UPSC Daily Current Affairs| Prelim Bits 01-04-2025

Joint Crediting Mechanism (JCM) between India and Japan

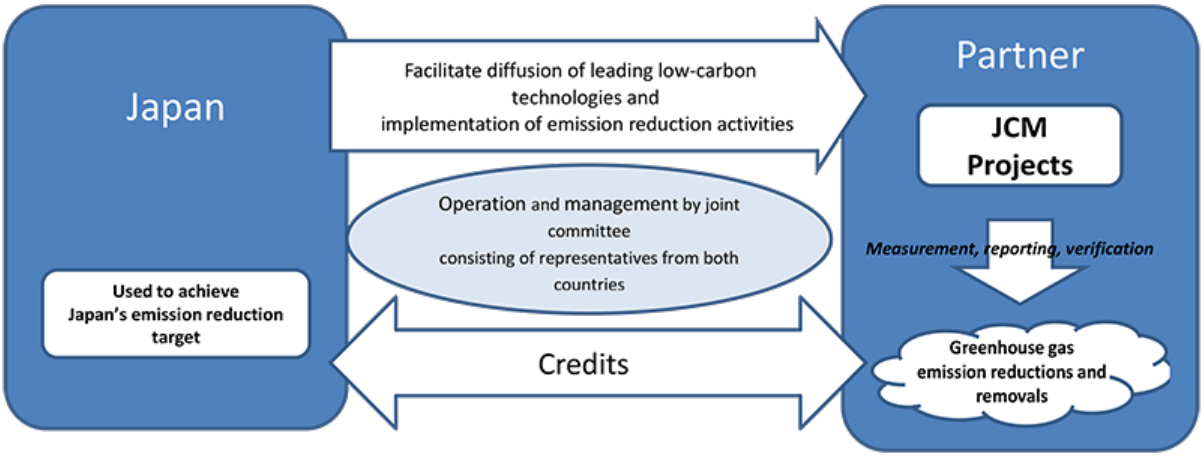
Prelims (GS - I) – *Environmental Ecology & Climate Change, International Relations.*

Mains (GS - II & III) – *GS II (Governance, International Relations) | GS III (Environment, Economy, Science & Tech).*

Why in News?

India and Japan plan to sign a Memorandum of cooperation for setting up a Joint Crediting Mechanism (JCM) to share emission reduction credits under Article 6.2 of the Paris Agreement.

- **Initiated by** – Japan.
- **Objective** – To facilitate the *transfer of low-carbon technologies* and infrastructure through investment by Japanese corporations to developing nations in exchange for *carbon credits.*
- **Purpose –** Helps both India and Japan achieve their climate targets (NDCs) by implementing sustainable technologies and sharing the resulting emission reductions.



- **Tracking Mechanism –** Carbon credits will be tracked ***through a registry system***, with joint committees managing projects and certifying credits.
- **Key Features of India-Japan JCM -** Japan *will invest* in India's decarbonization efforts by deploying advanced clean energy technologies.
- India will adopt new emission-reducing technologies in various industries, focusing on *high-cost sectors* that lack financing.
- Japan can use these credits to meet its *NDC commitments*, while India benefits from technology transfer and infrastructure development.
- **Sectors Covered Under the JCM Agreement -** The agreement covers *14 key*

sectors, including
    - Renewable energy with storage solutions
    - Solar thermal power plants
    - Green hydrogen production
    - Sustainable aviation fuel (SAF)
    - Decarbonization of hard-to-abate sectors

Reference

Business Standard | Joint Crediting Mechanism (JCM)

Sangita Kalanidhi Award

Prelims (GS - I) – *Current events of national and international importance.*

Mains (GS - I) – *Indian Heritage and Culture, History and Geography of the World and Society.*

Why in News?

Rudrapatna Krishnamurthy Shriramkumar has been chosen for this year's Sangita Kalanidhi Award by the Music Academy, Chennai.

