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Current affairs summary for prelims

1 March, 2024

Genome India project

Context: *The Genome India initiative announced the sequencing of 10,000 whole genomes, creating a comprehensive genetic profile of the country's population.*

➢ **About GIP:**

- The massive dataset of 8 petabytes, requiring 80 GB storage space per sequence, will be stored at the Indian Biological Data Centre in Faridabad.
- This dataset will be accessible to researchers as a "digital public good," aiding in the development of new diagnostics, therapies, and identification of rare diseases.

➢ **Significance of the Genome India Project:**

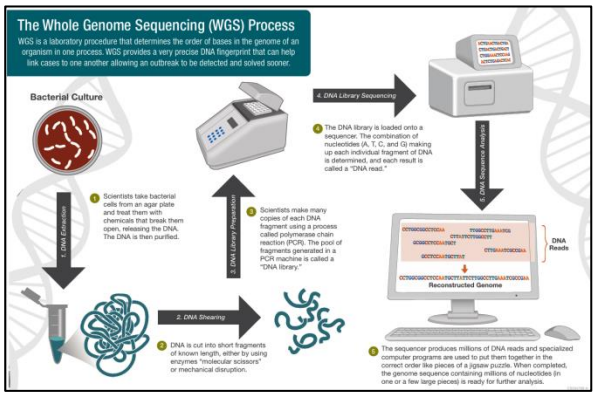
- Approved in 2020, the Genome India project aims to create a comprehensive genetic catalog of variations within the Indian population.
- It facilitates understanding genetic diversity, disease genetics, and future therapies tailored to Indian populations.
- Analysis of 5,750 genome sequences has already identified 135 million genetic variants in India.

➢ **Project Duration and Process:**

- The first complete human genome sequencing took 13 years and $3 billion, completed in 2003.
- India announced its first complete human genome in 2009, and the Genome India project completed 10,000 genomes in three to four months.
- Sample collection from 99 distinct population groups across the country, including tribal populations, faced delays due to the COVID-19 pandemic.

➢ **Genome Sequencing:**

- **Genome and Genome Sequencing:**
  - **Genome Definition:** The genome comprises the complete set of DNA instructions within a cell, containing all necessary information for development and functioning.
  - **DNA Structure:** DNA, or deoxyribonucleic acid, is the chemical substance encoding genetic information. It consists of paired strands forming a double helix, with four bases: adenine (A), thymine (T), guanine (G), and cytosine (C).
  - **Whole Genome Sequencing:** A method to sequence an organism's entire genetic code, applicable across various life forms.
- **Steps Involved in Whole Genome Sequencing:**
  - **DNA Shearing:** Molecular tools are utilized to fragment an organism's DNA into manageable pieces.
  - **DNA Barcoding:** Identification tags, or bar codes, are added to distinguish DNA fragments.
  - **DNA Sequencing:** Fragments undergo sequencing to identify the sequence of A, C, T, and G bases.
  - **Data Analysis:** Bioinformatic tools analyze sequences, identifying differences and relation-ships between organisms.



- **Global Efforts towards Genome Sequencing:**
  - **Human Genome Project (HGP):** Launched in 1990, aimed to sequence the entire human genome to aid in disease research and advance genomic medicine.
  - **Encyclopedia of DNA Elements (ENCODE) Project:** Initiated in 2003, aimed to identify all functional elements within the human genome.
  - **Earth Biogenome Project (EBP):** Aiming to sequence and catalog all eukaryotic life forms on Earth, commenced in 2018 with a ten-year timeline.

India's first indigenous Hydrogen Fuel Cell Ferry

Context: *Prime Minister Narendra Modi virtually inaugurated India's inaugural domestically produced hydrogen fuel cell ferry.*

➢ **About the Vessel:**

- The vessel, constructed by Cochin Shipyard Limited (CSL), is designated for service in Varanasi, Uttar Pradesh.
- Featuring a 24-meter-long catamaran design, it can accommodate up to 50 passengers in its air-conditioned area.
- The accommodation space is crafted using high-quality fiberglass reinforced plastic, akin to metro train coaches.

