponsored Scheme under Ministry of AYUSH, to strengthen, improve and provide Ayush healthcare services throughout the country.
- **Global Ayush Investment and Innovation Summit (GAIIS) 2022** held at Gandhinagar (Gujarat) to promote agreements, and mutual research and increase Ayush reach globally.
- WHO - **Global Center for Traditional Medicine** was established in Jamnagar (Gujarat) to accelerate global progress in Traditional Medicine.
- Others: Three National Ayush Institutes of Eminence in Ayurveda, Unani and Homoeopathy, AYUSH Visa, etc.

GENERAL ANTI-AVOIDANCE RULE (GAAR)

Telangana High Courts ruled in favour of **GAAR against a taxpayer** and has held that colourable devices (transactions without commercial substance) cannot be part of tax planning.

About GAAR

- It empowers tax authorities to reject tax benefits on transactions or arrangements lacking commercial substance and whose only purpose is to evade tax.
- It came into effect on 1st April 2017.
- Provisions of GAAR are contained in Chapter X-A of the Income tax Act, 1961.

TAX DEVOLUTION TO STATES

This cumulative amount comprises the regular monthly devolution along with an additional instalment to accelerate development and capital spending in states.

- Interim Budget 2024-25 has a provision of Rs. 12,19,783 crore towards devolution of taxes to States.

Devolution of Taxes to States

- Article 270 of the Constitution provides for distribution of net tax proceeds collected by the Union government (corporation tax, personal income tax, central GST, etc.) between Union and states.
- This devolution is based on the recommendation of the Finance Commission (FC)

constituted every five years as per Article 280.

- This divisible pool does not include cess and surcharge levied by the Centre.

Basis of Devolution

- **Vertical Devolution:** Share of states from divisible pool which presently stands at 41% based on the recommendations of the 15th FC.
- **Horizontal Devolution:** It refers to distribution among the states from the share allocated to states based on various criteria.
- As per 15th FC, the assigned criteria with their weights are: Income Distance (45%), Area (15%), Population, 2011 (15%), Demographic performance (12.5), Forest and Ecology (10%), and Tax and fiscal efforts (2.5%).

Grants to States

- **Post Devolution Revenue Deficit Grant:** It is provided under Article 275 of the Constitution as per FC recommendations.
- **Sector-Specific Grants:** 15th FC has recommended such grant to states for 8 sectors including health, education, agricultural reforms etc.
- **State-Specific Grants:** 15th FC recommended these in areas of social needs, administrative governance and infrastructure, water and sanitation, preservation of culture and historical monuments, high-cost physical infrastructure and tourism

PM-KISAN

Prime Minister released 17th instalment of PM Kisan Nidhi scheme.

About PM KISAN

- **Nodal Ministry:** Ministry of Agriculture & Farmers Welfare.
- **Type:** Central Sector Scheme.
- **Aim:** To supplement **financial needs of land-holding farmers** families in procuring various inputs and also domestic needs.
- **Objective:** To provide **income support** to all land-holding eligible farmer families (families include husband, wife and minor children).
- **Beneficiaries:** All landholding farmers, subject to certain exclusions.
- **Benefits:** **Rs. 6,000** is transferred annually in **three equal instalments of Rs. 2,000 each** every four months.

ADITYA-L1

The images were captured by remote sensing payloads i.e. Solar Ultraviolet Imaging Telescope (SUIT) and Visible Emission Line Coronagraph (VELC), aboard Aditya-L1 spacecraft. These images will help in studying solar flares, energy distribution, sun spot, understanding and predicting space weather, monitoring solar activity and UV radiation over a wide wavelength range.

About SUIT and VELC

- **SUIT:** To image Solar Photosphere and Chromosphere in near Ultra-violet (UV) and, to measure solar irradiance variations in near UV.
- **VELC:** To study solar corona and dynamics of coronal mass ejections.

