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DAILY CURRENT AFFAIRS-

1.BIMSTEC Maritime Security Exercise
2.India's First Private Fusion Power Company: Pranos Fusion
3. NVS-03 Satellite Launch: Significance for India's NavIC System
4.National Institute of Plant Genome Research (NIPGR)
5.Mekedatu Reservoir Project
6.Extreme Poverty in India: Declining Poverty and Employment Challenges

1.BIMSTEC Maritime Security Exercise

Source: PIB

Why in News?

- The inaugural BIMSTEC Maritime Security Exercise is being conducted in the Bay of Bengal.

Key Highlights

- It is the first-ever maritime security exercise of BIMSTEC and was announced by the Prime Minister of India at the 6th BIMSTEC Summit in Thailand.
- The exercise aims to strengthen maritime cooperation, enhance regional security and improve operational coordination among member states.
- Participating countries include Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand.
- It seeks to translate BIMSTEC's regional vision into practical cooperation through stronger maritime security mechanisms.
- The exercise reflects the shared vision of "Shared Seas, Shared Security and Shared Prosperity", promoting peace, stability and sustainable development in the Bay of Bengal region.

About BIMSTEC

- The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a regional grouping of seven countries located in the littoral and adjacent areas of the Bay of Bengal.
- It was established on 6 June 1997 through the Bangkok Declaration.
- Its primary objective is to strengthen technical and economic cooperation among member states.

Historical Background

- 1997: Established as BIST-EC, comprising Bangladesh, India, Sri Lanka and Thailand.
- 1998: Renamed BIMST-EC after Myanmar joined.

- 2004: Renamed BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation).

Institutional Mechanism

- Summits: Held once every two years.
- Ministerial Meetings: Convened annually.
- Senior Officials' Meetings: Held twice a year.
- Secretariat: Dhaka, Bangladesh.

2.India's First Private Fusion Power Company: Pranos Fusion

Subject: Science and Technology – Nuclear Technology

Why in News?

- Bengaluru-based start-up Pranos Fusion aims to finalise the blueprint for PRANIK, India's first privately developed nuclear fusion reactor, by 2027.
- The initiative marks the growing participation of India's private sector in advanced nuclear fusion research and the development of clean energy technologies.

About Pranos Fusion

- It is a Bengaluru-based private fusion energy start-up.
- It is developing nuclear fusion technology using the Tokamak reactor design.
- The company has secured approximately $7.2 million in funding from investors, including Ankur Capital and pi Ventures.
- It has developed PRAGYA, a smaller experimental tokamak, to test plasma control and superconducting magnets.
- PRANIK: A proposed larger fusion reactor for achieving the conditions required for nuclear fusion.

What is Nuclear Fusion?

- Nuclear fusion is a process in which two light atomic nuclei combine to form a heavier nucleus, releasing a large amount of energy.
- It is the process that powers the Sun and other stars.
- Most experimental fusion reactor designs use isotopes of hydrogen:
    - Deuterium: A stable isotope of hydrogen containing one proton and one neutron.

  - Tritium: A radioactive isotope of hydrogen containing one proton and two neutrons.

- Their fusion produces helium, a neutron and a large amount of energy.

Tokamak Technology

- A tokamak is a device designed to confine extremely hot plasma using powerful magnetic fields.
- It uses a doughnut-shaped (toroidal) vacuum chamber.
- Magnetic fields prevent the superheated plasma from coming into direct contact with reactor walls.
- Extremely high temperatures and controlled plasma conditions are required to initiate and sustain fusion reactions.
- Superconducting magnets help generate strong magnetic fields with reduced electrical resistance.