➢ **Features of the Vessel:**

- This hydrogen fuel cell-powered vessel operates without conventional batteries, relying instead on hydrogen fuel stored in cylinders.
- It houses five hydrogen cylinders capable of carrying 40kg of hydrogen, facilitating eight hours of operation.
- Additionally, the vessel is equipped with a 3-kW solar panel for supplementary power.
- Offering zero emissions and noise, it boasts energy efficiency and requires minimal maintenance compared to combustion vessels.

➢ **How Hydrogen Fuel Cells Work:**

- Hydrogen fuel cells generate electricity by harnessing the chemical energy stored in hydrogen, emitting only pure water as a byproduct.

- The hydrogen reacts with oxygen to produce electricity, with hydrogen cells maintaining continuous operation without the need for recharging.
- This technology is vital for sustainable transportation, offering a cleaner alternative to traditional fossil fuels.

➢ **Type of Cells Used:**

- Employing a 50-kW PEM (proton-exchange membrane) fuel cell paired with Lithium-Ion Phosphate batteries, the vessel benefits from lightweight and compact power sources.
- PEM fuel cells are renowned for their versatility and efficiency, operating at lower temperatures and adjusting output quickly in response to power demands.

➢ **Development Process:**

- Cochin Shipyard Limited spearheaded the vessel's construction, including the development of the automation and power management systems.
- The hydrogen fuel cell system was a collaborative effort between KPIT Technologies, Pune, and the Council of Scientific and Industrial Research Labs.
- India's strides in indigenous hydrogen fuel cell technology underscore its commitment to sustainable maritime solutions and green energy initiatives.

➢ **Initiative and Guidelines:**

- The vessel aligns with the 'Harit Nauka' initiative by the Ministry of Ports, Shipping and Waterways, aiming for a greener transition in inland water transportation.
- The initiative's guidelines mandate the increased utilization of green fuels for inland waterway-based passenger fleets, contributing to reduced greenhouse gas emissions and environmental conservation.

- This initiative reflects India's proactive approach towards addressing environmental challenges and fostering innovation in sustainable transportation.

International Big Cat Alliance (IBCA)

Context: *The Union Cabinet has granted approval for the establishment of the International Big Cat Alliance (IBCA), which will have its headquarters located in India.*

➢ **Background and Establishment of IBCA:**

- The Prime Minister of India emphasized India's conservation efforts for big cats during Global Tiger Day in 2019 and the commemoration of 50 years of Project Tiger in April 2023.
- This led to the formal announcement of the International Big Cat Alliance (IBCA) to secure the future of big cats and their habitats.
- India, being home to five out of seven big cat species, including tigers, lions, leopards, snow leopards, and cheetahs, holds a significant role in this alliance.

➢ **Scope and Membership:**

- The IBCA is envisioned as a multi-country, multi-agency coalition consisting of 96 big cat range countries, non-range countries, conservation partners, scientific organizations, and business groups.
- Its objective is to establish networks and develop synergies to centralize successful conservation practices, personnel, and financial support for the conservation of big cats.
- By including various stakeholders, the alliance aims to replicate India's pioneering conservation practices in other range countries.

➢ **Objectives and Approach:**

- The alliance seeks mutual cooperation among countries to further the conservation agenda, focusing on knowledge sharing, capacity building, advocacy, and financial support.
- It aims to leverage big cats as mascots for sustainable development and climate change mitigation, emphasizing the centrality of natural ecosystems in economic and development policies.
- The collaborative platform facilitates increased dissemination of gold standard conservation practices and access to technical expertise, aiming to secure ecological futures and mitigate adverse effects of climate change.

➢ **Governance and Funding:**

- IBCA's governance structure includes an Assembly of Members, Standing Committee, and Secretariat headquartered in India.
- The framework of Agreement is modeled after the International Solar Alliance (ISA), with plans for additional funding from bilateral and multilateral agencies, public sector organizations, and donor agencies.
- The alliance's initial support of Rs. 150 crore from the Government of India for five years (2023-24 to 2027-28) underscores its commitment to sustainable conservation efforts.

➢ **Mainstreaming Biodiversity and Sustainable Development:**

- IBCA advocates for policy initiatives that integrate biodiversity conservation efforts with Sustainable Development Goals (SDGs) to achieve holistic and inclusive conservation outcomes.
- It promotes sustainable land-use practices, habitat restoration initiatives, and ecosystem-based approaches, aligning with SDGs related to climate change, food security, clean water, and poverty reduction.
- The alliance emphasizes the importance of mainstreaming biodiversity across sectors to address

local needs and contribute to the attainment of UN SDGs within member countries.

