

### A GROUND VIEW OF THE INDIAN SPACE POLICY 2023

#### Context

- The Indian Space Research Organisation (ISRO) released the **Indian Space Policy 2023**, which envisages "**encouraging, enabling and developing a flourishing commercial presence in space.**"
- However, a few issues remain and India must address them to fully extract the benefits in the Second Space Age.

#### India's Space Ages and its space economy

- **First Space Age**
  - India's space industry and space economy were defined by ISRO until early 1990s.
  - **Private sector involvement** was limited to building to ISRO designs and specifications.
- **Second Space Age:** The Second Space Age began with the licensing of private TV channels, the explosive growth of the Internet, mobile telephony, and the emergence of the smartphone.

#### India's Space Economy

- Today, while ISRO's budget is approximately \$1.6 billion, India's space economy is over **\$9.6 billion.**
- Broadband, OTT and 5G promise a double-digit annual growth in satellite-based services.
- With an enabling environment, the **Indian space industry could grow to \$60 billion by 2030, directly creating more than two lakh jobs.**

#### How is the Space Policy 2023 different from earlier policies?

- It is an acceptance to the fact that **the private sector is a critical stakeholder** in the entire value chain of the space economy.
- **Focusing on civilian and peaceful applications:** There is only one reference to 'security' in the document makes it clear that the **focus is on civilian and peaceful applications.**

- **Different mechanism for security purpose:** Security agencies can task non-governmental entities (NGEs) for procuring tailor-made solutions to address specific requirements.
- **Different roles for departments and agencies**
  - The policy lays out a strategy and which assigns the roles of the Department of Space, ISRO, the Indian National Space Promotion and Authorisation Centre (IN-SPACe) set up in 2020.
  - The New Space India Limited (NSIL), a public sector unit set up in 2019 under the Department of Space as the commercial arm of ISRO to replace the now defunct Antrix.
- **Directs ISRO's focus only on R&D**
  - ISRO will transition out of the existing practice of being present in the manufacturing of operational space systems.
  - ISRO shall focus on R&D in advanced technology, proving newer systems and realisation of space objects for meeting national prerogatives.

### Conclusion

- The Space Policy 2023 is a forward-looking document reflecting good intentions and a vision. But it is not enough.
- A time frame is urgently needed to provide the necessary legal framework to translate this vision into reality, to successfully launch India into the Second Space Age.

### HARIT SAGAR GUIDELINES

The Ministry of Ports, Shipping & Waterways recently launched 'Harit Sagar', the Green Port Guidelines.



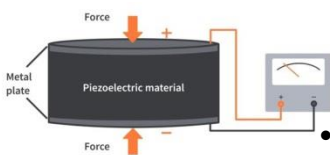
### About Harit Sagar Guidelines:

- **Objective:** To minimize waste through Reduce, Reuse, Repurpose and Recycle to attain zero waste discharge from port operations and promote monitoring based on Environmental Performance Indicators.
- These guidelines have been formulated with the aim of promoting environmentally friendly practices across all Indian Ports.

- It envisages ecosystem dynamics in port development, operation and maintenance while aligning with the working with Nature concept and minimizing the impact on biotic components of the harbour ecosystem.
- It lays emphasis on the use of Clean / Green energy in Port operation, developing Port capabilities for storage, handling and bunkering Greener Fuels, viz., Green Hydrogen, Green Ammonia, Green Methanol / Ethanol etc.
- This also covers aspects of the National Green Hydrogen Mission pertaining to ports, development of green hydrogen facilities, LNG bunkering, Offshore Wind Energy and provides provision for adopting global Green Reporting Initiative (GRI) standards.
- These Guidelines provide a framework for the Major Ports to draw out a comprehensive action plan for achieving targeted outcomes in terms of quantified reduction in carbon emission over defined timelines through focused implementation and close monitoring of Green Initiatives and to achieve Sustainable Developmental Goals (SDG).

