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Current Affairs - 19 December 2025

WHAT IS THE NATIONAL COUNCIL OF SCIENCE MUSEUMS (NCSM)?



NATIONAL COUNCIL OF SCIENCE MUSEUMS (NCSM)

- It is an **autonomous society** under the **Ministry of Culture**, Government of India.
- NCSM, with its **headquarters** in **Kolkata**, has its **own network** of **science museums/centres** spread across the country and a **Central Research & Training Laboratory (CRTL)** in **Kolkata**.
 - CRTL is the **Council's central hub** for **professional training, research, and development**.
- **National-Level Centres of NCSM:**
 - Science City, Kolkata
 - Birla Industrial and Technological Museum (BITM), Kolkata
 - Nehru Science Centre, Mumbai
 - Visvesvaraya Industrial and Technological Museum (VITM), Bangalore
 - National Science Centre, Delhi
 - National Science Centre, Guwahati
- **Except for Science City, Kolkata, all have regional** and sub-regional/district science **centres called Satellite Units (SUs)**.
- In addition, NCSM **develops Science Centres/museums for different States** and Union Territories.
- NCSM has also **developed several centres** and galleries for **different Government organisations** such as ONGC, BEL, ICAR, etc.
- It has also **collaborated internationally** for the development of **Museum/Science Centres** or for galleries such as the **Rajiv Gandhi Science Centre, Mauritius**; **'India' gallery on Buddhism** at the **'International Buddhist Museum', Kandy, Sri Lanka**;
- It also strives to communicate science to empower people through its **Mobile Science Exhibitions, Lectures** and **Demonstrations, Training** and **Workshops, Publications, etc.**



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SABHASAAR INITIATIVE



SABHASAAR INITIATIVE

- It is an **AI-enabled voice-to-text meeting summarisation tool.**
- It is launched by the **Ministry of Panchayati Raj.**
- It has been made **available to all States/UTs**, and **Gram Panchayats** are progressively adopting it for routine Gram Sabha and Panchayat meetings.
- The AI model used in SabhaSaar operates on **AI and cloud infrastructure** provisioned through the India AI Compute Portal under the **India AI Mission.**

Features of SabhaSaar Initiative:

- It leverages the power of AI to **generate structured minutes of meetings from gram sabha** videos and audio recordings.
 - It will bring uniformity in minutes of the gram sabha meetings across the country.
 - Panchayat officials can use their **e-GramSwaraj login credentials** to upload video/audio recordings on 'SabhaSaar'.
 - It is **built on Bhashini**, an AI-powered language translation platform launched by the government to bridge literacy, language, and digital divides.
 - The tool **generates transcription from a video or audio**, translates it into a chosen output language and prepares a summary.
 - It **enables transcription in all major Indian languages** like Hindi, Bengali, Tamil, Telugu, Marathi and Gujarati, in addition to English.
 - **Significance:** It is ideal for panchayats, administrative bodies, and rural development projects as it streamlines documentation and empowers stakeholders with instant access to meeting insights.
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IDENTIFYING BS-VI VEHICLES: SEPARATING NEW-EMISSION CARS FROM OLDER MODELS

- BS emission norms are India's legally enforced standards to regulate air pollutants emitted by motor vehicles.
- Framed by the Ministry of Environment, Forest and Climate Change (MoEFCC) and implemented by the Central Pollution Control Board (CPCB), these norms are broadly aligned with European emission standards (Euro norms) and apply to all new vehicles manufactured and sold in the country.
- **Evolution of Bharat Stage Norms**
 - India has progressively tightened vehicular emission standards to address worsening urban air pollution:
 - BS I – Introduced nationwide in 2000
 - BS II – 2001 (Delhi first), nationwide by 2005
 - BS III – Nationwide by 2010
 - BS IV – Nationwide by 2017
 - BS VI – Implemented directly from BS IV in April 2020, skipping BS V
- **Pollutants Regulated**
 - BS norms prescribe upper limits for key vehicular pollutants, including:
 - Carbon Monoxide (CO)
 - Hydrocarbons (HC)
 - Nitrogen Oxides (NOx)
 - Particulate Matter (PM)
 - Each successive BS standard tightens these limits significantly.
- **Significance of Bharat Stage Norms**
 - Public health protection by reducing pollutants linked to respiratory and cardiovascular diseases.