Nuclear Fusion vs Nuclear Fission

Basis	**Nuclear Fusion**	**Nuclear Fission**
Process	Combining light nuclei	Splitting a heavy nucleus
Fuel	Hydrogen isotopes such as deuterium and tritium	Uranium-235 or plutonium-239
Waste	Generally produces less long-lived radioactive waste, though reactor materials can become radioactive	Produces significant radioactive waste
Chain reaction	Does not involve a self-sustaining fission chain reaction	Can involve a self-sustaining chain reaction
Safety	Plasma conditions are difficult to sustain; loss of control stops the reaction	Requires control of the nuclear chain reaction
Current status	Experimental stage for electricity generation	Commercially established

Significance of Nuclear Fusion

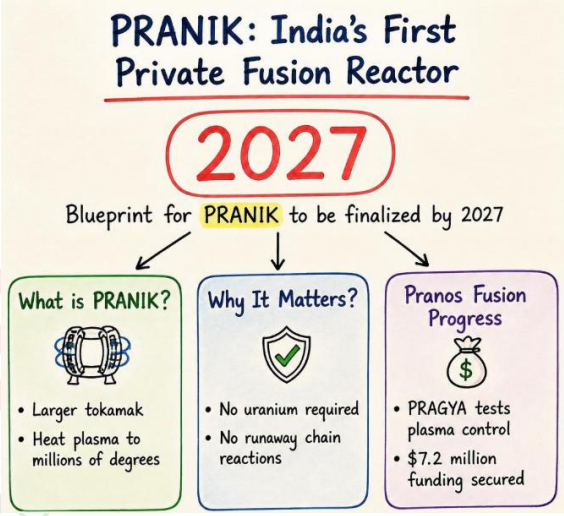
- Clean energy: Fusion does not produce carbon dioxide during the nuclear reaction itself.
- Fuel availability: Deuterium is abundant in seawater, while tritium can potentially be produced using lithium.

- Energy security: Can reduce dependence on conventional fossil fuels.
- Safety: No runaway fission chain reaction is involved.

- Low-carbon transition: Offers potential for reliable, low-carbon electricity generation.
- Long-term sustainability: Could provide a new source of energy for meeting future electricity demand.

Challenges in Nuclear Fusion

- Extremely high temperatures, generally exceeding 100 million °C for deuterium-tritium fusion.
- Maintaining stable plasma confinement for sufficient time.
- Developing materials capable of withstanding intense heat and neutron bombardment.
- High construction, maintenance and operational costs.
- Tritium production, handling and fuel-cycle management.
- Achieving commercially viable net electricity generation.



India's Nuclear Fusion Research

- Institute for Plasma Research (IPR): An autonomous institution under the Department of Atomic Energy involved in plasma science and fusion research.
- SST-1 (Steady State Superconducting Tokamak): India's indigenous experimental superconducting tokamak developed by IPR.
- ITER (International Thermonuclear Experimental Reactor): India is a partner in this international nuclear fusion research project.
- PRAGYA and PRANIK: Represent private-sector efforts by Pranos Fusion to develop experimental and larger-scale fusion reactor technologies.

Important Prelims Facts

- Nuclear fusion powers the Sun and stars.
- Deuterium: Stable isotope of hydrogen.
- Tritium: Radioactive isotope of hydrogen.
- Deuterium-tritium fusion produces helium and a neutron.
- Tokamak: Uses magnetic confinement of plasma.
- Plasma: Fourth state of matter consisting of ionised particles.
- ITER: International fusion research project located in Cadarache, France.
- India's fusion research institution: Institute for Plasma Research (IPR), Gandhinagar, Gujarat.

Conclusion

Nuclear fusion has the potential to provide low-carbon and reliable energy in the long term. Pranos Fusion's PRAGYA and proposed PRANIK projects indicate growing private-sector participation in India's advanced energy research. However, achieving stable plasma confinement, controlling costs and demonstrating commercially viable electricity generation remain major technological challenges.

UPSC Prelims – MCQs

Q1. With reference to nuclear fusion, consider the following statements:

1. Nuclear fusion involves the combining of two or more light atomic nuclei to form a heavier nucleus.
2. It releases energy because a part of the mass is converted into energy.
3. Nuclear fusion is the principle behind the functioning of conventional nuclear fission reactors.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

UPSC Mains Questions

1. What is nuclear fusion? Explain its working principle and discuss its potential as a clean and sustainable source of energy. 10 Marks (150 Words)

3.NVS-03 Satellite Launch: Significance for India's NavIC System

Subject: Science and Technology – Space Technology

Why in News?