- Sangita Kalanidhi, which translates as 'Treasure of Music and Art', is the ***highest honour in Carnatic music***.
- It is awarded ***annually*** by the Madras Music Academy, one of the oldest academies of Carnatic music in India.
- **Established in** – 1928.
- The Music Academy was established in 1928, following a decision taken at the *Indian National Congress session* in Chennai in *December 1927* to promote Carnatic music and Bharatanatyam.
- **Rewards** – The award comprising a gold medal and a birudu patra (citation).
- Since 2005, the Sangita Kalanidhi also receives the MS Subbulakshmi Award instituted by The Hindu.

The lawyer, freedom fighter, and artiste E Krishna Aiyar was trying at the time to revive Bharatanatyam, which had suffered from the stigma of association with devadasis.

- **Carnatic music** – Carnatic music is a classical music tradition of ***South Indian states*** such as South Indian states of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, and southern Odisha.
- It emphasizes vocal music and compositions, with a focus on intricate melodies, rhythms, and improvisations based on ragas and talas.
- **Origin** – Carnatic music has roots in ancient Hindu traditions and scriptures, particularly the ***Samaveda***.

- It is considered one of the two main classical music traditions of India, the other being Hindustani music.
- **Instrumented used** – The violin, mridangam, tambura, ghatam, and veena.
- Carnatic music uses the ***Melakarta system***, a system of 72 parent ragas (janaka ragas) to classify ragas.

Reference

The Indian Express | Sangita Kalanidhi award

India Bio-Economy Report

Prelims (GS - I) – *Economic and Social Development-Sustainable Development, Poverty, Inclusion, Demographics, Social Sector Initiatives, etc.*

Mains (GS - III) – *Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.*

Why in News?

India Bio-Economy report has pegged the value of India's bioeconomy in 2024 at more than $165 billion, accounting for over 4.2% of the country's GDP.

- **Bio-economy** – Refers to the industrial use of biological resources (plants, animals, and microorganisms), and the replication of natural biological processes in the production of goods and services.
- **Released by** – Department of Biotechnology.
- **Key findings** – The report shows that the value of India's bioeconomy nearly doubled in the last 5 years, from 2020 to 2024.

- The number of companies operating in the bioeconomy has gone up by almost 90% in

the last 3 years, from 2021 to 2024.

- This number is projected to double again by 2030, by which time such companies would employ close to 35 million people.
- Nearly half the value of the bioeconomy was generated in the industrial sector, for the *development and use of biofuels and bioplastics*, among other things.
- The pharma sector accounted for another 35% of the total value, with vaccines the major contributor.
- But the fastest growing segment in 2024 was research and IT, which includes biotech software development, clinical trials, and bioinformatics that helps in areas such as drug research.
- The report showed that only 5 states — Maharashtra, Karnataka, Telangana, Gujarat and Andhra Pradesh, accounted for more than two-thirds of the value generated in the bioeconomy.
- The entire eastern and northeastern region generated less than 6% of the total value.
- **Achievements in Bioeconomy** – India is among the *top producers of vaccines globally* and developed the world's first DNA COVID-19 vaccine.
- Ethanol blending largely increased from 2014 to 2024, with a target of 20% by 2025.
- The sector contributes **4.25%** to GDP with a compound annual growth rate (CAGR) of **17.9%** over the past four years.
- While the 4.2% share in the overall GDP was comparable to figures in the *United States and China*, the bioeconomy of countries like Spain and Italy accounts for more than 20% of their GDP.

Government Initiatives and Key Programmes
• **BioE3 policy (Biotechnology for Economy, Environment and Employment)** – Aims to establish India as a global hub for bio-manufacturing, and a major centre for research and development in biotechnology. • The idea is to incentivise and promote the setting-up of a network of universities, research institutions, start-ups and industries to facilitate bio-manufacturing. • **National Biopharma Mission (NBM)** – Innovate in India (i3), is a government-approved initiative led by the *Department of Biotechnology (DBT) and implemented by BIRAC.* • It aims to boost India's capabilities in biopharmaceuticals, vaccines, biosimilars, medical devices, and diagnostics by fostering collaboration between industry and academia. • **Biotech-KISAN** – It is a scientist-farmer partnership programme launched to empower farmers, especially women and those in rural and tribal areas, through agricultural innovation and scientific interventions. • It follows a ***hub-and-spoke model*** and is active across ***115 Aspirational Districts*** in India.

