

Current Affairs 5th March 2025 by Saurabh Pandey Sir



Dolphin Conservation Report Dolphin Population

Overview 🐬 Dolphin Population: The report highlights 6,324 Ganges river dolphins and three Indus river dolphins.

🐬 Distribution: Ganga main stem: 3,275 dolphins
 Ganga tributaries: 2,414 dolphins
 Brahmaputra main stem: 584 dolphins
 Brahmaputra tributaries: 412 dolphins
 Beas river: 101 dolphins



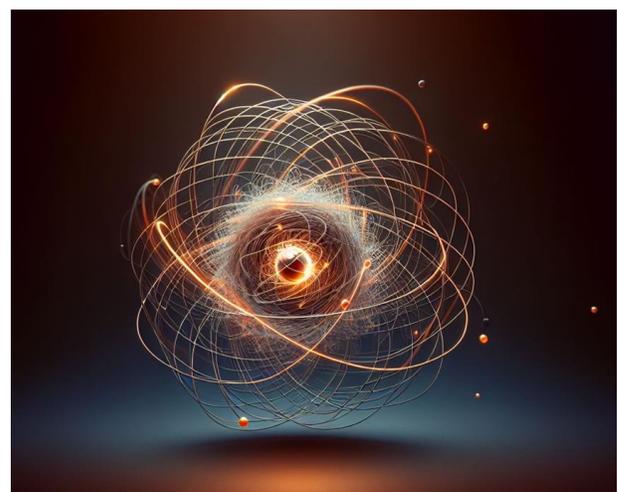
Conservation Challenges and Advocacy

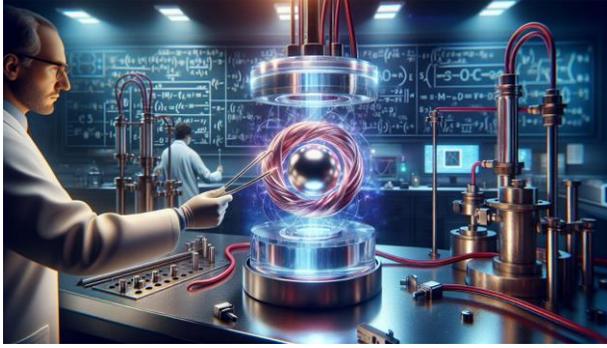
🐬 Threats to Dolphins: Major threats include entanglement in fishermen's nets and pollution affecting their habitat.

👤 Conservation Advocacy: Prime Minister Narendra Modi emphasized the role of local

populations in conservation efforts and encouraged schoolchildren to visit dolphin habitats. **📍 Geographical Insights:** The highest dolphin populations were found in Uttar Pradesh, followed by Bihar, West Bengal, and Assam

Superconductivity: The Fascinating Behavior of Zinc
 Introduction to Superconductivity
 Superconductivity is a phenomenon that captures the imagination of scientists and enthusiasts alike. At the heart of this marvel lies the ability of certain materials, like zinc, to conduct electricity without any resistance at ultra-low temperatures.





Zinc's Electrical Conductivity: Temperature Dependency Zinc's electrical conductivity is a captivating subject, particularly when examining how it varies with temperature. At a pleasant 20°C , zinc boasts an impressive conductivity of approximately 16.9 million siemens per meter. However, as it cools to an astonishing -272.3°C , zinc transforms into a superconductor, enabling it to conduct electricity with zero resistance.

Room Temperature vs. Low Temperature: At room temperature, electrons in a grid of zinc atoms move freely, facilitating electricity flow. Cooling zinc weakens various forces, leading to an intriguing transition where electrons pair up, thus paving the way for superconductivity.

The Role of Cooper Pairs in Superconductivity The formation of Cooper pairs is a cornerstone in understanding superconductivity. As the temperature drops, the net attractive force between electrons becomes significant. These pairs exhibit collective behavior, allowing them to navigate through the crystal lattice without scattering.

Key Characteristics of Cooper Pairs: Electrons form pairs without necessarily getting closer. This coupling results in a collective state that enhances conductivity.

