DAILY CURRENT AFFAIRS ANALYSIS

29 AUGUST 2024

1 - Strategic Significance of the Prototype Fast Breeder Reactor:

GS III

Science and Technology related issues:

- **Context/Why in News?**

- The Atomic Energy Regulatory Board (AERB) has recently given the green light for the "First Approach to Criticality" of the 500 MWe Prototype Fast Breeder Reactor (PFBR) at Kalpakkam, Tamil Nadu. This marks a crucial milestone as India's first indigenous PFBR moves closer to operational status, solidifying the nation's position in the global nuclear energy landscape.

- **Understanding Criticality in Nuclear Reactors:**

- **Criticality:** In nuclear reactor terminology, "criticality" occurs when a sufficient number of neutrons generated by fission are maintained to sustain a controlled, self-perpetuating chain reaction. This balance ensures that the reactor operates safely and efficiently without any fluctuation in neutron levels.

- **India's Fast Breeder Reactor (FBR) Programme: A Strategic Overview:**

- **Inception of the FBR Programme:**

- India embarked on the ambitious Fast Breeder Reactor (FBR) project over two decades ago, aiming to establish a robust and comprehensive nuclear fuel cycle that enhances the nation's energy security.
- The Department of Atomic Energy (DAE) envisions a significant boost in nuclear power output, aiming to achieve 22,400 MWe from its nuclear plants by 2032. This target includes the approval for the construction of 10 new Pressurised Heavy Water Reactors (PHWRs) under a 'fleet mode' approach, where each plant is expected to be operational within five years from the initiation of construction.

- **Significance of FBRs:**

- Fast Breeder Reactors are unique in that they produce more fissile material than they consume, converting fertile isotopes into fissile material, which is critical for sustaining long-term nuclear power production.

- **Role of BHAVINI:**

- Established in 2003, Bharatiya Nabhikiya Vidyut Nigam Ltd (BHAVINI) was tasked with constructing and operating India's most advanced nuclear reactor—the Prototype Fast Breeder Reactor (PFBR). Once operational, this will make India the second country in the world, after Russia, to have a commercially functioning FBR.

- **Three Stages of India's Nuclear Energy Programme:**

- **First Stage:**
- The first stage focuses on the installation of Pressurised Heavy Water Reactors (PHWRs), which use natural uranium as fuel and heavy water as both coolant and moderator.

- **Second Stage:**
- The second stage involves the development of Fast Breeder Reactors (FBRs), supported by reprocessing plants and plutonium fabrication units. These facilities are essential for multiplying the inventory of fissile material, which is a prerequisite for advancing to the third stage involving thorium utilisation.

- **Third Stage:**
- The third stage is designed to be based on the Thorium-Uranium Cycle, with a significant focus on generating Uranium-233 (U233) through the irradiation of thorium in both PHWRs and FBRs. The Advanced Heavy Water Reactor (AHWR) is proposed to play a pivotal role in this stage.

- **Long-term Energy Security:**
- The combination of reactors across all three stages is expected to provide sustainable energy security for India. However, the widespread commercial use of thorium will only be feasible when there is an ample supply of Uranium-233 (U233) or Plutonium-239 (Pu239).

- **Advancing to the Third Stage:**
- The progress made in the FBR programme brings India closer to the third phase of its nuclear energy strategy, where thorium utilisation can be commercially realised on a larger scale.

- **Conclusion/Way Forward:**

- The official approval for the Prototype Fast Breeder Reactor's approach to criticality is not just a technological milestone, but a strategic leap towards energy self-reliance for India. As the nation progresses through its meticulously planned nuclear energy stages, the successful operation of the PFBR will pave the way for the third stage, bringing the vision of a thorium-based nuclear energy future closer to reality. Continued focus on developing and commissioning advanced nuclear reactors will be key to ensuring India's long-term energy security, reducing dependence on fossil fuels, and positioning India as a leader in sustainable energy solutions on the global stage.

- ***Source → The Hindu***

2 - Sovereign Gold Bond Scheme:

GS II

Government Policies and Interventions:

- **Why in News?**

- **Budget 2024-25**: The Union Government has announced a reduction in the import duty on gold from 15% to 6%.
- **Future of SGBs**: The government is set to finalize decisions regarding the future of Sovereign Gold Bonds (SGBs).

