

SWACHH SURVEKSHAN AWARD



- It is an annual survey of cleanliness, hygiene and sanitation in cities and towns across India, launched as part of the **Swachh Bharat Abhiyan** (under SBA-Urban).
- It was launched by the **Ministry of Housing and Urban Affairs (MoHUA)** with **Quality Council of India (QCI)** as its implementation partner.
- It recognizes the tireless efforts of cities **driving the Swachh Bharat Mission-Urban (SBM-U)** forward.
- This year, the prestigious awards will be **presented across 4 categories**:
 - Super Swachh League Cities
 - **Top 3 clean cities** in 5 population categories
 - **Special Category**: Ganga Towns, Cantonment Boards, SafaiMitra Suraksha, Mahakumbh
 - **State Level Awards** – Promising clean city of State/UT. A total of 78 Awards will be presented this year.
- Swachh Survekshan 2024-25 adopted a smart, structured approach to assess urban cleanliness and service delivery, using **10 well-defined parameters with 54 indicators**—offering a complete view of sanitation and waste management in cities.
- This year it unfolds a very special league, **Super Swachh League (SSL)** - a separate league of cities excelling in cleanliness.
- The introduction of the SSL serves a dual purpose: it inspires top-performing cities to reach even higher standards of cleanliness, while also motivating other cities to improve their performance and compete for top rankings.
- The SSL features cities that have **ranked in the top three at least once in the last three years** and remain in the top 20% of their respective population category in the current year.

PRIME MINISTER PROFESSORSHIPS



- It is a prestigious initiative aimed at **fostering world-class research and innovation** within emerging institutions.
- It seeks to leverage the expertise of eminent scientists, senior faculty, and accomplished industry professionals to **provide mentorship and support to faculty and students** in less-endowed state universities, thereby strengthening their research and development culture.
- **Objective:** To utilize the extensive knowledge and experience of active, eminent, and superannuated/retired scientists and professionals.
- **Eligibility Criteria for Prime Minister Professorship:**
 - Superannuated faculty or scientists from reputed **Indian institutions**, research laboratories or from **private institutions** are eligible to apply.
 - **Overseas scientists**—including **Non-Resident Indians (NRIs)**, **Persons of Indian Origin (PIOs)**, and **Overseas Citizens of India (OCIs)**—are also encouraged to apply under this scheme.
 - In addition, professionals from **industry/ experienced Professor of Practice**, with a distinguished record of research and innovation may also apply.

Duration: The tenure of the PM Professorship will be up to 5 years, based on performance evaluated by the expert committee constituted for the purpose.

Age limit: Superannuated on the date of application (no upper age limit)

Funding Support: A PM Professor will receive a fellowship of Rs. 30 lakh plus Rs. 24 lakh as research grant (consumables, domestic travel, contingencies, equipment etc.) per annum. Also, an overhead of a fixed amount of Rs.1 lakh per year to be provided under the program.

WHAT IS MAGNETIC LEVITATION (MAGLEV) TECHNOLOGY?



- Magnetic levitation, or maglev, is an **advanced transportation technology** that **uses the principles of electromagnetism to enable vehicles to float above tracks**, eliminating physical contact and significantly reducing friction.
- Maglevs were **conceptualized during the early 1900s** by American professor and inventor Robert Goddard and French-born American engineer Emile Bachelet and have been in commercial use since 1984.
- **How Maglev Technology Works?**
 - Maglev trains operate using two key **electromagnetic principles: magnetic attraction and repulsion**.
 - The system typically consists of **three main components**:
 - **Levitation: Magnets lift the train above the track**, ensuring there is no physical contact. This **minimizes wear and tear** while providing a smooth ride.
 - **Guidance: Electromagnets stabilize the train laterally**, keeping it centered on the track.
 - **Propulsion: Linear motors generate magnetic fields that push and pull the train** along the track. This replaces the need for traditional engines or fuel.
 - The **tracks, known as guideways, are embedded with powerful electromagnets**, while the **trains themselves contain superconducting magnets or electromagnets**.
 - By carefully **controlling the magnetic fields, maglev trains achieve levitation and propulsion** with minimal energy loss.
- Benefits of Maglev Technology:

- **Speed and Efficiency:** Maglev trains can reach speeds of over 600 km/h (373 mph), making them faster than conventional trains and competitive with short-haul flights.
- **Reduced Friction:** With no physical contact between train and track, maglev systems have significantly lower maintenance costs and higher energy efficiency.
- **Eco-Friendly:** Maglev trains produce zero direct emissions and can be powered by renewable energy sources, making them a sustainable alternative to fossil fuel-based transport.
- **Comfort:** Passengers experience minimal vibrations and noise, thanks to the absence of wheels and rails.