Understanding Bose Metals and Anomalous Metallic States Bose metals represent a unique state of matter, showcasing the fascinating interplay of Cooper pairs. Unlike traditional superconductors, Bose metals fail to establish long-range superconducting coherence, leading

to anomalous metallic behavior. Understanding these states is crucial for unraveling the mysteries of disordered metals. **Key Insights on Bose Metals:** They are characterized by the presence of Cooper pairs without full superconductive properties. Studying these materials provides insights into the behavior of irregular structures and impurities in metals.

The Impact of Impurities and External Conditions on Superconductivity The presence of impurities can significantly disrupt the superconducting state of metals. Zinc, for instance, can be adversely affected by external magnetic fields, which tend to interfere with its superconductive properties. The fascinating aspect here is the way materials respond to these external conditions. **Influence of Impurities:** Impurities can introduce disorder, affecting electron pairing. Understanding these influences is essential for developing new superconducting materials. **Conclusion** In summary, the world of superconductivity is rich with complexities and surprises, particularly when examining zinc's behavior at low temperatures. From the formation of Cooper pairs to the peculiarities of Bose metals, this field of study continues to captivate researchers and hold promise for future technological advancements.

SPHEREx Space Telescope:

The Launch of SPHEREx NASA's ambitious SPHEREx (Spectro-Photometer for the History of the Universe, Epoch of Reionization, and Ices Explorer) space telescope is set to launch on March 4, 2025. This mission will lift off aboard a SpaceX Falcon 9 rocket from Vandenberg Space Force Base, California.

Objective: To investigate the origins of the universe and map the distribution of galaxies. **Duration:** The mission is planned for two years, collecting data from over 450 million galaxies and 100 million stars in the Milky Way. **Scientific Goals:** Analyze reservoirs of water frozen in

interstellar dust and create a stunning 3D map of the cosmos in 102 colors.



Understanding Cosmic Inflation

One of the primary scientific pursuits of SPHEREx is to delve into cosmic inflation the rapid expansion of the universe post-Big Bang, occurring about 13.8 billion years ago. Insight Gained: Mapping the distribution of galaxies will help refine our understanding of the unique properties of inflation. Quote from Cosmologist: Olivier Dore, a project scientist, mentioned, "The connection between galaxy distribution and inflation physics is powerful and mind-boggling.

The Broader Mission: Exploring Our Solar Neighborhood Alongside SPHEREx. the launch will also feature satellites for NASA's PUNCH mission to observe the sun's corona. This dual launch is crucial for enhancing our understanding of solar phenomena, particularly the solar wind—the ongoing flow of charged particles from the sun. Collaborative Science: Both missions will contribute significantly to our comprehension of not just the universe but also our solar system's dynamics.

Supreme Court Ruling on Orans in Rajasthan

Key Highlights 🌳 Supreme Court Ruling: In December 2024, T.N. Godavarman Thirumulpad v. Union of India, the Supreme Court recognized the importance of orans (sacred forests) in

Rajasthan and issued protection orders for their conservation.

🌿 Conservation Goals: The judgment aims to protect orans and empower local communities in their conservation efforts through formal governance and management.

📜 Biodiversity Laws: The ruling seeks to integrate orans into biodiversity-related laws to enhance their protection and management.

🏠 Cultural Significance: Orans are sacred groves with local deities, reflecting deep



💧 Ecological Benefits: Orans enhance local fauna and support traditional water sources by trapping surface runoff, which helps increase groundwater levels.

🏘️ Community Governance: In some Rajasthan villages, orans are managed by informal community institutions as part of watershed management strategies.

⚖️ Concerns on Formalization: While the formalization of orans is well intended, there are concerns that it may not yield the desired conservation outcomes.

Summary: The Supreme Court's ruling in December 2024 emphasizes the cultural and ecological significance of orans in Rajasthan, aiming to formalize their governance for better conservation, though concerns about effectiveness remain

Chennai's Second International Airport Development

✈️ **Initial Proposal:** The idea for a new international airport in Chennai was first introduced in 1998.