## WHAT IS PIEZOELECTRICITY?

Researchers from the Indian Institute of Technology Madras (IIT-M) and the Defence Research and Development Organisation (DRDO) recently developed piezoelectric MEMS (micro electro mechanical system) technology for underwater communication.



### About Piezoelectricity:

- Piezoelectricity (also called the piezoelectric effect) is the appearance of an electrical potential (a voltage, in other words) across the sides of a crystal when you subject it to mechanical stress.
- In the reverse piezoelectric effect, a crystal becomes mechanically stressed (deformed in shape) when a voltage is applied across its opposite faces.
- Thus, Piezoelectric materials allow the conversion of energy from the mechanical domain to the electrical domain and vice versa.
- It is due to the spontaneous separation of charge with certain crystal structures under the right conditions.

- There are a wide variety of materials which exhibit this phenomenon, including **natural quartz crystals**, **semi-crystalline polyvinylidene polymer**, **polycrystalline piezoceramic**, **bone** and **even wood**.
  - **Applications:**
    - They can be used to create various **sensors or actuators**.
    - Piezoelectric transducers are common in **ultrasonic applications**, such as **intrusion detectors and alarms**.
    - Piezoelectric devices are **employed at AF**(audio frequencies) as **pickups, microphones, earphones, beepers, and buzzers**.
    - In **wireless applications**, piezoelectricity makes it possible to **use crystals and ceramics as oscillators that generate predictable and stable signals at RF** (radio frequencies).
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## [NATIONAL TIGER CONSERVATION AUTHORITY \(NTCA\)](#)

The National Tiger Conservation Authority (NTCA) recently approved shifting three tigresses from Ranthambore Tiger Reserve (RTR) to two other state reserves.



### About National Tiger Conservation Authority (NTCA):

- It is a **statutory body** under the **Ministry of Environment, Forest, and Climate Change (MoEFCC)**.
- It was **established in 2006 under Wildlife (Protection) Act 1972**.
- **Objectives:**
  - Providing **statutory authority to Project Tiger** so that compliance of its directives becomes legal.
  - Fostering **accountability of Center-State in management of Tiger Reserves** by providing a basis for MoU with States within the federal structure.
  - Providing for an **oversight by Parliament**.
  - **Addressing livelihood interests of local people** in areas surrounding Tiger Reserves.
- **NTCA Composition:**
  - **Minister in charge of MoEFCC (as Chairperson)**,

- **Minister of State in MoEFCC (as Vice-Chairperson),**
- **three members of Parliament, the Secretary (MoEFCC), and other members.**

## **Key facts about Ranthambore Tiger Reserve (RTR):**

- **Location:**
  - It is located in **Rajasthan**.
  - It is located at the **junction of the Aravali and Vindhya hill ranges**.
- Its **flagship species is Panthera Tigris Tigris- the Indian or the Bengal tiger**.
- **Rivers:** The Rivers **Chambal in the South** and the **Banas River in the North** bound the tiger reserve.
- **Ranthambore Fort, World Heritage Site, is located within RTR.**
- **Landscape:** It alternates between a **dry deciduous jungle** and an **open grassy meadow** dotted by **numerous lakes and rivers**.
- **Vegetation:** **Dry-deciduous forest**.
- **Flora:**
  - The most **dominant plant is the 'Dhok'**. This tropical tree **constitutes more than three-fourths** of the vegetation of this national forest.
  - Apart from the Dhok tree, the other prime trees of this park are **Banyan** (Ficus bengalensis), **Pipal** (Ficus religiosa) and **Neem** (Azadirachta indica).
- **Fauna:**
  - Apart from tigers, the major wild animals include **Leopard, Nilgai, Wild boar, Sambar, Hyena, Sloth bear and Chital**.