Reference

The Indian Express | India Bio-Economy Report

Aortic Stenosis & TAVI

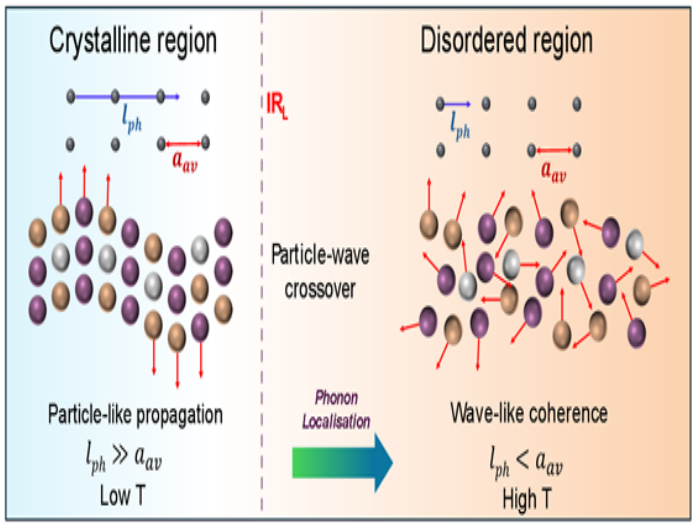
Prelims (GS - I) – *General Science.*

Mains (GS - III) – *Science and Technology- developments and their applications and effects in everyday life.*

Why in News?

TAVI is a minimally invasive procedure for treating severe heart valve diseases in high-risk patients.

- **Aortic Stenosis** – It is a condition where the ***aortic valve narrows***, obstructing blood flow from the heart to the aorta.
- As a result, the heart must work harder to pump blood, causing increased pressure within the heart chamber, which can lead to further complications.
- Aortic valve is a door that separates the heart from the aorta, the largest artery that carries blood to different organs of our body.
- As people age, the valve stops working properly. It becomes stiff and calcified (like a bony structure) that restricts its movements.



- **Common causes -** Degenerative aortic valve disease, bicuspid aortic valve disease and rheumatic heart disease.
- **Prevalence** - 0.4% in the general population and as high as 2.8% in people above the age of 75 years. It is also estimated that more than 10% of individual may have it after 80 years.
- **Symptoms -** Most of the patients remain asymptomatic till the disease becomes severe.
- **Some symptoms include -** Breathlessness, chest pain, syncope (passing out) and fatigue. Some of the individuals develop the weakness of the left side of the heart due to this disease.
- **Diagnosis -** Echocardiogram plays pivotal role in diagnosing the problem.
- **Treatment -**Until a few years ago, the treatment for this condition was surgical replacement of the valve through *open-heart surgery*.
- **Transcatheter Aortic Valve Replacement (TAVI)** – *First done in 2002* by professor

Alain Cribier, France.

- It is the ***first percutaneous valve replacement procedure***, where a new valve is implanted into the old, diseased valve via the arteries.
- It is also known as Transcatheter Aortic Valve Implantation (TAVR).
- TAVI is superior to ***Surgical Aortic Valve Replacement (SAVR).***
- TAVI is a minimally invasive procedure, and patients can often be discharged successfully within 2-3 days after the procedure.
- In younger patients, Surgical Aortic Valve Replacement (SAVR) remains the treatment of choice.
- However, in older patients, transcatheter aortic valve implantation (TAVI) is done through the leg arteries for patients aged 65 or older or for those expected to have a life expectancy of less than 10 years.
- The ESC (European Society of Cardiology) recommends considering TAVI for patients older than 75.

