

# NEWS TODAY

## China aims to construct the World's First Hybrid Fusion-Fission Nuclear Plant, named Xinghuo

The 100 MW project with a targeted Q factor greater than 30, could become a reality by 2030.

- The Q factor is the ratio of energy produced to energy consumed in heating the plasma inside the fusion reactor.

### About Fusion-Fission Hybrid Reactor

- **Concept:** Uses high intensity neutron flux produced by a fusion reactor to drive a nuclear fission reaction, and breed fissile fuel from fertile materials.
- **Design:** Contains a nuclear fusion reactor core where deuterium and tritium nuclei are fused to form helium and a fast neutron, surrounded by a blanket of fertile material (like uranium-238 or thorium-232).

### Key Striking features of the Hybrid Reactor

- **Capitalises on the advantages of Fusion and Fission:** Fusion reactors are 'neutron rich' and 'power poor' while fission reactors are 'neutron poor' and 'power rich'.
- **Low Power Requirements:** Fusion power required for hybrid reactor is lesser than pure fusion as its major purpose is the production of neutrons (not energy).
- **Reduced Radioactive Wastes:** Neutron flux in the blanket could transmute long-lived radioactive waste into less harmful, short lived, and easier to dispose wastes.
- **Fuel Supply:** Hybrid reactor would produce enough fissile fuel through breeding.
  - ⊕ The fusion neutrons can convert fertile materials into fissile materials (like plutonium-239 or uranium-233) increasing fuel supply.



### Nuclear Fission and Nuclear Fusion

- **Fission:** Splits heavy atomic nuclei into lighter ones, releasing energy and neutrons.
- **Fusion:** Light atomic nuclei combines to form a heavier nucleus, releasing tremendous energy.

## Over 5.5 Lakh Affected Due to Floods in The Northeastern Part Of India

The recent flooding and its magnitude have highlighted North East India's vulnerability to floods.

### Reasons for flood vulnerability of North East India

- **River instability:** The Brahmaputra and the Barak rivers are braided and unstable in their reaches due to high sediment charges, steep slopes and transverse gradients.
- **Geology:** The entire area is part of a seismic zone and periodic severe earthquakes are also a factor of river instability.
- **Hydrometeorology:** The drainage area of Brahmaputra, and Barak in India is subjected to cyclonic storms originating in the Bay of Bengal, particularly in the latter part of the monsoon season.
- **Climate change:** Although overall rainfall is decreasing in North East, in some areas intensity of rainfall has increased (CSE).
  - ⊕ For example, in Assam, districts north of the Brahmaputra show an increasing trend in rainfall in the last 30 years (CSE).
- **Drainage congestion:** Due to heavy rainfall of short duration coupled with high flow levels in the main river, rainwater is prevented from draining quickly into the riverbed.
- **Anthropogenic:** Construction, encroachment of river bodies, embankments, obstructing natural flows, etc. also induce drainage congestion.



### Recommendations for enhancing flood resilience of North East India

- Increase the river water-holding capacity by dredging.
- Flood Zoning of a river according to flood frequencies.
- Set up modern weather stations in the upstream catchment of all dams in the North East.
- Strengthen flood protection structures (currently most are very old).
- Afforestation and rejuvenation of wetlands

## India to build first-ever indigenous Polar Research Vessel (PRV)

To achieve this, an MoU was signed between **Garden Reach Shipbuilders and Engineers Limited (GRSE)** and Norway's Kongsberg Oslo marking an important **milestone for India's shipbuilding sector**.

- **GRSE (Kolkata)**, is a premier Warship building **Mini Ratna Category I** company under **Ministry of Defence**.

### Polar Research Vehicle (PRV)

- **About:** It is a ship that serves as a platform for **research in the polar regions** (around the **North and South Poles**).
- **Purpose:** Equipped with the **latest scientific equipment**, enabling exploration of the **oceans' depths** and **study of marine ecosystems**.