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- Environmental benefits, including lower smog formation and black carbon emissions.
- Technological upgradation of India's automobile industry.
- Global alignment, improving export competitiveness of Indian vehicles.

Why Older Vehicles Contribute More to Air Pollution?

- Older vehicles emit significantly higher levels of harmful pollutants because they lack advanced emission-control technologies.
- Diesel vehicles, in particular, release large amounts of nitrogen oxides and fine particulate matter, major contributors to smog and respiratory and cardiovascular diseases.
- They also emit volatile organic compounds that form secondary pollutants in the atmosphere.
- In addition, black carbon from diesel exhaust not only damages public health but also accelerates climate warming, making older vehicles especially polluting.
- **Scale of Older, High-Polluting Vehicles in Delhi-NCR**
 - A significant share of vehicles in Delhi-NCR remains highly polluting.
 - Government assessments indicate that nearly **37% of vehicles** in the region comply only with older **Bharat Stage I, II or III norms**, making them major contributors to the air quality crisis.

BS VI vs BS IV: What Changed in Emission Standards

- BS VI emission norms impose far tighter pollution limits than BS IV.
 - For petrol vehicles, nitrogen oxide (NOx) limits are reduced by about 25%.
 - For diesel vehicles, NOx emissions must fall by nearly 68%, while particulate matter (PM) emissions are cut by around 82%.
 - BS VI vehicles also run on much cleaner, low-sulphur fuel, enabling advanced emission-control technologies to operate effectively.
 - In addition, BS VI introduces more stringent testing procedures, closer to real-world driving conditions, to ensure lower on-road emissions.
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STRENGTHENING INDIA'S SEMICONDUCTOR SELF-RELIANCE - DHRUV64

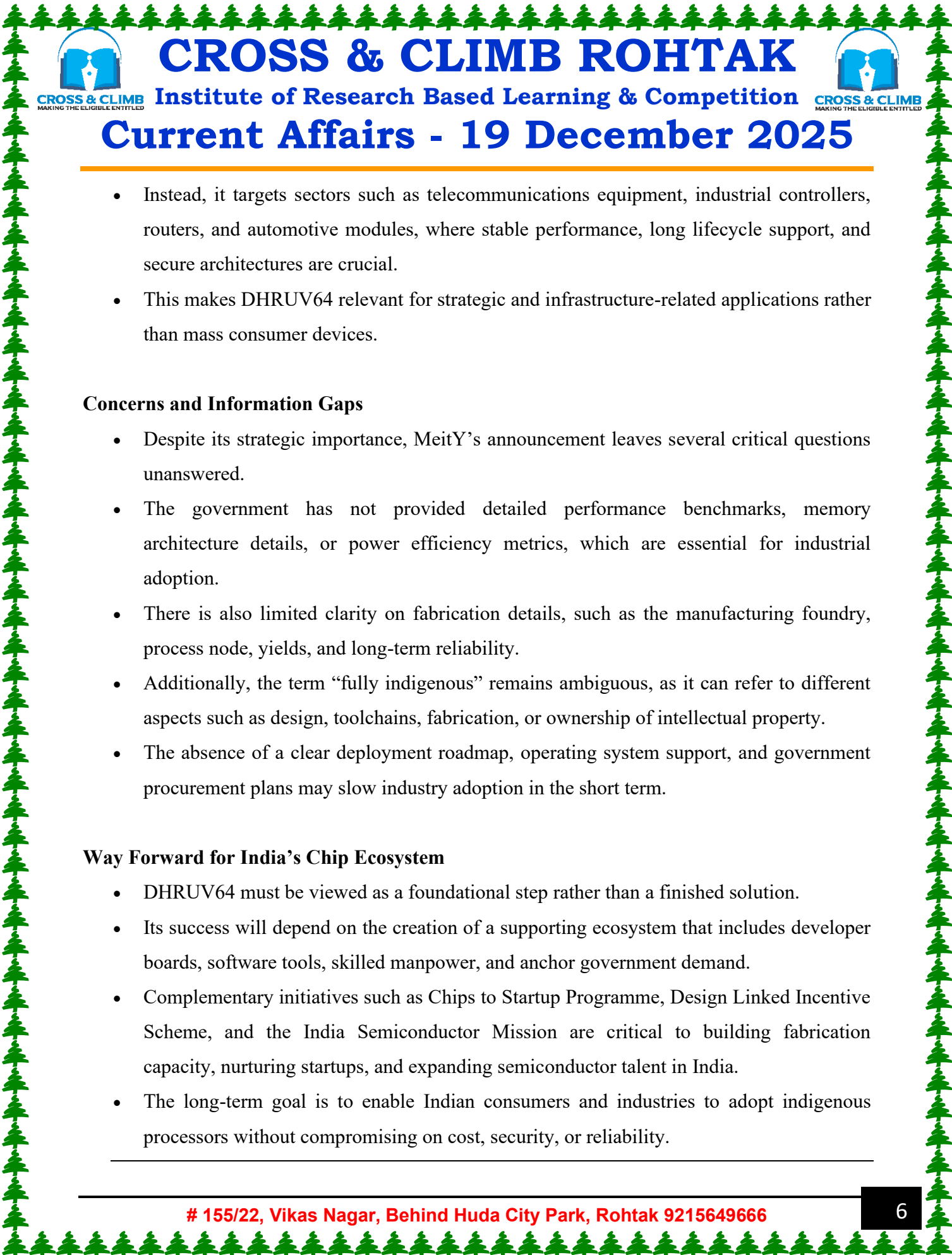
- India is one of the world's largest consumers of electronic devices and processors, yet it remains heavily dependent on foreign-designed chips and global supply chains.
- Microprocessors form the core of modern digital infrastructure, powering telecommunications, industrial automation, defence systems, automobiles, and consumer electronics.
- Dependence on imported processors exposes India to **supply disruptions, export controls, and cybersecurity vulnerabilities**.
- Recognising this strategic vulnerability, the Government of India has consistently pushed for **"homegrown processor technology"** as part of its broader vision of technological sovereignty and digital resilience.