Reference

The Hindu | Transcatheter Aortic Valve Replacement (TAVI)

Neutrinos

Prelims (GS - I) – *Current events of national and international importance | General Science.*

Mains (GS - III) – *Science and Technology- developments and their applications and effects in everyday life.*

Why in News?

The AMoRE experiment in South Korea has reported not finding evidence of neutrino less double beta decay, imposing stringent limits on this elusive subatomic event.

- **Neutrinos** – They are the 2nd-most abundant subatomic particle in the universe, after photons, the particles of light.
- They were produced in abundant amounts during the Big Bang event.
- They are produced in radioactive decay, when massive stars explode, and when cosmic rays strike the earth's atmosphere.
- They are also made during nuclear fusion; the sun alone is responsible for flooding every square centimetre on the earth with 60 billion neutrinos each second.
- These particles are also extraordinarily hard to catch because they interact very weakly and very rarely with matter.
- **Weight –** Unknown.
- **Types –** It come in three flavours, or varieties, and the differences between the squares of their masses is known, but not the individual masses themselves.
- **Anti-Particle-** A subatomic particle having the same mass as a given particle but opposite electric or magnetic properties.
- If two of them meet, they will annihilate each other in a flash of energy.

- **Majorana particle** – It is a type of fermion that, gets its mass through a *self-interaction mechanism* that does not involve the Higgs field.

  Higgs field gives mass to fundamental particles such as electrons and quarks. Particles gain mass by interacting with the Higgs field and the strength of the interaction is proportional to mass of the particle.

- **Key feature** – *Majorana fermions must be their own antiparticle*. where the particle and its anti-particle are identical.
- Since antiparticles typically have opposite electric charges to their corresponding particles, Majorana fermions *can only be neutral particles.*
- **Majorana hypothesis** – As a result, neutrinos are often considered as potential candidates for being Majorana particles, since they are neutral.
- This has led to several experiments attempting to find evidence of Majorana neutrinos *through neutrino less double beta decay.*
- **Double beta decay** – It typically involves a nucleus emitting 2 protons, 2 electrons and 2 anti-neutrinos.
- **Neutrino less Double Beta Decay (0νββ) –** It is a rare nuclear process *where two neutrons decay into two protons and emit two electrons*, but no anti-neutrinos are produced.
- For **0νββ** to occur, neutrinos must be their own **anti-particle**.
- Here the neutrino emitted by one neutron is absorbed as an anti-neutrino by the other neutron, allowing the decay to proceed *without emitting an anti-neutrino*.
- **Significance –** If 0νββ is observed, it would prove that neutrinos are Majorana particles, because such a decay can only happen if neutrinos and anti-neutrinos are the same.
- Ongoing experiments like the **AMoRE experiment** aim to detect 0νββ by looking for the distinct energy signatures and confirming if neutrinos are indeed Majorana particles.

Reference

The Hindu | Neutrinos

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Social Issues/ society

National Council for Vocational Education and Training (NCVET)

• Recently, NCVET part of the Ministry of Skill Development & Entrepreneurship (MSDE), has granted official recognition to the National Institute of Social Defence (NISD).
• **Status** – Autonomous Body under the Union Ministry of Social Justice and Empowerment.
• **Established On** – December 5, 2018
• **Objective** – To oversee, elevate, and standardize vocational education, training, and skill development throughout India.
• **Responsibilities** – Recognize, oversee, and revoke certifications for awarding bodies and assessment organizations.
• Create regulations for approving and monitoring qualifications.
• Guarantee quality assurance in the vocational training framework.
• Resolve complaints via a systematic grievance mechanism.
• Consolidate and optimize disjointed regulatory systems to boost employability.

Economy

India's Tea Export Triumph

India has surged to become the world's second–largest tea exporter in 2024, surpassing Sri Lanka, according to the Tea Board of India.

• **India's Export Growth** – India exported 254 million kilograms (Mkg) of tea in 2024, a notable increase from 231 Mkg in 2023, propelling it past Sri Lanka.
• **Kenya's Continued Dominance** – Kenya remains the global leader, exporting over 500 Mkg of tea in 2024, maintaining its top position.
• **Historical Highs and Current Performance** – India's 2024 exports are the second highest in its history, only slightly behind the 256 Mkg exported in 2018.
• **Ambitious Future Targets** – The Indian tea industry aims to achieve 300 Mkg in exports by 2030, building on its recent export success.