### Significance of the Indigenous PRV for India

- **Indigenous Needs:** PRV would serve the requirements of **National Centre for Polar and Ocean Research (NCPOR)**, Goa, who will use it for research activities.
- **Support Existing Scientific Missions:** In **Antarctica (Maitri [1989] and Bharati [2011])** and in the **Arctic (Himadri, 2008)**.
- **Cater to Geo-political and Geo-economic dynamics of the region:** Significant for India to assert its **presence** and **interests** in the region.
- **Complements Existing Maritime Visions:**
  - ⊕ **SAGAR (Security and Growth for All in the Region)** that leverages India's vast coastline, strategic location, and maritime heritage and **MAHASAGAR (Mutual and Holistic Advancement for Security Across the Regions)** for holistic maritime engagement.
  - ⊕ **Sagarmala 2.0**, Under **Ministry of Ports, Shipping and Waterways**, which is a key pillar of the **Maritime Amrit Kaal Vision 2047 (MAKV)**.
    - ◆ MAKV seeks to place India among the **top five shipbuilding nations by 2047**.
- **Others:** Climate research, oceanography, and polar logistics.

## Centre Notified Rule and Regulations to Protect Ladakh's Land, Jobs, Culture, And Identity

Move follows local demands to bring Ladakh under the **Sixth Schedule** for greater constitutional autonomy (refer to the infographic).

### Key Highlights of the Recent Rules and Regulations

- **85% Government Jobs Reserved for Locals:** Definition of local is provided under the Domicile Certificate Rules, 2025.
  - ⊕ The reservation is in addition to the current 10% reservation for Economically weaker Sections (EWS).
- **Reservation for Women in LAHDC:** Reserve one-third of the seats for women in the **Ladakh Autonomous Hill Development Councils (LAHDC)** of Leh and Kargil, through rotation.
- **Language and Cultural Protection:**
  - ⊕ **English, Hindi, Urdu, Bhoti, and Purgi** made official languages.
  - ⊕ Institutional backing for promotion of **Shina, Brokskat, Balti, and Ladakhi**

### What are the limitations of these regulations?

- **No constitutional protection:** All new rules and regulations have been enacted under **Article 240** of the Constitution, which empowers the President to make regulations for UTs without the legislature.
  - ⊕ Thus, they **can be amended or withdrawn** by the Centre at any time
- **No ban on land ownership by outsiders:** This raise concerns due to the growing **tourism, construction, and climate-related risks**.
- **No local legislature or council with law-making powers:** This is in contrast to the power given to the ADCs or ARCs under the Sixth Schedule
- **Limited Cultural Support:** There is **no clear plan** to utilise local languages in **schools, government, or courts**.

| 6 <sup>th</sup> Schedule of the Constitution<br>Constitutional Provisions for Tribal Areas   |  |
|--|--|
| <b>Part of Article 244(2)</b> of the Constitution  | <b>Applies to 4 States:</b> <ul style="list-style-type: none"> <li>■ Assam</li> <li>■ Meghalaya</li> <li>■ Tripura</li> <li>■ Mizoram</li> </ul>   |
| <b>Governor's Authority</b><br>Empowers Governor to create Autonomous District Councils (ADCs) and Autonomous Regional Councils (ARCS)   |  |
| <b>Powers of ADCs and ARCS</b>   |  |
| <b>Legislative Powers – Enact Laws on:</b> <ul style="list-style-type: none"> <li>■ Forest Management</li> <li>■ Agriculture</li> <li>■ Inheritance</li> <li>■ Marriage</li> <li>■ Social Customs</li> </ul> | <b>Financial Powers – Authority to:</b> <ul style="list-style-type: none"> <li>■ Collect Land Revenue</li> <li>■ Impose Taxes</li> <li>■ Regulate Trade</li> <li>■ Collect Mineral Royalties</li> <li>■ Other Administrative Powers</li> </ul> |

## Laws made by Parliament or State Legislature cannot be an act of Contempt of Court (CoC): Supreme Court (SC)

SC in the **Nandini Sundar & Ors. Vs. State Of Chhattisgarh**, held that **enacting a law** by legislature **contradictory** to previous Court orders cannot be viewed as CoC.

- The court further held that a legislature has the powers to **remove** the basis of a judgment or, **validate through an amendment** a law which has been struck down.

### About Contempt of the Court

- **Meaning:** It refers to **disobeying** or **disrespecting** a court, lowering its authority and dignity.
- **Legislative Framework:** The **Contempt of Courts Act, 1971** and the **Rules to Regulate Proceedings for Contempt of the Supreme Court, 1975**.