About DHRUV64

- DHRUV64 is a 64-bit, dual-core general-purpose microprocessor developed by C-DAC under MeitY's **Microprocessor Development Programme**.
- Operating at a clock speed of **1 GHz**, it is designed to strike a balance between computational capability and energy efficiency.
- Unlike simple microcontrollers used for basic sensing tasks, DHRUV64 is capable of running modern operating systems and handling more complex workloads.
- Its intended applications range from consumer electronics to industrial automation and embedded systems, where reliability and integration matter more than peak computing power.

Technical Significance of the Processor

- From a technological perspective, DHRUV64 does not compete with high-end smartphone or laptop processors that feature multiple cores, advanced GPUs, and high clock speeds.



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- Instead, it targets sectors such as telecommunications equipment, industrial controllers, routers, and automotive modules, where stable performance, long lifecycle support, and secure architectures are crucial.
- This makes DHRUV64 relevant for strategic and infrastructure-related applications rather than mass consumer devices.

Concerns and Information Gaps

- Despite its strategic importance, MeitY’s announcement leaves several critical questions unanswered.
- The government has not provided detailed performance benchmarks, memory architecture details, or power efficiency metrics, which are essential for industrial adoption.
- There is also limited clarity on fabrication details, such as the manufacturing foundry, process node, yields, and long-term reliability.
- Additionally, the term “fully indigenous” remains ambiguous, as it can refer to different aspects such as design, toolchains, fabrication, or ownership of intellectual property.
- The absence of a clear deployment roadmap, operating system support, and government procurement plans may slow industry adoption in the short term.

