NATIONAL INSTITUTE OF PLANT GENOME RESEARCH (NIPGR)



- It is an **autonomous institution under the Biotechnology Research and Innovation Council (BRIC)** of the **Department of Biotechnology**, Ministry of Science and Technology.
- **Location: New Delhi**
- **Mandate**: To **undertake**, promote, and **coordinate research; train workers;** and serve as an **information resource** in identified aspects of **plant genomics** to build a frontline institution.
- **Objectives:**
  - To **conduct high-quality research** in **frontier areas of plant genomics** and **molecular biology,** with the aim of having practical application in crop improvement;
  - To utilize molecular biology and omics approaches along with tissue culture and genetic engineering technology to **identify important genes/proteins/metabolites** and **manipulate these for generating plants** with **improved agronomic characters,** biotic/abiotic stress tolerance, and enhanced nutritional value
  - To take up any fundamental work related to gene regulation, systems biology, and mapping that would aid in achieving the above mandate
  - **Development of molecular markers** for **monitoring important traits**
  - Production and **testing of transgenic and gene-edited plants**
  - **Identification of genes** that are **vital for the survival of the pathogens,** and **targeting them for pathogen resistance**
  - Knowledge generation and innovation, including **publications and patents**
  - To impart **advance training module in plant genetic engineering** and genome analysis

Cross And Climb

Key Facts about Biotechnology Research and Innovation Council (BRIC):

- It is an Apex Autonomous Body established as a registered Society.
- Nodal Ministry: Ministry of Science and Technology.
- It was formed by subsuming 14 Autonomous Institutes of the Department of Biotechnology (DBT).
- BRIC aims to provide a centralized and unified governance mechanism for the administration of its research institutions through intra-mural core grants.
- BRIC seeks to nurture the next generation of scientific leaders by enabling the pursuit of knowledge and innovation in globally competitive and nationally relevant ecosystems.

Objectives:

- Promoting cutting-edge research in biotechnology aligned with national priorities.
- Fostering innovation and translation across institutional boundaries.
- Developing indigenous technologies and capabilities in line with the principles of Atmanirbhar Bharat.

WHAT IS DOPAMINE?



- Dopamine is a **hormone and a type of neurotransmitter**, or **chemical messenger**, **made in your brain.**
- It is a **nitrogen-containing organic compound.**
- The **nervous system uses it to send messages between nerve cells.** These messages also travel between the brain and the rest of the body.
- It is often referred to as the **"feel-good" chemical** in the brain.
- **High or low dopamine levels** are associated with diseases including **Parkinson's disease, restless legs syndrome,** and **attention deficit hyperactivity disorder (ADHD**).
- Dopamine is **found in humans as well as animals**, including **both vertebrates** and **invertebrates.**

EXTREME POVERTY IN INDIA - DECLINING POVERTY, PERSISTENT EMPLOYMENT CHALLENGES

- The World Bank's (WB) latest Poverty & Equity Brief indicates that India's extreme poverty rate has **declined significantly**.
- However, persistent unemployment, stagnant real earnings and regional disparities raise concerns about the sustainability of poverty reduction.
- The central challenge is to translate economic growth into productive employment, higher incomes and improved living standards, particularly in India's poorer states.

Declining Poverty - WB Estimates:

- **Significant reduction in poverty:**
  - Extreme poverty, measured using the World Bank's **$3-per-day** poverty line, declined from **5.3%** in 2022 to **2.6%** in 2023.
  - Using the Lower Middle-Income Country (LMIC) threshold of $4.20 per day, poverty declined from 23.9% to 16.1%.
  - The poverty rate under the $4.20 threshold is projected to decline further to 14.2% in 2026 and 12.1% by 2028.
- **Employment remains the critical determinant:**
  - The WB emphasises that future poverty reduction depends on the creation of **productive jobs** in India's poorest states.

The 'Feeling' of Growth - A Disconnect Between GDP and Incomes:

- **Economic growth without equitable gains:**
  - India recorded GDP growth of 7.8% in the April–June quarter, exceeding most forecasts.
  - Yet, the benefits of growth are not uniformly reflected in household incomes and living standards.
  - The International Labour Organization (ILO) highlights a weakening relationship between productivity and wages.