About Aditya L-1

- **Launched in 2023**, it is India's first space mission to **observe Sun from a halo orbit around the Lagrange point 1 (L1) of Sun-Earth system**, which is about 1.5 million km from Earth.
- It was launched by **Polar Satellite Launch Vehicle (PSLV) XL (PSLV-C57)** with 7 payloads on board.

Significance

- To understand Coronal heating and solar wind acceleration.

Lagrange point (L1)

- Lagrange points is an **equilibrium position** in space where the gravitational forces of two large bodies, like the earth and the sun, produce enhanced region of attraction and repulsion.
- L1point provide an **unobstructed view of the sun** even during phenomena like an eclipse; allow payloads to directly observe the sun; makes an mission full efficient.
- There are five Lagrange points, three are unstable (L1, L2, L3- lie along the line connecting two large masses) and two are stable (L4, L5).

INTERNATIONAL YEAR OF QUANTUM SCIENCE AND TECHNOLOGY

Quantum Science and Technology refers to the study and application of the principles of quantum mechanics, which governs the behaviour of matter and energy at the atomic and subatomic scales.

Foundational concepts

- **Wave-particle duality:** Extremely small objects have characteristics of both particles (tiny pieces of matter) and waves (disturbance or variation that transfers energy).
- **Quantum superposition:** In quantum mechanics, a particle or system can exist in a superposition of multiple states simultaneously, until it is measured.
- **Entanglement:** Two particles are linked up in a certain way, affect one another and remain linked irrespective of the distance.
- **Uncertainty Principle:** We cannot know both the position and speed of a particle, such as photon or electron, with perfect accuracy at the same time.

Applications

- **Industry and infrastructure:** Drives technological innovation and secures financial infrastructures through quantum communication.
- **Health & well-being:** Quantum photonics is advancing medical imaging and diagnosis and Quantum chemistry is supporting development of new vaccines and drugs.
- **Climate action:** More energy-efficient and affordable solar cells, low-emission LED light sources and improving accuracy of long-term climate models.

India's Initiatives in the field of Quantum Technology

- **National Quantum Mission (2023):** Aims to seed, nurture, and scale up scientific and industrial R&D and create a vibrant & innovative ecosystem in Quantum Technology.
- **Quantum Enabled Science & Technology (QuEST):** A research program to build quantum capabilities.

- Quantum Computing Applications Lab (**QCAL**): To accelerate quantum computing-led research and development and enable new scientific discoveries.

COOLING OF SUPERCOMPUTER

Researchers from the IIT Bombay and C-MET, Pune have proposed using Low-Temperature Co-fired Ceramic (LTCC) as an efficient alternative to conventionally used copper for making cold plates.

COOLING OF SUPERCOMPUTERS

- High-Performance Computing systems (HPCs) or supercomputers resort to cooling using liquid coolants and cold plates that dissipate heat.
- In liquid-cooled devices, liquid coolants like deionised water are circulated through system to remove excess heat.
- Cold plates are used like a heat sink transferring heat from circuit components into the coolant liquid and copper is presently the preferred material due to high thermal conductivity.

Use of LTCC for cold plates

- LTCC is a technology used to manufacture ceramic substrates for circuits.
- Substrates are materials on which electrical interconnections are printed resistors, inductors, etc are mounted.
- It facilitates 3D circuit packing, making designs more compact and efficient than conventional PCB (Printed Circuit Boards).
- LTCC can effectively cool microprocessor chips in supercomputers.

About Supercomputers

- Supercomputers are largest and more powerful computers that have multiple central processing units grouped into 'compute nodes'.
- Their performance is measured in Floating-Point Operations Per Second (FLOPS).
- **Application of Supercomputers:** Scientific research, Space exploration, Weather Forecasting and Climate Modelling, Genomic Sequencing, etc.