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## **POSHAN BHI, PADHAI BHI: ANGANWADI SCHEME FOR EARLY CHILDHOOD CARE, EDUCATION LAUNCHED**

### **Why in News?**

- The Union Ministry of Women and Child Development (MoWCD) recently launched the Centre's flagship programme 'Poshan Bhi, Padhai Bhi', which will focus on **Early Childhood Care and Education (ECCE)** at anganwadis across the country.

- ECCE is an important component of **Mission Saksham Anganwadi and Poshan 2.0** (Mission Poshan 2.0) and envisaged under the **National Education Policy 2020**.

### **Anganwadi Ecosystem in India:**

- Considering global evidence that **85% of brain development is achieved by the age of 6 years**, the Anganwadi eco-system becomes a critical access point for building the children's base.
- Close to **9 lakh** operational Anganwadi centres across the country are providing **supplementary nutrition and early care and education** to around 8 crore beneficiary children (under the age of 6 years).
  - This makes it the largest public provisioning of such services in the world.
- MoWCD has allocated **Rs 600 crore for the training** of anganwadi workers to implement the ECCE.
- The National Institute of Public Cooperation and Child Development (**NIPCCD**) has been roped in for the training of Anganwadi workers.

### **What is the Poshan Bhi Padhai Bhi Programme?**

- It is a pathbreaking ECCE program to **ensure that India has the world's largest, universal, high-quality pre-school network**, as suggested by the NEP 2020.
- The aim is not only to make anganwadi centres **nutrition hubs** but also **education-imparting centres** - providing at least two hours of high-quality preschool instruction on a daily basis.
- Under this, the government will target children's development in every domain mentioned in the **National Curriculum Framework**, viz., physical and motor development, cognitive development, socio-emotional-ethical development, etc.
- It will also ensure the **use of developmentally appropriate pedagogies** and emphasising the links with primary education as well as early childhood health and nutrition services.
- It will help build a **Jan Andolan**, to involve communities in strengthening the foundations of the country's future generations.

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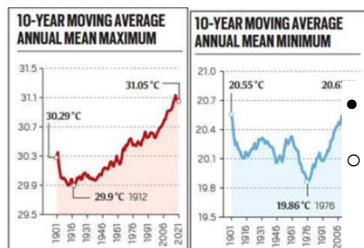
## **GLOBAL WARMING: WHY INDIA IS HEATING UP SLOWER THAN THE WORLD AVERAGE?**

## Background:

- The annual mean temperature of the world is known to have **increased by 1.1 degree Celsius** from the average of the 1850-1900 period. But this increase, as can be expected, is not uniform.
- It varies in different regions and also at different times of the year.
- This single number denoting global temperature increase, very effective for communicating the dangers of climate change, is built on top of several layers of averages.
  - For example, temperature rise over land is much higher than over oceans.
- The warming trends over the Indian region are very different.
- An assessment of climate change over the Indian subcontinent, published by the Ministry of Earth Sciences in 2020, said **annual mean temperatures had risen by 0.7 degree Celsius from 1900**.
  - This is significantly lower than the 1.59 degree Celsius rise for land temperatures across the world.
- It could give the impression that the problem of climate change over India was not as acute as other parts of the world.

## Why is Warming Over India Lower?

- The relatively lower rise in temperatures over India is not a surprise. Also, India is not a special case.
- The **increase in temperatures is known to be more prominent in the higher altitudes, near the polar regions, than near the equator**.
- This is attributable to a complex set of atmospheric phenomena, including **heat transfers from the tropics to the poles through prevailing systems of air circulation**.
- Geographically, India is located in the tropical region, quite close to the equator.



## • Impact of Aerosols –

- Aerosols refer to all kinds of particles suspended in the atmosphere.
- These particles have the potential to affect the local temperature

in multiple ways.