Regional Concentration of Poverty:

- **A new BIMARU?**
  - The World Bank estimates that 57% of India's poor live in a contiguous belt extending from **UP to West Bengal**.
  - This recalls the term BIMARU, coined by demographer Ashish Bose to describe Bihar, Madhya Pradesh, Rajasthan and UP.
  - The emerging poverty belt suggests a shift in the geographical concentration of poverty, with West Bengal becoming an important part of the region.
- **State-wise poverty rates (2022–23):**
  - Chhattisgarh (25.1% rural poverty, 13.3% urban), Jharkhand (16.6% and 12.6%), MP (9.6% and 11.6%), WB (7.5% and 12.4%), Bihar (5.9% and 9.1%), and UP (5.7% and 9.9%).
  - Despite relatively high poverty levels, these states have achieved substantial reductions between 2011–12 and 2022–23.
  - Urban **Bihar** recorded the largest decline among states, from 50.8% to 9.1%.

Way Forward:

- **Labour-intensive manufacturing**: Promote textiles, food processing, footwear and other employment-intensive sectors in poorer states.
- **Human capital development**: Strengthen foundational literacy, vocational education, healthcare and digital skills to improve labour productivity.
- **Decentralised development**: Improve infrastructure, logistics, urbanisation and investment conditions in lagging regions.
- **Employment quality**: Focus on formalisation, social security, minimum wages and productive self-employment.
- **Evidence-based policy**: Use updated consumption surveys, employment data and multidimensional poverty indicators to identify vulnerable groups.

E100 VEHICLE RULES IN INDIA - ETHANOL BLENDING AND CONSUMER CONCERNS

- Ethanol is an alcohol-based fuel produced through the fermentation of plant biomass, including sugarcane, maize and broken rice. It can be blended with petrol in different proportions to reduce dependence on conventional fossil fuels.
- Ethanol blending is represented through an 'E' classification, indicating the percentage of ethanol in the fuel.
- The use of higher ethanol blends requires specially designed engines and compatible vehicle components.

Fuel Type	Composition
E10	10% ethanol and 90% petrol
E20	20% ethanol and 80% petrol
E85	Up to 85% ethanol
E100	100% ethanol

New E100 Vehicle Rules

- The Ministry of Road Transport and Highways has amended the Central Motor Vehicles Rules, 1989, to include E100 alongside E85 in several tables under Rule 115, which deals with emission standards and related requirements for motor vehicles.
- A key provision clarifies that E85 and E100 can be used only in flex-fuel vehicles designed by original equipment manufacturers (OEMs).
- The amendment establishes the regulatory basis for introducing vehicles capable of operating on petrol, varying ethanol blends and pure ethanol. It does not mean that all existing petrol vehicles can use these fuels.

No Mandatory Conversion for Existing Vehicles

- The Ministry has clarified that owners of existing vehicles are not required to switch to E85 or E100 or modify their vehicles.
- Compatibility with E10 or E20 does not automatically establish compatibility with E85 or E100. Motorists must check their vehicle's fuel-compatibility sticker and follow the manufacturer's instructions in the owner's manual.

India's Ethanol Blended Petrol Programme

- The National Policy on Biofuels, 2018, originally envisaged achieving 20% ethanol blending by 2030. India achieved the E20 target in 2025, five years ahead of the original deadline.
- From April 2026, all Bharat Stage-VI (BS-VI) vehicles are required to fully meet E20 emission standards, while petrol sold across India is mandated to contain 20% ethanol.
- The policy focus is now expanding beyond E20, with the regulatory pathway for E85 and E100 vehicles being enabled. However, their adoption will require compatible flex-fuel vehicles and suitable fuel-storage and dispensing infrastructure.

Consumer Concerns and Challenges

- **Vehicle Compatibility and Maintenance**
  - Owners of older or non-E20-compliant vehicles have expressed concerns about possible damage to engine components, increased maintenance costs and the availability of lower-ethanol petrol.
- **Fuel Efficiency**
  - Ethanol has a lower energy density than conventional petrol. Consequently, vehicles running on ethanol-blended fuel may deliver lower mileage.
- **Storage and Contamination**
  - Ethanol has an affinity for water, raising concerns about fuel contamination, particularly during the monsoon. This strengthens the case for appropriate storage, handling and separate dispensing infrastructure for higher ethanol blends.
- **Impact on Retail Fuel Prices**
  - Consumers have questioned why increased ethanol blending has not translated into lower retail petrol prices.
- **Food Security and Environmental Concerns**
  - Large-scale ethanol production requires substantial land and water resources. The choice of agricultural feedstock also raises concerns about competition between food production and fuel production.