- **Status of the Gold Industry in India:**

- **Gold Reserves**: According to the National Mineral Inventory (2015), India has gold ore reserves estimated at 501.83 million tonnes.
- **Distribution**: Bihar (44%), Rajasthan (25%), Karnataka (21%), West Bengal (3%), Andhra Pradesh (3%), Jharkhand (2%).
- **Karnataka**: Produces around 80% of India's gold. The Kolar Gold Fields (KGF) is among the world's oldest and deepest gold mines.
- **Gold Imports**: India, the world's second-largest gold consumer, saw a 30% increase in gold imports in 2023-24, totaling USD 45.54 billion. However, imports declined by 53.56% in March 2024.

- **What is the Sovereign Gold Bond Scheme?**

- **Launch**: Introduced in November 2015 to reduce physical gold demand and redirect savings into financial investments.
- **Issuance**: Issued under the Government Securities (GS) Act, 2006, by the Reserve Bank of India (RBI) on behalf of the Government of India. Available through various channels including Scheduled Commercial banks, Stock Holding Corporation of India Limited, Clearing Corporation of India Limited, designated post offices, and stock exchanges.
- **Eligibility**: Available to resident individuals, Hindu Undivided Families (HUFs), trusts, universities, and charitable institutions.

- **Features:**

- **Issue Price**: Linked to the price of gold of 999 purity (24 carats) as published by the India Bullion and Jewellers Association (IBJA), Mumbai.

- **Investment Limit**:

- Retail investors and HUFs: Up to 4 kilograms (4,000 units) per financial year.
- Trusts and similar entities: Up to 20 kilograms per financial year.
- Minimum investment: 1 gram of gold.
- **Term**: Maturity period of 8 years, with an exit option after 5 years.
- **Interest Rate**: Fixed annual interest rate of 2.5%, payable semi-annually. Interest is taxable under the Income Tax Act, 1961.

- **Benefits**:

- Can be used as collateral for loans.
- Capital gains tax on redemption is exempt for individuals.

- **Disadvantages**:

- Long-term investment; not as liquid as physical gold.
- Low trading volumes can make it difficult to exit before maturity.

- **Green Bonds:**

- **Definition**: Issued to fund projects with positive environmental or climate benefits, providing fixed income payments to investors.
- **Government Plans**: Issue sovereign green bonds worth approximately Rs 20,000 crore in the financial year 2024-25.

- **Summary:**

- The Sovereign Gold Bond Scheme aims to reduce physical gold demand and shift savings into financial investments, offering benefits like tax exemptions on capital gains and the ability to use bonds as loan collateral. However, it has limitations in terms of liquidity and trading volumes. The recent changes in gold import duty and the upcoming issuance of green bonds highlight ongoing developments in the gold and financial sectors.

- ***Source → The Hindu***

3 - Pingali Venkayya: The Visionary Behind the Indian Tricolour:

GS I

Modern Indian History:

- **Context/Why in News:**

- On August 2nd, the Prime Minister paid tribute to Pingali Venkayya on his birth anniversary, recognizing his pivotal role in the creation of the Indian National Flag. In honor of his contributions, citizens are encouraged to support the Har Ghar Tiranga movement by displaying the national flag between August 9th and August 15th, 2024.

- **Introduction:**

- Pingali Venkayya, an eminent figure in Indian history, is celebrated for his significant contribution to the design of the Indian National Flag. His innovative spirit and dedication to the cause of Indian independence are exemplified through his work on the flag, which has become a symbol of national pride and unity. This article explores the evolution of the Indian flag and highlights Venkayya's remarkable contributions.

- **Evolution of the Indian Flag:**

- **1916: Initial Designs:**

- In 1916, Pingali Venkayya published a booklet titled "A National Flag for India," which featured nearly 30 different designs for a potential Indian flag. His designs were inspired by the flags of various nations, reflecting his deep understanding of flag symbolism.

- **1921: Approval of the Flag:**

- Venkayya's flag design was endorsed by Mahatma Gandhi during a Congress meeting in Vijayawada. The initial version, known as the Swaraj Flag, included two horizontal bands of red and green. These colors represented the Hindu and Muslim communities respectively, and a charkha (spinning wheel) was placed in the center to symbolize Swaraj (self-rule).

- **1921: Introduction of White Band:**

- Mahatma Gandhi suggested adding a white band to represent peace, leading to a revised design that included saffron, white, and green bands. The colors were assigned new meanings: saffron

for courage and sacrifice, white for truth and peace, and green for faith and strength. The charkha was placed on the white band, signifying the welfare of the masses.