India's initiatives in Supercomputing

- **National Supercomputing Mission:** It is steered jointly by Department of Science and Technology and Ministry of Electronics and Information Technology (MeitY) and implemented by Centre for Development of Advanced Computing (C-DAC), Pune.
- **IndiaAI Mission:** Under it, IndiaAI Compute Capacity will build a high-end scalable AI computing ecosystem.
- **International Collaborations:** India-EU Cooperation on High Performance Computing

MARS RECONNAISSANCE ORBITER

High-Resolution Imaging Science Experiment camera onboard NASA's Mars Reconnaissance Orbiter (**MRO**) **captured images of a mysterious pit on the side of an ancient volcano on Mars.**

About MRO

- **Launched in 2005**, it is the second longest-lived spacecraft to orbit Mars.
- **Objective:** To gain better knowledge of distribution and history of water on Mars.

MULTI-DRUG RESISTANT PATHOGENS

Researchers from IIT Madras and NASA are studying multi-drug resistant (MDR) pathogens, particularly *Enterobacter bugandensis*, on the International Space Station (ISS).

- It is a prevalent nosocomial (hospital acquired infection) pathogen found on surface within ISS.
- *Enterobacter* species are on the WHO priority list for developing new antimicrobials.

Multi-Drug Resistant (MDR) Pathogens

- Pathogens (bacteria, virus, fungi, parasites, etc. that causes disease) that have become resistant to antimicrobial drugs like antibiotics, antifungal etc.
- They occur either naturally through genetic changes or may get accelerated due to the misuse or overuse of antimicrobials.

TRADITIONAL MEDICINE

National Institute of Indian Medical Heritage (NIIMH) is recognised as the first WHO Collaborating Centre (CC) for "Fundamental and Literary Research in Traditional Medicine (CC IND-177)".

- The recognition is granted for Four years, starting from June 3, 2024 Responsibilities of NIIMH as CC IND-177 Assisting WHO in standardizing terminologies for Ayurveda, Unani, Siddha, and Sowa-Rigpa, Assisting WHO in updating the Traditional Medicine Module-II for the Eleventh edition of the International Classification of Diseases (ICD-11).
- ICD is the international standard for systematic recording, reporting, analysis, interpretation, and comparison of mortality and morbidity data.
- It also includes a dedicated chapter on traditional medicine.
- Module 2 of the supplementary chapter on traditional medicine conditions under ICD 11 is dedicated to Ayurveda, Siddha, and Unani data and terminology.
- Support Member States in developing research methodologies for Traditional Medicine.

About NIIMH

- **Genesis:** Established in 1956
- **Nodal Ministry:** NIIMH is a unit of the Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of Ayush.
- **Mandate:** To document and showcase medico-historical research in Ayurveda, Yoga Naturopathy, Unani, Siddha, etc. and other related healthcare disciplines in India

Initiatives of NIIMH for promoting Traditional Medicine research

- Publication: Journal of Indian Medical Heritage Digital Initiatives
- **AMAR Portal:** Catalogues 16,000 Ayush manuscripts (it includes digitized manuscripts, rare books, etc.)
- National Ayush Morbidity and Standardized Terminologies Electronic (**NAMSTE**) portal: Provides standardized terminologies & morbidity codes for Ayurveda, Siddha and Unani systems of medicine.
- Showcase of Ayurvedic Historical Imprints (**SAHI**) portal: Showcases various medico-historical artefacts. **Other: e-Books of Ayush, Ayush Research Portal**

PREVENTION OF ARMS RACE IN OUTER SPACE

In a recent joint statement, BRICS Ministers for Foreign Affairs emphasized the need to discuss a legal multilateral instrument on PAROS.

About PAROS Treaty

- In 2008, draft treaty submitted to the Conference on Disarmament aims to refrain State Parties from placing objects carrying any type of weapon into orbit, installing weapons on celestial bodies, and threatening to use force against objects in outer space.
- It would complement and reaffirm the importance of the 1967 Outer Space Treaty.