- The Indian Space Research Organisation (ISRO) successfully launched the NVS-03 navigation satellite on 30 October 2026 using the Geosynchronous Satellite Launch Vehicle (GSLV) from the Satish Dhawan Space Centre, Sriharikota.
- The mission aims to restore the operational capabilities of India's indigenous satellite navigation system, NavIC, and strengthen technological self-reliance through indigenous atomic clocks.

About NavIC (Navigation with Indian Constellation)

- NavIC is India's indigenous regional satellite navigation system, earlier known as the Indian Regional Navigation Satellite System (IRNSS).
- It was developed by ISRO to provide independent positioning, navigation and timing (PNT) services.
- Coverage: India and approximately 1,500 km beyond its geographical boundaries.
- Original constellation: Seven satellites.
    - 3 satellites in Geostationary Earth Orbit (GEO).
    - 4 satellites in Geosynchronous Orbit (GSO).
- Services offered:
    - Standard Positioning Service (SPS): Available to civilian users.
    - Restricted Service (RS): Encrypted service available to authorised users, including defence forces.
- Accuracy: Approximately 10 metres for civilian users, with higher accuracy for authorised strategic users.

NVS-03 Satellite: Key Features

- It belongs to the second-generation Navigation Satellite series developed by ISRO.
- Launch vehicle: Geosynchronous Satellite Launch Vehicle (GSLV).
- Launch date: 30 October 2026.
- Indigenous atomic clocks: Carries rubidium atomic clocks developed by ISRO's Space Applications Centre (SAC).
- Improved reliability: Indigenous clocks and increased clock redundancy aim to reduce dependence on imported components.

- Mission objective: Strengthen NavIC's positioning, navigation and timing capabilities and replace ageing first-generation satellites.
- The second-generation NVS series also supports the L1 frequency band, improving compatibility with civilian navigation receivers and consumer devices.

Why is the NVS-03 Launch Significant?

1. Restoring NavIC Functionality
   - Several first-generation IRNSS satellites became non-functional due to failures of their onboard atomic clocks.
   - The last functioning atomic clock on IRNSS-1F reportedly stopped working in March 2026.
   - Only three satellites remained operational, whereas at least four are required for standalone positioning as originally designed.
2. Indigenous Atomic Clock Technology
   - Earlier NavIC satellites relied on imported atomic clocks.
   - NVS-03 carries indigenous rubidium atomic clocks developed by ISRO.
   - This reduces foreign dependence and strengthens India's technological self-reliance.
3. Strategic Autonomy
   - Reduces dependence on foreign navigation systems such as the US-based GPS.
   - Ensures greater control over critical navigation services for defence and national security.
4. Civilian Applications
   - Supports vehicle tracking, navigation, fisheries, disaster management, surveying and transportation.
   - Improves the availability of indigenous navigation services for smartphones and other compatible devices.
5. Improved System Reliability
   - Multiple atomic clocks per satellite provide redundancy.
   - The second-generation satellites aim to improve the continuity and accuracy of navigation services.

Challenges Faced by NavIC

- Atomic clock failures: Several first-generation satellites experienced failures of imported atomic clocks.
- Satellite replacement delays: Maintaining the required constellation has been challenging.
- NVS-02 setback: Its thrusters failed to place it into the intended final orbit in January 2025.
- Limited civilian adoption: Delays in developing compatible receivers have restricted widespread use of NavIC.
- Launch challenges: ISRO has also faced successive PSLV mission failures, highlighting the importance of launch reliability.

4.National Institute of Plant Genome Research (NIPGR)

Source: PIB

Why in News?

- Researchers at NIPGR recently identified a previously uncharacterised protein called CNGC13, which helps plants alert undamaged leaves when an insect attacks another leaf.