📍 **Location Selection:** In 2022, the Tamil Nadu government selected Parandur as the site for the second airport.

😞 **Public Reaction:** The announcement was met with disappointment from some residents due to environmental concerns related to the site's numerous waterbodies.

🌳 **Current Progress:** Land acquisition for the airport project is currently underway.

🏗️ **Environmental Surveys:** Surveys mandated by the Ministry of Environment, Forest and Climate Change are being conducted.

🎯 **Development Goals:** The government aims to make up for lost time in the airport's development.

🦋 **Environmental Concerns:** Environmental threats are a significant concern regarding the chosen site. **Summary:** The Tamil Nadu government has chosen Parandur for Chennai's second international airport, facing environmental concerns and ongoing land acquisition and surveys.

Understanding Virtual Digital Assets (VDAs) The Rise of Digital Economies The digital economy is booming, with more people engaging in online transactions than ever before.

🛒 **E-commerce Growth:** The pandemic accelerated the shift toward online shopping, with global e-commerce sales projected to reach \$6.39 trillion by 2024. **Digital Currency Adoption:** Cryptocurrencies are gaining traction, with an estimated 300 million users worldwide as of 2021. **Need for Regulation:** As the digital landscape evolves, the necessity for clear

regulations surrounding VDAs becomes paramount to ensure consumer protection and market integrity

Blockchain Technology and Its Impact At the heart of this transformation lies Blockchain technology.

🔗 **Decentralization:** Blockchain offers a decentralized and secure method to record transactions, making it perfect for managing VDAs. **Transparency:** The transparent nature of Blockchain enhances accountability, which is crucial for regulatory compliance.

Challenges: However, the rapid growth of Blockchain technology poses challenges for governments in terms of regulation and oversight. **Benefits of Blockchain:** Enhanced security through cryptographic techniques. Reduction in transaction costs and times. Potential for innovative applications in various sectors

The Need for Regulation Without regulation, VDAs can become a breeding ground for fraud and illicit activities.

⚖️ **Consumer Protection:** Establishing a legal framework is vital to protect consumers and maintain market integrity.

Global Trends: Countries worldwide are recognizing the necessity of regulation, with many taking steps to formulate comprehensive guidelines for VDAs. **Global Perspectives on VDAs** Countries like the U.K., U.S., Singapore, Australia, New Zealand, and the UAE have already begun classifying and regulating VDAs. **How Major Economies Classify VDAs:** U.S.: The SEC classifies many crypto assets as securities. U.K. & Australia: These countries treat VDAs mainly as property, significantly affecting taxation and regulation.

In a significant move, India's Income Tax Bill, 2025, explicitly classifies VDAs as property and capital assets.

📌 **Historic Classification:** This marks a pivotal moment in the regulation of digital assets in India.

Key Provisions of the Bill: The bill outlines various provisions that will impact how VDAs are treated, aiming to align the country's tax structure with global standards. VDAs as Property and Capital Assets According to Section 92(5)(f) of the bill, VDAs, including cryptocurrencies and Non-Fungible Tokens (NFTs), are now considered property. This classification significantly influences taxation and legal recognition. Tax Implications of VDAs Gains from the sale or transfer of VDAs will be taxed under capital gains provisions, similar to real estate and stocks. For instance, if someone buys Bitcoin.

Compliance and Reporting Requirements

The bill introduces stringent compliance and reporting requirements for individuals and entities dealing in VDAs. Tax Deducted at Source (TDS) A 1% TDS on VDA transfers is mandated, even for peer-to-peer transactions, effectively enabling the government to track large crypto transactions. Undisclosed Income and Asset Seizure Individuals who fail to report their VDA holdings may be classified as having undisclosed income, potentially leading to asset seizure during tax investigations. This aligns with global enforcement trends.

Conclusion: India's Income Tax Bill, 2025, marks a transformative step in the regulation of Virtual Digital Assets. By classifying VDAs as property and capital assets, the government is taking proactive measures to ensure compliance and protect consumers. However, the journey is far from over, and a comprehensive regulatory framework is essential for a balanced and secure digital asset ecosystem