EASTASIA SUMMIT

East Asia Summit Senior Official's Meeting was held in Vientiane, Lao PDR.

About The EAS

- **Established:** In 2005 at Kuala Lumpur (Malaysia).
- It is Leaders-led forum for dialogue and cooperation on broad strategic, political, and economic issues of common interest and concern with aim of promoting peace, stability, and economic prosperity in East Asia.
- **Membership:** 18 Members, including **10 ASEAN members and Australia, China, Japan, India, New Zealand, Republic of Korea, Russia, and US.**
- **6 priority areas of cooperation:** Environment and energy, Education, Finance, Global health issues and pandemic diseases, Natural disaster management, and ASEAN Connectivity.

CHINA-PAKISTAN ECONOMIC CORRIDOR IN 2ND PHASE

CPEC phase-1 focused on infrastructure, energy, and port development projects while CPEC phase-2 revolves around Special Economic Zone development and industrialization.

About CPEC

- It is a **3,000-km-long route** of infrastructure projects **connecting China's northwest Xinjiang Uyghur Autonomous Region and Gwadar Port in western Pakistan** province of Balochistan.
- Launched in 2015, it is a flagship project under Belt & Road Initiative (BRI).

Concerns of India

- CPEC, passes through Gilgit-Baltistan (Pakistan occupied Kashmir) violating India's sovereignty and territorial integrity.
- Gwadar port's development threatens India's maritime security in Arabian Sea and energy/oil import through Gulf of Oman.
- Economic non-viability of many of the BRI projects that led to "debt trap" situations in countries like Sri Lanka.

Steps taken by India to counter CPEC

- Chabahar port In Iran, to enhance connectivity and counter Gwadar port.
- International North-South Transport Corridor, connecting India to central Asia and Eurasia bypassing Pakistan.



IORA

India-IORA Cruise Tourism Conference held in New Delhi.

About IORA

- **Genesis:** An inter-governmental organisation established in 1997 and based on the visions of Nelson Mandela.
- **Aim:** Strengthening regional cooperation and sustainable development within IOR.
- **Members:** 23 members (including India).
- **Priority areas:** Maritime Safety & Security, Disaster Risk Management etc.
- **Specialised agencies:** Regional Centre for Science and Technology Transfer (RCSTT)
- **Secretariat:** Mauritius

NEW CRISPR GENE EDITING PLATFORM

SafeEXO-Cas, exosome-based platform has been developed by Scientists at Columbia University.

- **Exosomes are naturally occurring vesicles that act as vehicles for transporting molecules**, such as proteins and genetic material, between cells. These tiny membrane-bound structures play a crucial role in cell-to-cell communication and have potential applications in drug delivery, diagnostics, and therapeutics.

It significantly **enhances the delivery of CRISPR/Cas9 genome** editing components to specific cells. It will also facilitate development of the precision medicine and will improve cancer treatment.

About CRISPR/Cas9 Technology

- Clustered Regularly Interspaced Short Palindromic Repeats Associated protein 9 (CRISPR-Cas9) is a type of genome editing technology.
- It is utilised to change genetic code or edit Deoxyribonucleic acid (DNA) at particular locations.

Working

- Works as **cut and paste** mechanism on **DNA Strands**.
- Genetic codes that need to be changed are identified.
- **Cas9 protein** is used as a pair of molecular scissors to cut off a part from strand, allowing modifications to the genome

Applications of CRISPR

- Edit genes in **human embryo**.
- Change genetic codes of crops to **improve crop resilience**.
- Treating **a range of medical conditions that have a genetic component**, including cancer, hepatitis B, or even high cholesterol.

XYLITOL

A recent study has found out that **Artificial sweetener xylitol** may pose health risks. It's commonly found in products like sugar-free chewing gums, low-sugar baked goods, mints, and toothpaste, may increase the risk of blood clots and cardiovascular events including heart attacks, and strokes.