- **Impact and Future Prospects:**
  - By safeguarding big cats and their habitats, IBCA contributes to natural climate adaptation, water and food security, and the well-being of communities reliant on these ecosystems.
  - Cooperation among countries for mutual benefit and the furthering of long-term conservation goals are expected outcomes of the alliance.
  - Through collaborative action and initiatives, IBCA aims to enhance green economy projects and ensure the conservation and prosperity of enabling partners across range countries.

NEWS IN BETWEEN THE LINES

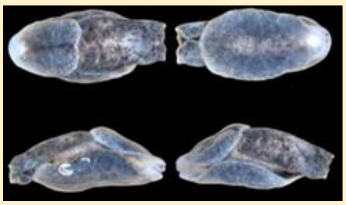
Pey Jal Survekshan Awards

Recently, the Union housing and urban affairs ministry announced that the President of India will present the first Pey Jal Survekshan Awards on 5th March 2024 in New Delhi.

About the Pey Jal Survekshan Awards:

- The Pey Jal Survekshan (PJS) Awards are an integral part of the Atal Mission for Rejuvenation and Urban Transformation **(AMRUT) 2.0 mission.**
- The primary **goal is to assess and acknowledge the service level achievements related to water supply, sewerage, septage management, wastewater** reuse and water body conservation within cities.
- These awards are designed to foster healthy competition among cities, thereby encouraging them to improve their water management systems.
- 130 awards will be presented, including **Pey Jal Gold**, **Silver** and **Bronze City** Awards, highlighting top performers in various population categories.
- Additional accolades for Best Water Body, Sustainability Champion, Reuse Champion, Water Quality, City Saturation, and the prestigious AMRUT 2.0 Rotating Trophy of the Year.
- The initiative not only enhances the role of women in water management but also aligns closely with the **socio-economic objectives of AMRUT 2.0**.

Melanochlamys Droupadi



Recently, the Zoological Survey of India (ZSI) has discovered a new species of head-shield sea slug with a ruby red spot, naming it Melanochlamys droupadi in honour of President Droupadi Murmu.

About Melanochlamys Droupadi:

- The species, named Melanochlamys Droupadi, was discovered along the coasts of **West Bengal** and **Odisha**.
- Morphological traits include **hort**, **blunt**, **cylindrical body** with **smooth dorsal surface** and **two dorsal shields - anterior cephalic** and **posterior shield.**
- It is a **small invertebrate** with a maximum **length up to 7 mm with brownish black** with a **prominent ruby red** spot at the hind end.
- Typically found in the **intertidal zone**, leaving crawl marks on sandy beaches.
- The reproductive cycle of Melanochlamys droupadi is observed to occur between the months of **November** and **January**,
- Species of this group are generally distributed in temperate regions of the Indo-Pacific Oceanic realm but three species are truly tropical distributed, Melanochlamys papillata from the **Gulf of Thailand**, Melanochlamys bengalensis from **West Bengal and Odisha coast** and the present species.

Krishnaraja Sagar Reservoir

Recently, Karnataka has faced scorching heat, sparking worries over dwindling water levels in the Krishnaraja Sagar reservoir, crucial for major cities, as it hit its lowest level since 2018 in February.

About Krishnaraja Sagar Reservoir/Dam:

- The Krishnaraja Sagar (KRS) Dam is a **gravity dam** in the Mandya district of **Karnataka**.
- It's located below the **confluence of the Kaveri River and its tributaries, the Hemavati and Lakshmana Tirtha.**
- The construction of the KRS Dam began in **1911** and it was completed in **1931** during the rule of **Krishna Raja Wadiyar IV Maharaj of Mysore.**
- The dam was **designed by a famous Indian engineer Sir M. Visvesvaraya** (his birthday on15th September is celebrated as Engineer Day).
- It is made of **surki mortar instead of cement** because cement was not manufactured in India at the time.
- The dam is **2,621 meters (8,600 ft) long, 40 meters (130 ft) high** and has arch type 177 Iron sluices.