NVS-03: CAN ISRO'S LATEST SATELLITE FINALLY REVIVE NAVIC

ISRO successfully launched **NVS-03**, its **third new-generation** navigation satellite, aboard GSLV-F18 from the Satish Dhawan Space Centre, Sriharikota.

The launch is crucial: NavIC, India's regional satellite navigation system, had stopped providing positioning data after repeated atomic clock failures and failed replacement satellite launches.

NVS-03 aims to restore the minimum four operational satellites NavIC needs to function.

What Is NavIC?

- NavIC (**Navigation with Indian Constellation**) is the operational name for the Indian Regional Navigation Satellite System (IRNSS).
- A **seven-satellite** constellation covering India and **up to 1,500 km beyond its borders** — similar in concept to the US's GPS, but regional rather than global.
- With all satellites functional, it offers public accuracy up to 10 metres, plus a more accurate restricted service (for authorised users like the military) — roughly ten times more precise.
- **Origins:** Development began in 1999, after the Kargil War, when the US reportedly restricted GPS data access to India — exposing the risks of depending on a foreign-controlled navigation system during conflict.

Why NavIC Stopped Working?

- Since July 2013, ISRO has launched 11 navigation satellites — but **six have failed**, mainly due to defective imported atomic clocks and some orbital issues.
- **July 2025:** Five satellites were found completely defunct, with all onboard clocks non-functional.
- **March 2026:** The last functioning clock aboard IRNSS-1F failed — just three days after completing its 10-year mission life — leaving only three operational satellites (minimum four needed for positioning service).
- Government told Parliament the constellation cannot provide standalone positioning service, though timing service remained functional.

- **Replacement Failures:**
  - IRNSS-1H couldn't reach orbit — its heat shield failed to open.
  - NVS-02 (January 2025) was placed in transfer orbit but its thrusters/propulsion system failed, preventing it from reaching final orbit.

Deeper Structural Challenges

- **Indigenous clock supply issues**: Despite moving to domestic rubidium clocks, procurement of flight-ready equipment remains unreliable.
- **Institutional gap**: Unlike the US GPS Directorate or the EU Agency for the Space Programme, ISRO acts as both designer and operator of NavIC, with no dedicated counterpart agency.
- **Resource strain**: ISRO simultaneously juggles human spaceflight, Earth observation, new launch vehicles, and R&D — alongside the absence of a national space law.
- **Broader launch setbacks**: Two consecutive PSLV failures (May 2025 — EOS-09; January 2026 — N1 satellite) forced a pause. Of seven major missions scheduled since December 2025, only two succeeded before NVS-03.

How NavIC Compares Globally?

- India is the only country with a regional-only navigation system; Japan's Quasi-Zenith Satellite System merely augments GPS in Asia-Oceania.
- **Four global systems exist**: GPS (USA, ~32 satellites), GLONASS (Russia, 24), Galileo (EU, 27), BeiDou (China, 30).
- Most use middle-earth orbit (19,000-24,000 km); BeiDou uniquely combines middle and higher orbits — NavIC, like Japan's system, uses higher orbits.

Conclusion

With NVS-04 and NVS-05 expected by December 2026, India's path to a fully self-reliant, strategically significant regional navigation system remains promising but incomplete — a reminder that technological sovereignty in space requires not just successful launches, but sustained institutional and manufacturing reliability.

PENCH TIGER RESERVE



- It is located in the **southern reaches of the Satpura hills** in Madhya Pradesh and shares the southern boundary with Maharashtra.
- In 1983, it was declared a National Park, and **in 1992, a tiger reserve.**
- It derives its **name from its life line-the River Pench** which flows from North to South.
- It comprises the **Indira Priyadarshini Pench National Park, the Pench Mowgli Sanctuary**.

Vegetation: The forests in Pench tiger reserve are classified into three types:

- South Indian **Tropical Moist Deciduous** (slightly moist)
- Southern **Tropical Dry Deciduous Teak Forests** and
- Southern **Dry Mixed Deciduous Forest**

Flora: The reserve boasts a diverse range of flora, including teak, saag, mahua, and various grasses and shrubs.

Fauna: The area is especially famous for large herds of Chital, Sambar, Nilgai, Gaur (Indian Bison), and wild boar.

Cross And Climb