About Xylitol

- It is a sugar alcohol combine traits of sugar molecules and alcohol molecules that is commonly used as a sweetener.
- It is a common ingredient in sugar-free chewing gums, diabetes friendly foods and oral-care products.
- It can be found naturally or artificially produced, primarily from plant materials.

VIDYUT RAKSHAK

Indian Army launched Vidyut Rakshak Monitoring System as part of its modernisation drive.

About

- Vidyut Rakshak is an **Internet of Things (IoT)**-enabled integrated generator monitoring, protection and control- system.
- IoT is a network of interrelated devices that connect and exchange data with other IoT devices and the cloud.
- Indigenously developed by the **Army Design Bureau (ADB)**.
- It integrates and automates operation of multiple generators from a single system remotely.

JIMEX

Bilateral Japan – India Maritime Exercise (JIMEX) 2024 commenced at Yokosuka in Japan.

- This is the eighth edition, since its inception in 2012.

KARGIL WAR

Recently, Indian Army commenced a Pan-India Motorcycle Expedition to pay tribute to heroes of Kargil War.

About Kargil War (1999)

- It was fought between India and Pakistan in Kargil district of Kashmir and along the Line of Control (LOC).
- Pakistan's motive was to cut link between Kashmir and Ladakh
- It commenced shortly after the signing of the Lahore declaration in 1999.
- It provided the framework for peaceful relations whereby all issues including the issue of Jammu and Kashmir would be resolved by peaceful means.
- During the war, Indian Army evicted Pakistani intruders and succeeded in recapturing Tiger Hill and other posts as part of Operation Vijay.

Aftermath of the war

- After the war, several military and intelligence reforms were carried out on the basis of the Kargil Review committee.
- It recommended To reorganize the mechanisms between the Defence Ministry and the Service Headquarters and the interface between them.
 - Later post of the Chief of Defence Staff was created Strengthen surveillance capability and develop required technology indigenously.
- Full time National Security Adviser to advise the Prime minister about threats to security.



NAGASTRA-1

Indian Army received First indigenous Loitering Munition suicide drones Nagastra-1.

About Nagastra-1

- Developed by Solar Industries' Economics Explosives Ltd (EEL) Nagpur.
- Can neutralise hostile threats in 'kamikaze mode' with GPS- enabled precision strikes with an accuracy of up to 2 metres.

- Kamikaze refers to members of a Japanese air attack corps in World War II assigned to make a suicidal crash on a target (such as a ship)
- However, Nagastra-1 is capable of carrying out precision strikes on enemy camps without endangering the lives of soldiers.
- Equipped with day-and-night surveillance cameras.
- Carries a 1 kg high-explosive fragmenting warhead.
- Unique features include abort, recover and reuse, facilitated by a parachute recovery mechanism.

GLOBAL GENDER GAP REPORT

The report is based on the Global Gender Gap Index (GGGI) which annually benchmarks the current state and evolution of gender parity based on 14 indicators across four key dimensions.

Key findings

Global

- Among 146 countries, Iceland, Finland, Norway, New Zealand, and Sweden are the top five countries.
- The share of women in parliamentary positions has shown an almost uninterrupted positive trajectory since 2006.
- At the current rate of progress, it will take 134 years to reach full parity.
- Women constitute 28.2% of the STEM workforce and 47.3% of the non-STEM workforce.

India

- Overall, India was ranked 129th (ranked 127 in 2023), and 5th in South Asia after Bangladesh, Nepal, Sri Lanka and Bhutan.
- Saw small declines in Educational Attainment and Political Empowerment while Economic Participation and Opportunity slightly improved.
- Shares of women are high in primary, secondary and tertiary education enrolments.

GLOBAL ECONOMIC PROSPECTS 2024

The report is based on the Global Gender Gap Index (GGGI) which annually benchmarks the current state and evolution of gender parity based on 14 indicators across four key dimensions.