- **Many of these scatter sunlight back, so that lesser heat is absorbed by the land.**
  - Aerosols also affect cloud formation. Clouds, in turn, have an impact on how much sunlight is reflected or absorbed.
  - **Aerosol concentration over the Indian region is quite high**, due to natural as well as man-made reasons.
  - Due to its location in the tropics and the arid climate, India is no stranger to dust.
  - But it also happens to be experiencing heavy pollution right now.
  - Emissions from vehicles, industries, construction, and other activities add a lot of aerosols in the Indian region.
  - **A reduction in warming could be an unintended but positive side-effect.**
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## [NATIONAL TECHNOLOGY DAY: PM TO VIRTUALLY LAY LIGO FOUNDATION STONE TODAY](#)

### **Why in news?**

- Today, on National Technology Day, PM Modi will lay the foundation stone of Laser Interferometer Gravitational Wave Observatory – India (LIGO-India).
- The LIGO-India facility is being constructed in Hingoli district in Maharashtra.

### **National Technology Day**

#### • **About**

- National Technology Day is observed annually on May 11 in India.
- This day is observed to commemorate the significant achievements and contributions made by Indian scientists, engineers, and technologists towards nation building.
- It is celebrated with a new and different theme every year.

#### • **History**

- The celebration of this day was started in 1999 to honour Indian scientists, engineers and technologists, who ensured the successful conduct of Pokhran tests in May 1998.
- On May 11, 1998, India successfully conducted its nuclear tests under Pokhran-II, codenamed **Operation Shakti**.



- The series of nuclear tests marked a major milestone in India's technological prowess and showcased its capability to develop and deploy nuclear weapons.

- **Objective**

- The primary objective of National Technology Day is to promote scientific temper and inspire the younger generation to pursue careers in STEM (science, technology, engineering, and mathematics) fields.
- It serves as an occasion to raise awareness about the importance of technology in addressing societal challenges and fostering economic growth.

- **Theme for 2023**

- This year's theme is 'School to Startups- Igniting Young Minds to Innovate'.

## **LIGO – India**

- LIGO-India will be an advanced gravitational-wave observatory to be located in India as part of a worldwide network.
- Two existing LIGO observatories in the United States detected gravitational waves for the first time in 2015.
- Since then, two more similar detectors have come onboard, one in Italy and the other in Japan.
- LIGO India would be the fifth node of this network, and possibly the last.
- The LIGO facility involves the construction of two 4-km long vacuum chambers in L-shape along with other structures. The facility is set to become operational by 2030.
- It is set to become the largest scientific facility in India.
- This facility will be capable of sensing gravitational waves generated during the merger of massive astrophysical objects such as black holes, and neutron stars.

## **Rare Earth Permanent magnet Plant in Visakhapatnam**

- The new magnet plant would produce rare earth magnets like Samarium-Cobalt and Neodymium-Iron-Boron.
- This plant has been built inside an existing facility of Bhabha Atomic Research Centre (BARC) in Visakhapatnam.

- These magnets are critical components for a variety of high technology products in telecommunications, electric vehicles, microelectronics, wind turbines, airplanes and also in weapons.
- As of now, the supply chains of these magnets are highly dependent on China. India plans to use locally sourced rare earth elements to produce these magnets.
- With this plant, **India will join a select group of nations with capacity to produce such magnets.**

### **The Molybdenum-99 production facility**

- This Facility located in Trombay Campus of Bhabha Atomic Research Centre.
- This facility is expected to enable about 9 to 10 lakh patient scans per year.
  - **Molybdenum-99** (Mo-99) decays to create **technetium-99m** (Tc-99m), a radioisotope used by hospitals and medical centres.
    - Tc-99m is used worldwide in nuclear medicine procedures to diagnose heart disease and other diseases.
    - Roughly 85% of medical imaging in nuclear medicine uses this isotope (Tc-99m).

### **The National Hadron Beam Therapy Facility**

- The National Hadron Beam Therapy Facility of Tata Memorial Centre, Navi Mumbai works to undertake highly precise delivery of radiation to the tumour with minimal dose to the surrounding normal structures.
- The precise delivery of dose to target tissue reduces the early and delayed side effects of radiation therapy.