DECARBONISING GLOBAL SHIPPING: PATHWAYS AND CHALLENGES

- Green hydrogen is produced via water electrolysis using renewable energy.
- For shipping, more stable alternatives like **green ammonia** (from green hydrogen and nitrogen) and **green methanol** (from green hydrogen and industrial carbon dioxide) are preferred.
- India promotes green ammonia to reduce LNG imports in fertilizer production.

Green Methanol as Shipping's Preferred Transition Fuel

- Shipping is gradually adopting green methanol as its primary decarbonisation fuel due to its ease of use and lower carbon emissions—about 10% compared to conventional fuels.
- Green methanol can largely replace VLSFO without major engine modifications, unlike green ammonia, which, despite emitting no greenhouse gases, requires complex onboard handling.
- However, green e-methanol is significantly more expensive—costing \$1,950 per tonne in Singapore as of February, compared to \$560 per tonne for VLSFO.
 - This price gap is driven by high renewable electricity requirements (10–11 MWh per tonne of methanol) and the substantial upfront cost of electrolyser facilities.

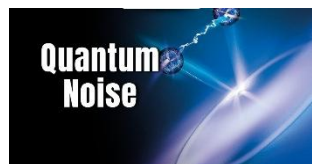
India's Shipping Decarbonisation Strategy and Global Green Fuel Ambitions

- India plans to decarbonise its domestic shipping by promoting green fuels for container ships and establishing green fuel bunkering hubs at ports like Tuticorin (V.O. Chidambaranar) and Kandla.
- The government also aims to produce and export green fuels to Singapore, a major global ship fuelling hub handling nearly 25% of the world's ship fuel needs.
- With its large solar power capacity and expertise, India is positioning itself as a key global supplier of green fuels to support international shipping's shift towards sustainability.

Building India's Green Marine Fuel Hub: Challenges and Solutions

- India aims to become a major producer of marine green fuels like green methanol but faces challenges such as dependence on imported solar panels and electrolyzers.
- However, India's solar power growth—from 2.82 GW in 2014 to 105 GW in 2025—shows how sovereign guarantees and strategic policies can overcome such hurdles.
 - Sovereign guarantees help lower project costs by enabling cheaper international financing.
- For large-scale green methanol production, India needs innovative financial tools, including Production-Linked Incentive (PLI) schemes for electrolyzers and incentives for carbon capture, utilisation, and storage (CCUS).
 - These measures would support local value chains, reduce raw material transport costs, and make green methanol production from captured CO₂ feasible.
- The government's push to **establish 1.5 GW local electrolyser manufacturing** capacity and **expanded industrial CO₂ sourcing** positions India well for developing integrated green fuel hubs.
- Multilateral development banks offering low-interest financing (around 4% compared to 11–12% from Indian lenders) can also be leveraged to scale up efforts.

WHAT IS QUANTUM NOISE?



- It refers to the **unwanted disturbances that affect quantum systems, leading to errors in quantum computations.**
- **Unlike classical noise, which might simply add random errors to a signal, quantum noise can have more complex and detrimental effects.**

What Causes Quantum Noise?

- Quantum noise comes from the fact that **energy**—like light or radio waves—**exists in discrete packets, or quanta.**
- For example, **light is made of photons**, and radio waves are made of individual electromagnetic excitations. **When you try to measure or amplify these signals, there's a natural limit to how accurately you can do so.**
- This is a direct result of the **Heisenberg uncertainty principle**, which says you **can't perfectly measure certain pairs of properties** (like the strength and phase of a wave) **at the same time.** These **unavoidable fluctuations are what we call quantum noise.**
- Even if you had a perfect detector in a perfectly quiet room at absolute zero temperature, quantum noise would still be present.
- Quantum noise can arise from various **sources, including thermal fluctuations, electromagnetic interference, imperfections in quantum gates, and interactions with the environment.**
- It's a major **challenge in the development of quantum computers**, as it can **cause qubits to lose their delicate quantum state, known as decoherence.**
 - **Even small amounts of noise can lead to decoherence**, causing qubits to lose their superposition and entanglement properties.
 - This loss of quantum information can **render computations meaningless** and limit the size and complexity of feasible quantum algorithms.