Key findings

Global

- Among 146 countries, Iceland, Finland, Norway, New Zealand, and Sweden are the top five countries.
- The share of women in parliamentary positions has shown an almost uninterrupted positive trajectory since 2006.
- At the current rate of progress, it will take 134 years to reach full parity.

- Women constitute 28.2% of the STEM workforce and 47.3% of the non-STEM workforce.

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Recommendation

- Achieving gender parity by 2030 would require a collective investment of \$360 billion per year.
- Targeted interventions and ensuring equitable access to emerging technological competencies are needed.
- Businesses need to have effective diversity, equity and inclusion policies and upskilling.
- NOTE: Gender Inequality Index (GII), released by UNDP, is also a composite metric of gender inequality based on three dimensions: reproductive health, empowerment and the labour market.
- Report called for a significant acceleration in public investments by Emerging Markets and Developing Economies (EMDEs) to meet their development goals.

Key highlights

- Investment Level:
- Public investment averages about 25% of total investment in the median EMDE.
- Public investment in these economies has experienced a historic slowdown in the past decade

Benefits

- Economic growth: Increasing public investment by 1% of GDP can boost GDP by over 1.5% and raise private investment by 2.2% in the medium term.
 - However, public investment may also crowd out private investment, especially when fiscal space is limited and additional fiscal stimulus raises sovereign risk and borrowing costs for the private sector Sustainability of growth: Public investment can be critical in delivering public goods or services that may not be privately profitable, such as public health care and education.
- Recommendations (“three Es” package of policy priorities) to harness the benefits of public investment
- Expansion of fiscal space: Improve tax collection efficiency, enhance fiscal frameworks, and curtail unproductive spending.
- Efficiency of public investment: Tackling corruption, and poor governance, facilitating public-private partnerships, etc.

- Enhanced global support: Coordinated financial support and effective technical assistance are imperative for structural Reforms

ENERGY PROSPECTS REPORT 2024

Report is a joint effort of five SDG 7 custodian agencies – International Energy Agency (IEA), International Renewable Energy

- Agency (IRENA), United Nations Statistics Division (UNSD), World Bank and World Health Organization (WHO).
- Sustainable Development Goal (SDG) 7 is to ensure access to affordable, reliable, sustainable and modern energy for all.

Key Highlights

- SDG 7.1.1: Number of people without access to electricity increased for first time in over a decade, reaching 685 million.
- Factors: Global energy crisis, inflation, growing debt distress in many low-income countries etc.
- India: 11 million people lack access in 2022.
- SDG 7.1.2: 2.1 billion people live without access to clean cooking fuels and technologies.
- Implications: 3.2 million premature deaths each year.
- India: Largest share of the access deficit, with 360 million people lacking access.
- SDG 7.2: Share of Renewable energy (RE) in Total Final Energy Consumption (TFEC) was 18.7% in 2021.
- India: 34.9% renewable energy share in Total Final Energy Consumption.
- SDG 7.3: Average annual improvements in Energy efficiency through 2030 must accelerate to over 3.8% to meet target.

Initiatives for SDG7 in India

- Pradhan Mantri Sahaj Bijli Har Ghar Yojana – **SAUBHAGYA**: Objective of achieving universal household electrification.
- **PM Surya Ghar Muft Bijli Yojana**: Providing up to 300 units of free electricity every month from solar rooftop.
- **Pradhan Mantri Ujjwala Yojana**: To replace biomass as cooking fuel with LPG connections to women of BPL families.
- National Mission for Enhanced Energy Efficiency (**NMEEE**): To enhance energy efficiency in energy intensive industries.

VETERINARY COUNCIL OF INDIA (VCI)

The Veterinary Council of India (VCI) held an online election **on June 8**.

- In every **three years**, Department of Animal Husbandry and Dairying holds elections to elect 11 members to VCI.
- Among the 93 candidates from various parts of India, 16 members of the council of ministers include engineers, an advocate, farmers, and businessmen.