Way Forward for India’s Chip Ecosystem

- DHRUV64 must be viewed as a foundational step rather than a finished solution.
 - Its success will depend on the creation of a supporting ecosystem that includes developer boards, software tools, skilled manpower, and anchor government demand.
 - Complementary initiatives such as Chips to Startup Programme, Design Linked Incentive Scheme, and the India Semiconductor Mission are critical to building fabrication capacity, nurturing startups, and expanding semiconductor talent in India.
 - The long-term goal is to enable Indian consumers and industries to adopt indigenous processors without compromising on cost, security, or reliability.
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A BOLD STEP AMID AN AMBITIOUS NUCLEAR ENERGY TARGET

- Human Development Index (HDI) closely correlates with per capita **Final Energy Consumption** (FEC), linking development outcomes with energy availability.
- As a G20-member aspiring to an **HDI of 0.9** or higher, India would need to generate around 24,000 TWh of energy annually, even after accounting for improvements in energy efficiency and electrification.
- Of this, about 60% would be used as electricity, while the remaining would go into hydrogen production via electrolyzers, essential for decarbonising hard-to-abate sectors such as steel, fertilisers and plastics.

The SHANTI Bill, 2025: A New Push for Nuclear Energy

- **Ambitious Nuclear Expansion Target**
 - Building on recent successes in nuclear power, the Union government has set a target of 100 GW of installed nuclear capacity by mid-century.
 - It is planning for a major expansion of the sector to support long-term development and decarbonisation goals.
- **Consolidated Legal Framework**
 - Parliament has passed the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Bill, 2025.
 - It is an overarching legislation that consolidates and harmonises provisions of the Atomic Energy Act, 1962 and the Civil Liability for Nuclear Damage Act, 2010.
- **Regulatory and Safety Provisions**
 - The Bill provides continuity in regulation by stating that the Atomic Energy Regulatory Board (AERB) “shall be deemed to have been constituted under this Act.”
 - It clearly assigns the primary responsibility for safety, security and safeguards to the licensee of the nuclear facility, strengthening accountability.



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- **Strategic Significance**

- With its ambitious capacity target and streamlined legal framework, the SHANTI Bill represents a bold policy step.
- Such decisive measures, coupled with long-term vision, are viewed as essential for India's transition to a developed, energy-secure and low-carbon economy.

FRESHWATER SPONGE



Recently, scientists from Bose Institute studied freshwater sponges from the Sundarban delta and identified their potential to act as bio indicators of toxic metal pollution.

- Freshwater sponges are the **earliest multicellular eukaryotes**.
- They filter large volumes of water and are **vital for ecosystem health**.
- **Habitat:** They grow on **sturdy submerged objects** in clean streams, lakes, and rivers.
- Sponges are **filter feeders**. They obtain food from the flow of water through their bodies and from symbiotic algae.
- **Appearance:** Many freshwater sponges appear **green** because they contain algae, which live on sponges in a **symbiotic relationship**.

Reproduction: They can reproduce **sexually or asexually**.

- When small piece is broken off and grow into new sponges.
- The sponge forms **gemmules**.

Ecological Role: They act both as **bioindicators and absorbents** of toxic metals like arsenic, lead, and cadmium and can be a promising solution for bioremediation.

- They are effective bio indicators for monitoring water quality and pollution levels in estuarine and freshwater ecosystems.



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KHEONI WILDLIFE SANCTUARY



Recently, forest department officially recorded sighting of two Wild Dogs (Dholes) in Kheoni wildlife sanctuary.

- **Location:** It is located in **Madhya Pradesh**.
- **Vegetation:** The sanctuary's habitat consists of **dry deciduous forests**.
- **Fauna:** Its wildlife includes jackals, palm civets, Leopards, Sloth bears, Hyenas, Nilgai, and many bird species.
- **Flora:** Teak, Tendu, Bamboo, Kusum, Kanak Champa, Ber, Karanj, Kaim, Kadamb etc.

Key Facts about Dhole

- It is a wild canid **carnivorous species**.
- **Other Names:** Indian wild dog, whistling dog, red wolf, red dog and mountain wolf.
- **Habitat:** Dholes are animals that **inhabit dense jungles, steppes, mountains, scrub forests, and pine forests**.

Distribution of Asiatic Wild Dog

- They are found throughout **Central, Eastern Asia and Southeastern Asia**.
- In India, the Western and Eastern Ghats is a stronghold region for dholes.

Conservation status of Asiatic Wild Dog

- **IUCN Red List:** Endangered
 - **CITES:** Appendix II
 - **Wildlife Protection Act 1972:** Schedule II.
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