SEBI's Revised FPI Disclosure Norms

The Securities and Exchange Board of India (SEBI) has increased the disclosure threshold for Foreign Portfolio Investors (FPIs) from Rs25,000 crore to Rs50,000 crore.

• **Original Mandate for FPI Disclosures (2023)** – SEBI initially mandated comprehensive disclosures for FPIs holding over RS25,000 crore in Indian equity assets.
• This measure was implemented to prevent stock manipulation and reduce market disruption risks from large FPIs.
• **Rationale for Threshold Increase** – The decision to raise the threshold is attributed to the substantial growth in cash equity market trading volumes, which have more than doubled between FY 2022–23 and FY 2024–25.
• This adjustment reflects the expanding scale of the Indian equity markets.
• **New Disclosure Requirements** – FPIs with equity Assets under Management (AUM) exceeding Rs50,000 crore are now required to *disclose full ownership and control details*, tracing back to the ultimate natural person.
• This aims to *provide greater transparency* regarding the entities behind significant FPI investments.
• **Objectives of the Revised Norms** – SEBI's primary objective is to *maintain market integrity while adapting to the evolving dynamics* and increased volumes of the Indian equity market.
• This adjustment balances the need for regulatory oversight with the market's growth.

Gold Monetisation Scheme: Changes Announced

The Ministry of Finance will discontinue Medium– and Long–Term Gold Deposits under the Gold Monetization Scheme (GMS) from March 26, 2025.

• **Launched in** – November 2015,
• **Aim** – To mobilize idle household and institutional gold, making it productive and reducing gold imports.
• **GMS Components and Structure** – The scheme comprised gold deposits of :
  - Short–Term (1–3 years)
  - Medium–Term (5–7 years)
  - Long–Term (12–15 years)
• **Deposit Parameters** – A minimum deposit of 10 grams of raw gold was required, with no maximum limit imposed.
• **Current Revision and Continuation** – Banks can continue offering Short–Term Gold Deposits at their discretion, while Medium– and Long–Term options will be discontinued.

Environment

Global Lake Deoxygenation Crisis

Studies show that 83% of over 15,000 lakes are losing dissolved oxygen (DO), threatening aquatic ecosystems.

• **The Necessity of Dissolved Oxygen** – Dissolved oxygen (DO) is vital for aerobic aquatic life, low levels cause hypoxia, endangering fish and biodiversity.
• **Climate Change** – A Major Oxygen Depletion Factor accounting for 55% of global surface DO decline.
• **Eutrophication's Contribution to DO Loss** – Nutrient runoff causes eutrophication, contributing 10% to DO loss via algal bloom decomposition.
• **Combined Impact and Ecological Consequences** – Climate change and eutrophication synergistically reduce DO, impacting aquatic health and ecosystem stability.

Kasungu National Park

Kasungu National Park, located in Malawi's Central Region, is facing legal action due to increased human–elephant conflicts following a large–scale elephant relocation.

• **Location** – West of Kasungu town in Malawi (African country) and bordering Zambia.
• **Managed by** – The Department of National Parks and Wildlife (DNPW).
• **Features** – The Park features the Dwangwa, Lingadzi, and Lifupa rivers, supporting diverse wildlife and is predominantly inhabited by the Chewa people.
• **Flora and Fauna Diversity –** Kasungu primarily consists of Miombo woodland and grassy wetlands, home to elephants, various antelope species, zebras, and buffaloes.
• It is also a designated Lion Conservation Unit.
• **Elephant Relocation and Resulting Conflicts –** In 2022, 263 elephants were relocated from Liwonde National Park to Kasungu by the DNPW, African Parks, and the International Fund for Animal Welfare (IFAW).
• **Legal Action and Community Impact –** The relocation has led to increased elephant incursions into villages, resulting in at least 12 deaths and extensive crop damage affecting over 11,000 villagers, prompting legal action against IFAW.