### Types of Contempt

- ⊕ **Civil Contempt:** Wilful disobedience of court orders or undertakings.
- ⊕ **Criminal Contempt:** Publishing or doing anything (spoken, written, signs, etc.) that:
  - ◆ **Scandalises** or lowers court's authority .
  - ◆ **Prejudices** or **interferes** with any ongoing proceedings
  - ◆ **Obstructs the administration** of justice in any manner.
- **Major Exceptions (Contempt of Courts Act, 1971):** Innocent publication; fair and accurate reporting of judicial proceedings; fair criticism of the judicial act, etc.

### Issues with Contempt Powers



**High Pendency:** Over 1,800 contempt cases are pending in the SC and 1.43 lakhs in High Courts.



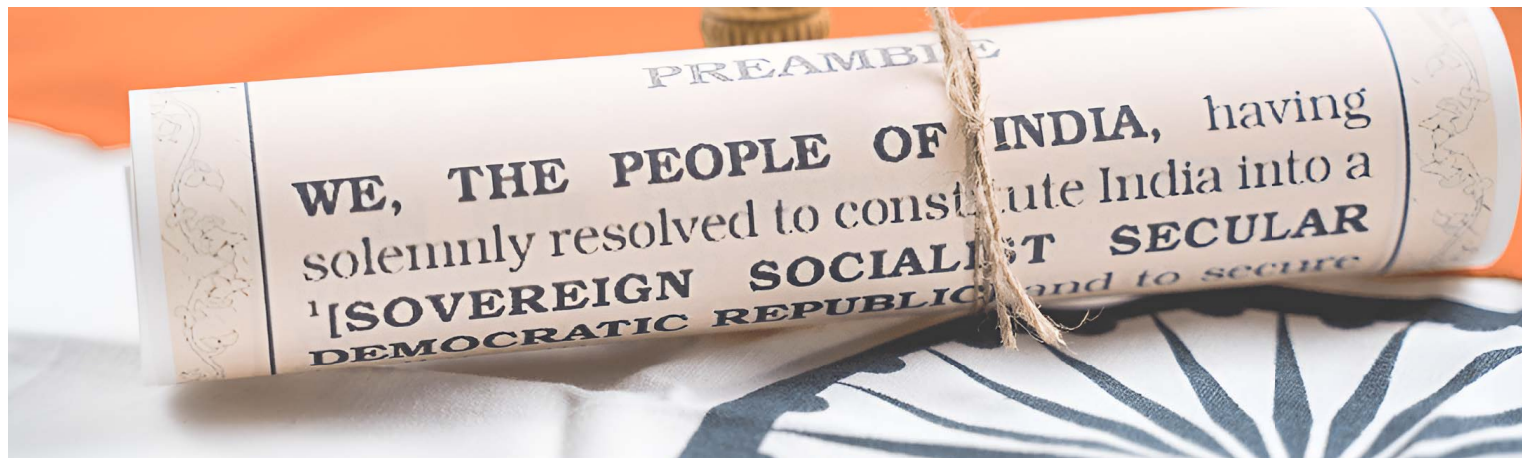
**Excessive Judicial Discretion:** Power could be used to prosecute individuals even in trivial instances.



**Ambiguity:** Terms like "scandalising the court" are vague, leaving scope for misuse.

### Related Constitutional Provisions

- **Article 129:** Makes the Supreme Court 'a court of record' and confers power to punish for contempt of itself.
  - ⊕ **Article 215** extends similar powers to the **High Court**.
- **Article 142:** SC can pass orders to ensure **complete justice**, including contempt.
- **Article 19(2):** Includes **contempt** as a ground for **reasonable restrictions** on freedoms under **Article 19(1)**.



### Also In News



#### Thermophilic bacteria

Scientists believed that Thermophilic bacteria from hot springs are untapped sources of powerful antibiotics.

#### About Thermophilic bacteria

- **Definition:** Thermophiles are microorganisms that **can grow between 40 and 90 °C**.
- **Reasons for Heat tolerance:** They form **spores**, a **dormant**, resistant state that helps them survive harsh conditions.
- **Applications:**
  - ⊕ Bioconversion of xylose to ethanol
  - ⊕ Crude Oil Degradation
  - ⊕ Heavy Metal Recovery
  - ⊕ Saccharification of Agricultural Residues
  - ⊕ Hygiene Indicator in Dairy Products
  - ⊕ Breast Cancer Treatment
  - ⊕ Remediation of Textile Dyes



#### Article 311

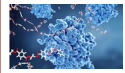
The J&K Lieutenant Governor dismissed three government employees for alleged terror links using powers under Article 311(2) (c).