VCI

- It is a **statutory body** established under Indian Veterinary Council Act 1984.
- It receives **100% Grants-in-Aid** from Ministry of Fisheries Animal Husbandry and Dairying to cover its office expenses.
- It's making provision for regulation of veterinary practice, preparation and maintenance of Indian Veterinary Practitioners Register etc.

SUBANSIRI RIVER

An Agreement has been signed for the implementation of comprehensive Fisheries Management Plan at Subansiri **Lower Hydro Electric Project (SLHEP)**.

- **SLHEP** is an under construction gravity dam on the Subansiri River.
- Gravity dam is a concrete or masonry dam so proportioned that it will resist overturning and sliding forces by its own weight.

About Subansiri River (Gold River)

- Rises from the **Kangig glacier range in Tibet**.
- It is a trans-Himalayan river.
- In India, it enters in the state of Arunachal Pradesh.
- Right bank tributary of Brahmaputra River, joins it, in the plains of Assam.
- Major tributaries: **Laro, Nye, Yume, Tsari, Kamla**, etc.

PANTANAL WETLAND

South America's Pantanal wetlands is grappling with devastating wildfires.

Pantanal Wetland

- It is the world's largest tropical wetland, spread across three countries: Bolivia, Brazil, and Paraguay.
- It comprises a UNESCO World Natural Heritage Site and Biosphere Reserve and two Ramsar sites.
- It is a seasonal floodplain, flooded by waters of Paraguay River System.
- Home to South America's highest concentration of some wildlife species such as jaguar and caiman.
- Less than 5% of Pantanal is protected and around 95% is under private ownership.
- Threats: Cattle grazing, untreated waste pollution, pesticide runoff, unsustainable infrastructure development, etc.



JAGANATH TEMPLE

Odisha has opened all four doors of Shree Jagannath Temple for devotees.

About Shree Jagannath Temple

- Located in Puri, Odisha, and also called as White Pagoda.
- Dedicated to Lord Jagannath (incarnation of Lord Vishnu), sister Devi Subhadra and elder brother Lord Balabhadra (holy trinity).
- **Constructed by Ganga Dynasty** King Ananta Verman Chodaganga Deva.
- One of the four Char Dhams (Dwarka, Badrinath & Rameshwaram) for pilgrimages in India.
- **Architecture style:** Kalinga Architecture.
- It has four component parts consisting of Vimana or Deula (Garbhagriha), Jagamohana, Natamandapa and Bhogamandapa.
- Architectural style of temple is a combination of two types of temple structures, i. e. Rekha and Pidha

JYOTIRMATH

The Centre approved the Uttarakhand government's proposal for renaming the Joshimath tehsil in Chamoli district to Jyotirmath, and Kosiyakutoli tehsil in Nainital district to Pargana Shri Kainchi Dham.

About Jyotirmath

- It is one of the four cardinal mathas established by 8th century
- Philosopher Adi Shankaracharya across India to promote Advaita Vedanta philosophy.
- It is believed that Adi Shankaracharya performed penance in Jyotirmath under a tree known as Amar Kalpavriksha.
- It is also known as winter abode of Lord Badrinath.
- It is a base camp for mountaineers attempting to climb Nanda Devi peak

RAMPRASAD BISMIL

Birth anniversary of Ram Prasad Bismil was recently celebrated.

- Born in the **Shahjahanpur** district of present-day Uttar Pradesh.
- Contribution At young age joined the **Arya Samaj Youth Association** and began spreading the teachings of Swami Dayanand.
- In the **Mainpuri Conspiracy (1918)**, police found Bismil among youths selling banned books.
- He published a pamphlet titled '**Deshwasiyon ke Naam**' and distributed it along with his **poem 'Mainpuri ki Pratigya'**.
- In 1924, Sanyal, Bismil, Ashfaqullah, and Chatterjee united to establish the Hindustan Republican Association.
- He was the mastermind behind the infamous Kakori Conspiracy Case.