Security

Successful VLSRSAM Flight Test

Recently DRDO and the Indian Navy successfully tested the Vertically–Launched Short–Range Surface–to–Air Missile (VLSRSAM) at ITR Chandipur, Odisha.

• **Indigenous Development and Purpose** – VLSRSAM is an indigenously developed missile designed for short–range air defence, capable of engaging low–altitude aerial threats.

• **Advanced Technology** – The missile features an indigenous Radio Frequency seeker, enhancing target acquisition and engagement precision.

• **Test Execution and Results** – Launched from a land–based vertical launcher, it successfully engaged a high–speed aerial target, demonstrating Near–Boundary–Low Altitude capability and high agility.

• **Significance for Indian Defence** – This successful test marks a significant advancement in India's defence capabilities, strengthening its shortrange air defence systems.

Science

MeitY's Deepfake Report to Delhi High Court

Ministry of Electronics and Information Technology (MeitY) has submitted a status report to the Delhi High Court, addressing the escalating issue of deepfake technology and its associated risks.

• **Understanding Deepfake Technology** – Utilizes artificial intelligence, specifically generative adversarial networks (GANs), to create synthetic media that manipulates or replaces real content with fabricated, highly realistic versions.

• **Deepfake Creation Process** – Involves data collection, feature learning, synthesis and manipulation, and refinement using GANs, where AI models compete to enhance realism, ultimately producing convincing fake content.

• **Key Concerns Highlighted by MeitY** – Report emphasizes the lack of a uniform definition for "deepfake," hindering regulatory and detection efforts.

• It also raises serious concerns about the targeted use of deepfakes against women during elections, leading to privacy violations and harmful content dissemination.

• **Proposed Mitigation Strategies** – To focus on developing detection technologies, enhancing legal frameworks.

• To promote public awareness to combat the spread of misinformation and protect individuals from malicious deepfake usage.

Gaia's Retirement: A Milestone in Galactic Mapping

European Space Agency (ESA) has retired its Gaia space observatory, which significantly advanced our understanding of the Milky Way.

• **About the Gaia Mission** – Gaia, launched in December 2013, was an ESA operated astrometry mission designed to create a precise 3D map of the Milky Way.

• **Mission Objectives and Scope** – Its primary goal was to chart the galaxy, tracking positions, distances, movements, and characteristics of over 2 billion stars, and to study the Milky Way's formation and future.

• **Key Scientific Discoveries** – Gaia provided a detailed 3D map of the Milky Way, revealed a new class of "dark" black holes, confirmed stellar collisions impacting galactic evolution, and catalogued over 1.5 lakh asteroids.

• **Lasting Legacy and Data Utilization** – Despite mapping only 2% of the Milky Way, Gaia's data will continue to drive astronomical discoveries for decades through future data releases.

BioSaarthi: Nurturing India's Biotech Startups

Union Minister unveiled the Bio-Saarthi Mentorship Initiative at the 13th Foundation Day of BIRAC, highlighting India's rapid rise in the global bio-economy.

• Bio-Saarthi is a structured global mentorship program designed to support India's emerging biotech startups through expert guidance and capacity building.
• **Initiated by** – Ministry of Science and Technology.
• **Implemented by** – Biotechnology Industry Research Assistance Council (BIRAC) under the Department of Biotechnology (DBT).
• **Program Objectives** – Aims to strengthen India's biotechnology ecosystem by fostering innovation, supporting startups, and enhancing global competitiveness through mentorship.
• **Key Program Features** – Bio-Saarthi employs a sixmonth cohort model, providing structured mentormentee engagements, access to a global mentor pool, and a startupcentric approach addressing R&D, scaling, regulation, and funding challenges.
• **Ecosystem Linkage and Outreach** – It promotes collaboration between industry, academia, and government, complementing initiatives like BioE3 for inclusive sectoral growth and nationwide impact.