Kaveri River

- The Kaveri, also known as the Cauvery, holds significance as a sacred river in southern India and is often referred to **as the Ganga of South India**.
- It **rises from the Brahmagiri Hill in the Western Ghats** of southwestern Karnataka, flows through the states of **Karnataka and Tamil Nadu** and ultimately **drains into the Bay of Bengal** at Poompuhar in the Mayiladuthurai district of Tamil Nadu.
- Its basin extends across the states of **Tamil Nadu, Karnataka, Kerala and the Union Territory of Puducherry.**
- Major left bank tributaries of the Kaveri include the **Harangi**, **Hemavati**, **Shimsha**, and **Arkavati** rivers, while significant right bank tributaries comprise the **Lakshmantirtha**, **Kabbani**, **Suvarnavati**, **Bhavani**, **Noyil** and **Amaravati** rivers.

Mudumalai Tiger Reserve

Recently, a herpetofaunal survey conducted in Mudumalai Tiger Reserve recorded 82 species of amphibians and reptiles.

Mudumalai Tiger Reserve:

- Mudumalai Tiger Reserve (MTR) is a national park in the **Nilgiris Mountains of Tamil Nadu.**
- It's located at the **tri-junction of Karnataka**, **Kerala** and **Tamil Nadu**.
- The reserve is **part of the Nilgiris Biosphere Reserve, India's first Biosphere Reserve**, which was established in **1986**.
- It shares a border with the **Wayanad Wildlife Sanctuary** in Kerala to the west and the **Bandipur Tiger Reserve** in Karnataka to the north.
- **Flora:** The flora includes tall grasses, known as "**Elephant Grass," giant bamboo** and valuable timber species such as **Teak** and **Rosewood**.
- **Fauna:** It has **Tiger**, **Elephant**, **Indian Gaur**, **Panther**, **Sambar**, Spotted Deer, Barking Deer, **Mouse Deer**, Mangoose**, Malabar Giant Squirrel** and more.

Measles

Recently, the World Health Organization (WHO) reported that more than half of the world's population is facing high measles risk.

About Measles:

- Measles is a **highly contagious, serious airborne disease caused by a virus**.
- It's **most common in young children** and can lead to severe complications and death.
- The virus initially **infects the respiratory tract** and then spreads throughout the body.
- Humans are the only natural hosts of the measles virus.
- Measles is covered under the **Universal Immunization Program** of India.
- Symptoms of measles include a **high fever, cough, runny nose** and a characteristic **rash** all over the body.
- It can be prevented by the **MR (measles rubella) vaccine**.

Place in News

Belgium

Recently, Belgium has become the first in the European Continent to recognise 'ecocide' as a national as well as an international crime.

Belgium (Capital: Brussels)

Location: Belgium, officially the Kingdom of Belgium is a country in Northwestern Europe.

Boundaries: Belgium shares its border with **Germany** (East), the **North Sea** (West), **Netherlands** (North), **France** (South) and **Luxembourg** (Southeast).

Physical Features:

- The major rivers in Belgium include the **Scheldt** (Escaut), **Meuse** (Maas) and **Yser**.
- The highest point in Belgium is the **Signal de Botrange**, located in the High Fens region.
- **Antwerp** is one of the largest ports in the world and a vital economic center for Belgium.

Membership: Belgium is a member of various international organizations including the **European Union**, **WHO**, **WTO**, **OECD**, **NATO** and the **United Nations**.

Ecocide:

- Ecocide refers to **unlawful or wanton acts** committed with the knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts.
- The term was coined by American biologist **Arthur Galston in 1970**.
- India is yet to make ecocide an offense within its legal framework.

POINTS TO PONDER

- Which article of the Indian Constitution does the Calcutta High Court state is violated when differentiating between contractual and permanent employees for extending maternity leave? **- Article 14**
- When was the Central Emergency Response Fund (CERF) established and by whom? **- Established by the United Nations General Assembly in 2005.**
- Which country recently initiated its fourth discharge of nuclear-contaminated water despite facing opposition? **- Japan**
- According to the recent observation by the Kerala High Court, what fundamental right under the Constitution does not grant the right to any member of the Hindu community to perform the role of Archakas (priests)? **- Article 25**
- When was the Financial Intelligence Unit (FIU) of India established by the government of India? **- November 2004**