PRESERVING INDIA'S LINGUISTIC SECULARISM: CONSTITUTIONAL VALUES AND CULTURAL UNITY

- Secularism in India extends beyond religion; it encompasses language as a vital dimension of cultural identity and democratic coexistence.
- Unlike Western secularism, which emphasises the separation of church and state, **Indian secularism is embedded in the idea of inclusive pluralism**. The state neither promotes nor suppresses any religion or language but ensures equal treatment for all.
- It also empowers citizens with the right to preserve their linguistic and cultural identity without fear of discrimination.

Constitutional Provisions Supporting Linguistic Plurality

- The Indian Constitution provides multiple safeguards to preserve the linguistic diversity of the nation:
 - **Article 343:** Declares Hindi in **Devanagari script as the official language of the Union**, while allowing states to adopt their own official languages.
 - **Eighth Schedule:** Lists 22 scheduled languages that are accorded recognition and development support from the government.
 - **Article 29:** Grants every section of citizens the right to conserve their distinct language, script, or culture, ensuring that language is not a basis for exclusion or discrimination.
- These provisions form the legal foundation of India's linguistic secularism, preventing the dominance of any single language and promoting the coexistence of multiple languages within a single national identity.

Official Language vs. National Language

- Contrary to popular perception, **India does not have a national language**. The Constitution deliberately avoids designating any language as national, recognising the sensitivities associated with India's multilingual reality.

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- While Hindi is the official language at the central level, states are free to conduct their affairs in their own official languages.
- This decentralised approach has helped maintain harmony but also led to periodic friction, especially where fears of cultural imposition arise.

Language Politics and Rising Tensions

- The recent incidents of violence in Maharashtra against non-Marathi-speaking citizens, along with historic resistance to Hindi imposition in Tamil Nadu and parts of the Northeast, reflect deeper anxieties about identity and cultural domination.
- The misuse of linguistic pride for political gains undermines the inclusive ethos of the Indian Constitution. Instead of cultural preservation, these movements often descend into exclusionary practices that contradict India's secular and federal ideals.

The Role of Political and Civil Institutions

- The preservation of linguistic secularism is not only a constitutional mandate but also a political responsibility.
- Political parties must act as guardians of India's linguistic harmony, resisting the temptation to exploit language for electoral benefits.
- Civil society, media, and educational institutions must also play a proactive role in promoting tolerance, mutual respect, and inter-lingual understanding. Recognition of each language's value in the national narrative can strengthen India's unity in diversity.

A Call for Respect and Inclusivity

- The essence of India's linguistic secularism lies in its ability to respect all languages equally.
 - This respect must extend beyond scheduled languages to the many dialects and mother tongues that constitute the soul of India's cultural heritage.
 - Respecting linguistic rights is not only a constitutional imperative but also a moral one. It ensures social harmony, fosters inclusive development, and strengthens democratic citizenship.
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KAZIRANGA NATIONAL PARK



- **Location:** It is situated in the north-eastern part of India in the **state of Assam.**
- It is the single largest undisturbed and representative area in the **Brahmaputra Valley floodplain.**
- In 1985, the park was declared a **World Heritage Site** by UNESCO.
- **Terrain:** It is of sheer forest, tall elephant grass, rugged reeds, marshes, and shallow pools.
- **Rivers:** The **River Difalu**, a tributary of the Brahmaputra, flows through the National Park while another tributary, Moradifalu, flows along its southern boundary.
- **Flora and Fauna of Kaziranga National Park**
 - **Flora:** It is primarily famous for its dense and tall elephant grasses intermixed with small swamplands. It also includes an abundant cover of water lilies, water hyacinths and lotus.
 - **Fauna:** Many endangered and threatened species like Rhino, Tiger, Eastern swamp deer, Elephant, Buffalo, Hoolock gibbon, Capped langur, and Gangetic River dolphin are commonly found in the habitat. It is inhabited by the world's largest population of one-horned rhinoceroses, as well as many mammals.

Highlights of Grassland Bird Survey Report:

- Bird experts, scientists, and conservationists recorded 43 grassland species across Kaziranga's three wildlife divisions.
- It reported that the **Finn's weaver (IUCN Status: Endangered)**, locally known as **tukura chorai**, is breeding successfully.
- This bird is an important indicator of grassland health and is known for building nests atop trees.