About NIPGR

- The National Institute of Plant Genome Research (NIPGR) is an autonomous institution under the Biotechnology Research and Innovation Council (BRIC), Department of Biotechnology (DBT), Ministry of Science and Technology.
- It started functioning in 1998 and is located in New Delhi.
- Its mandate is to promote and coordinate research, train researchers and provide information resources in identified areas of plant genomics.

Objectives and Research Areas

- To conduct advanced research in plant genomics and molecular biology for practical applications in crop improvement.
- To identify and manipulate important genes, proteins and metabolites for developing crops with improved agronomic traits, stress tolerance and nutritional value.
- To undertake research on gene regulation, systems biology, molecular markers and plant-pathogen interactions.

- To develop and test transgenic and gene-edited plants.
- To promote knowledge generation, innovation, publications, patents and advanced scientific training.
- Major research areas include:
    - Computational Biology and Genome Analysis.
    - Molecular Mechanisms of Abiotic Stress Responses.
    - Nutritional Genomics.
    - Plant Development and Architecture.
    - Plant Immunity and Molecular Breeding.
    - Transgenics for Crop Improvement.

About Biotechnology Research and Innovation Council (BRIC)

- BRIC is an apex autonomous body established as a registered society under the Department of Biotechnology, Ministry of Science and Technology.
- It was formed by subsuming 14 autonomous institutes of the Department of Biotechnology.
- It provides a centralised governance mechanism for administering research institutions through intra-mural core grants.
- It promotes multidisciplinary biotechnology research, from basic scientific discoveries to practical applications.
- Its objectives include:
    - Promoting cutting-edge biotechnology research aligned with national priorities.
    - Encouraging innovation and technology translation across institutions.
    - Developing indigenous technologies and capabilities under the vision of Atmanirbhar Bharat.

5.Mekedatu Reservoir Project

Source: NIE

Why in News?

- The Karnataka Chief Minister recently stated that 2,500 acres of land have been identified for the Mekedatu project, of which only 500 acres of private agricultural land need to be acquired.

Key Features

- The Mekedatu Reservoir Project is a multipurpose project aimed at providing drinking water and generating hydropower.
- It involves constructing a balancing reservoir near Kanakapura in Ramanagara district, Karnataka, approximately 90 km from Bengaluru and 4 km from the Tamil Nadu border.
- The project is proposed at the confluence of the Cauvery River and its tributary, the Arkavathi.
- It includes a 99-metre-high and 735-metre-long concrete gravity dam, an underground powerhouse and a water conductor system.
- The reservoir will have a storage capacity of 67 TMC ft.
- It envisages using 4.75 TMC of water annually for drinking-water supply to Bengaluru and surrounding areas.
- The project is expected to generate approximately 400 MW of hydropower.
- Once constructed, the dam will submerge more than 5,000 hectares of protected area within the Cauvery Wildlife Sanctuary.

Mekedatu Project Dispute

- The dispute is linked to the broader Cauvery River water-sharing conflict between Karnataka and Tamil Nadu.



- Tamil Nadu, being the lower riparian state, opposes the project due to concerns over its impact on the flow of Cauvery water into the state.
- Tamil Nadu argues that Mekedatu is the last point in Karnataka from where Cauvery water flows freely into Tamil Nadu.
- It contends that the proposed dam could obstruct this unrestricted flow of water.

6.Extreme Poverty in India: Declining Poverty and Employment Challenges

Source: The Indian Express (IE), 1 November 2026

Why in News?

- The World Bank's latest Poverty and Equity Brief indicates a significant decline in extreme poverty in India.
- However, unemployment, stagnant real wages and regional inequalities raise concerns about the sustainability of poverty reduction.
- The key challenge is to convert economic growth into productive employment and higher household incomes.

World Bank Estimates: Declining Poverty

Poverty indicator	2022	2023
Extreme poverty ($3/day)	5.3%	2.6%

Lower-middle-income poverty ($4.20/day)	23.9%	16.1%

- The $3-per-day poverty line is the World Bank's extreme poverty threshold cited in the article.
- Poverty under the $4.20 threshold is projected to decline to 14.2% in 2026 and 12.1% by 2028.
- Future poverty reduction will depend on productive employment, particularly in poorer states.