- **1931: Final Design Changes:**

- In 1931, the Flag Committee made further modifications to the flag. The red band was replaced with saffron, and the saffron band was placed on top, followed by white and then green. The charkha was replaced with the Ashok Chakra in the center of the white band, symbolizing the eternal wheel of law and dharma.

- **Pingali Venkayya: A Multifaceted Legacy:**

- **Second Boer War:**

- Venkayya participated in the Second Boer War (1899-1902), showcasing his commitment to broader causes beyond the Indian independence movement.

- **1913: Japanese Lecture:**

- In 1913, he delivered a lecture in Japanese in Bapatla, Andhra Pradesh, earning the moniker 'Japan Venkayya' for his linguistic and cultural engagement with Japan.

- **Research in Cotton:**

- Known as Patti Venkayya, he conducted significant research into Cambodia Cotton, contributing to the field of agricultural science.

- **2009: Commemoration:**

- In recognition of his contributions, a postage stamp was released in 2009 to honor Venkayya's role in the creation of the Indian National Flag.

- **Conclusion/Way Forward:**

- Pingali Venkayya's contributions to the Indian National Flag are a testament to his vision and dedication to India's independence and unity. As we commemorate his legacy, it is vital for us to reflect on the values the flag represents and actively participate in movements like Har Ghar Tiranga. By displaying the tricolour, we honor Venkayya's memory and reaffirm our commitment to the ideals of courage, peace, and strength embodied in the national flag.

- ***Source → The Hindu***

4 - Fin Whale and Japan’s Expanded Whaling Activities:

GS III

Environmental Conservation related issues:

- **Context: Why in the News:**

- Recently, Japan has expanded its commercial whaling practices to include the fin whale, one of the largest animal species on Earth.
- This development follows Japan’s withdrawal from the International Whaling Commission (IWC) and the resumption of commercial whale hunting in July 2019.
- The move has raised significant international concern regarding the conservation of whale species and the effectiveness of global whaling regulations.

- **Introduction:**

- The fin whale (*Balaenoptera physalus*) is a massive marine mammal, recognized for its size and elegance. It is classified as "Endangered" on the IUCN Red List, based on assessments from 2018 to 2021.
- Despite global efforts to protect whale species, recent actions by Japan have brought the fin whale into the spotlight. As one of the few countries that still practice commercial whaling, Japan's actions are scrutinized against the backdrop of international conservation efforts.

- **Key Facts about Fin Whales:**

- **Scientific Name:** *Balaenoptera physalus*
- **IUCN Red List Status:** Endangered (as per 2018-2021 assessments)

- **Potential Threats to Fin Whales:**

- **Commercial Whaling:** The primary threat from Japan's expanded whaling practices.
- **Large Commercial Vessels:** Collisions and disturbances from shipping traffic.
- **Shipping Noise and Disturbance:** Acoustic pollution affecting whale communication and behavior.
- **Seismic Activities:** Oil and gas exploration impacting whale habitats.
- **Pollution:** Persistent organic pollutants entering marine ecosystems.
- **Climate Change and Ocean Acidification:** Altering the whales' natural habitat and food sources.

- **Japan’s Role in Commercial Whaling:**

- Japan is one of only three nations (along with Norway and Iceland) that continues to hunt whales commercially.
- Despite international bans, Japan's Whale Research Program has continued to hunt Minke whales within the Southern Ocean Whale Sanctuary, an area designated by the IWC to protect whale populations.

- **Whale Conservation Efforts:**

- **Southern Ocean Whale Sanctuary:** Encompasses 50 million square kilometers surrounding Antarctica. The IWC has imposed a complete ban on commercial whaling in this region to safeguard whale species.
- Despite this ban, Japan’s continued research and hunting activities within the sanctuary raise questions about the enforcement and effectiveness of global whaling protections.

- **Conclusion/Way Forward:**

- The expansion of commercial whaling by Japan, particularly targeting endangered species like the fin whale, underscores the need for stronger international conservation measures and compliance enforcement.
- It is crucial for global stakeholders to reinforce efforts to protect endangered whale species, uphold existing conservation agreements, and address the underlying issues that enable commercial whaling.
- Enhanced cooperation among nations, increased monitoring, and stricter penalties for violations could help ensure the long-term survival of fin whales and other endangered marine species.

- ***Source → The Hindu***