BIRSA MUNDA

Freedom fighter and tribal leader Birsa Munda was remembered on his death anniversary.

About Bhagwan Birsa Munda

- He was born in the Munda tribe at Ulihatu, Khunti district of the Chotanagpur Plateau region (Jharkhand).
- Also known as 'Dharti Aaba'.
- Started faith of Birsait and stressed the importance of prayer, staying away from alcohol, and having faith in God.
- Started a movement called 'Ulgulan (The Great Tumult)' against the exploitation of tribals by local authorities.
- This led to the enactment of the Chotanagpur Tenancy Act (1908) which restricted the transfer of land from tribal people to non-tribals.
- His birth anniversary (on 15th November) is celebrated as **Janjatiya Gaurav Divas**

TARAKNATH DAS

The birth anniversary of Shri Taraknath Das was celebrated.

About:

- Born in North 24 Pargana, Bengal, Shri Das was a journalist, teacher, philanthropist and revolutionary.
- In 1903, he joined the revolutionary organisation Anushilan Samiti (established by Satish Chandra Bose and Praanath Mitra in Kolkata).
- Started an anti-British newspaper, 'Free Hindusthan' in the USA.
- In 1913, he was associated with the Ghadar Movement.
- Implicated in the Indo-German conspiracy case in 1917.
- Established Taraknath Das Foundation in 1935, to promote educational activities, to foster cultural relations between the US and Asian countries

SNOW LEOPARD

Research has found that Snow leopards also eat plants despite being carnivorous.

About Snow Leopards

- **Habitat:** Inhabits Mountains of Central and South Asia with 12 snow leopard range countries including India.
- Currently, there are around 718 snow leopards in India.
- Their distribution coincides closely with distribution of their principal prey, ibex and blue sheep.
- Snow leopard is the state animal of Himachal Pradesh and Ladakh.

Characteristics

- Have short forelimbs and long hind limbs for traversing in rugged mountainous environments.



GREATER ADJUTANT STORK

Rapid urbanisation in Assam is affecting Greater Adjutant stork survival.

About Greater Adjutant Stork

- **Habitat:** Mostly breed in Brahmaputra Valley of Assam.
- **Characteristics**
 - They are omnivorous and primarily scavengers of large carrion.
 - The name adjutant comes from their distinctive, military style walking.
 - They are known to be monogamous.
 - Both male and female participate in nest building.
 - They lack vocal muscles and rely on unique behaviour and tactile form of communication.
- **IUCN status:** Near Threatened.
- **Threats:** Habitat loss, disturbance of its breeding and feeding sites, hunting of adults, etc.



SEA CUCUMBERS

As per a new research, repopulating Sea Cucumbers can help in recovery of coral reefs.

About Sea cucumbers

- Belong to the animal group called echinoderms, which also contains starfish and sea urchins.
- Are known as janitors of tropical seas as they consume decomposing organic matter and convert it into recyclable nutrients and buffers the ocean's acidification.
- It exhibits sexual and asexual reproduction.
- Protected under Schedule I of Wildlife Protection Act, 1972.
- Threats: illegal harvest, trade and trafficking



CAMEL

UN declared 2024 as International Year of Camelids (members of camel family) to build awareness of untapped potential of camelids.

About Camel

- Camels are found in Africa and Asia.
- **Characteristics:** Domesticated by people, Mammals, Herbivores, survive in hot conditions (Draught animal).
- **Types of camel:** Dromedary or Arabian camel (single hump) and Bactrian camel (two humps).

Camels in India

- State animal of Rajasthan.
- Kharai Camel swim long distances (3 km at a time) in sea to eat Mangroves; found in Kutch (Gujarat).
- Bactrian camels are found in Ladakh's Nubra Valley.
- Dromedaries camel are found in hot deserts (Rajasthan, Gujarat)