Understanding the Poverty Line

In India, the **Poverty Line** serves as a benchmark to identify the "poor." Historically, this has been determined by a mix of calorie intake and Monthly Per Capita Expenditure (MPCE).

Categories of the Poor

Understanding the "nature" of poverty helps in designing targeted policy interventions. We can categorize the poor based on the duration of their deprivation:

1. **Chronic Poor:** Those who are always poor (e.g., landless laborers) or usually poor but may occasionally see a small spike in income.
2. **Transient Poor:** This includes the **churning poor**—who regularly move in and out of poverty (like seasonal small farmers)—and the **occasionally poor**, who are usually above the line but fall below due to a shock like a medical emergency.
3. **Non-Poor:** Those who never fall below the poverty line.

Types of Poverty

Poverty may be understood as absolute, defined by minimum subsistence needs, or relative, defined by inequality and deprivation compared to societal standards.

- Absolute poverty: It refers to a condition where individuals or households are unable to meet the minimum basic necessities required for survival, such as adequate food, clothing, shelter, and healthcare. It is measured against a fixed and universal poverty line, such as the International Poverty Line (IPL) of $2.15/day (World Bank) based on 2017 Purchasing Power Parity.
- Relative Poverty: Relative poverty is defined as a condition where individuals have significantly lower income or resources compared to the average or median income of the society they live in. It highlights economic inequality, as people may meet basic needs but remain deprived relative to societal standards.... Read more at: https://vajiramandravi.com/current-affairs/poverty-in-india/

State-wise Poverty Estimates (2022–23)

State	Rural poverty (%)	Urban poverty (%)
Chhattisgarh	25.1	13.3
Jharkhand	16.6	12.6
Madhya Pradesh	9.6	11.6
West Bengal	7.5	12.4
Bihar	5.9	9.1
Uttar Pradesh	5.7	9.9

- These states have recorded substantial poverty reductions between 2011–12 and 2022–23.
- Urban Bihar recorded the largest decline among states, from 50.8% to 9.1%.
- The earlier Rangarajan Committee estimated the monthly per capita poverty line at ₹972 for rural areas and ₹1,407 for urban areas, with an overall poverty rate of 29.5%.

Employment: The Key Challenge

- World Bank estimates indicate that employment increased by 13.4 crore between 2017 and 2023, nearly twice the increase in the working-age population.
- However, employment generation has not always translated into better wages and job quality.

Key concerns:

- Wage stagnation: Factory workers' wages in Jharkhand declined by 5.2% in 2024–25, against an all-India increase of 5.3%.
- NEET youth: In 2025, 81% of Bihar's districts had more than one-fourth of their 15–29-year-olds neither employed nor in education or training.
- Regional inequality: Poorer states face inadequate industrial diversification, low productivity and limited quality employment.
- AI disruption: Automation may increase pressure on low-skilled workers and create demand for large-scale reskilling.
- Positive development: Uttar Pradesh recorded the largest increase in the number of factories in 2024–25, at 12.8%.

Conclusion

India's declining poverty is an important development achievement, but its sustainability depends on employment-led inclusive growth. Productive jobs, rising real wages, skill development and balanced regional development are essential to realise the demographic dividend and achieve the vision of Viksit Bharat 2047.

UPSC Prelims Practice

Q.With reference to poverty measurement in India, consider the following statements:

1. The World Bank uses international poverty lines to compare poverty across countries.
2. The Rangarajan Committee estimated separate monthly per capita poverty lines for rural and urban India.
3. Economic growth automatically ensures a proportional increase in workers' wages.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (a) 1 and 2 only.

UPSC Mains Practice

Q.Despite declining poverty levels, unemployment, stagnant real wages and regional disparities remain challenges for India. Discuss the need for employment-led inclusive growth. (15 Marks)

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