#### About Article 311 (2)

- Provides '**Right to an informed inquiry**' before dismissal, removal, or reduction to a lower rank to those employed in
  - ⊕ **All India Services** or
  - ⊕ **in civil capacities or under the Union or a State,**
- **However, no enquiry is needed if**
  - (a) Person is convicted of a crime,
  - (b) Authority is satisfied that **holding an inquiry is not practical** (reasons must be recorded in writing).
  - (c) **President/Governor**, is satisfied that, in the **interest of the security of the State** it is not expedient to hold such inquiry

**NOTE:** Provisions under Article 311 are **enforceable in a court of law**





### Nanozyme

Researchers at Indian Institute of Science (IISc) developed an artificial **metal-based nanozyme** (vanadium pentoxide ( $V_2O_5$ )) to clamp down on **abnormal blood clotting** caused by conditions like **pulmonary thromboembolism (PTE)**.

- Under normal conditions, an **injured blood vessel** witnesses the **activation of platelets** to form clots while under PTE **overactivation of platelets occur** causing excess **blood clots or thrombosis** leading to mortality.

#### About Nanozymes

- They are **nanomaterials** with **intrinsic enzyme-like properties**.
- Compared to **natural enzymes**, they exhibit the **unique advantages** including high catalytic activity, low cost, high stability, easy mass production, etc.



### Ungulates

Wildlife Institute of India and National Tiger Conservation Authority did India's first survey of ungulates (hoofed animals).

- Study warns that **Ungulates (Hoofed animals)** which are **key prey species for tigers** are **declining** in Odisha, Jharkhand, and Chhattisgarh.

#### About Ungulates

- Classification:** They are primarily **herbivorous mammals**, including the chital, antelopes, sambar, nilgai, wild pig, barking deer, gaur, and wild boars.
- Habitat:** Grasslands, Forests and mountainous regions
- Significance:**
  - Aid forest and **grassland regeneration** through seed dispersal.
  - Influence **nutrient cycling** and **soil health**.
  - Play key role in **sustaining carnivores** like **tiger, leopard, dhole, hyena, and jackal**.
- Threats:** **Habitat loss, poaching, competition** with livestock for grazing, **changing rainfall patterns**.



### SHUKR Gene

Researchers from **CSIR- Centre for Cellular and Molecular Biology (CCMB), Hyderabad**, shed light on the molecular innovations in flowering plants that help explain **abominable mystery** through newfound gene, called **SHUKR (or sperm)**.

- CCMB is a premier research organization in frontier areas of modern biology.

#### About SHUKR Gene

- It controls a group of genes called **F-box**, which help **manage proteins** involved in **developing healthy pollen**.
- SHUKR and its F-box **genes evolve** fast, explaining Darwin's "**abominable mystery**" or the **sudden rise and success of flowering plants** in evolutionary history.



### International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

ICRISAT, in collaboration with the **Research and Information System for Developing Countries (RIS)**, launched the **ICRISAT Centre of Excellence for South-South Cooperation**.

- ICRISAT also signed an MoU with **DAKSHIN** (Development and Knowledge Sharing Initiative), which is India's initiative for strengthening **South-South cooperation through capacity building and development partnerships**.

#### About ICRISAT

- Headquarters:** Hyderabad, Telangana
- Genesis:** Established as a Non-profit research centre under the CGIAR consortium in the 1970s.
  - CGIAR is a **global research group** dedicated to achieving **food security and sustainable agriculture**.
- Purpose:** To improve **food security in semi-arid regions** and **support smallholder farmers in drylands**.
- Global Footprint:** Asia, Sub-Saharan Africa, and other dryland regions globally.
- Achievements**
  - Awarded the Africa Food Prize in 2021.
  - Developed the world's first pigeon pea hybrid



### Directorate of Revenue Intelligence (DRI)

While inaugurating DRI's new headquarters, in New Delhi Union Finance Minister urged it to **adopt a holistic and technology-driven approach** to tackle **smuggling and narcotics trade**.

#### About DRI

- Apex anti-smuggling agency** of India, under the **Central Board of Indirect Taxes & Customs, Ministry of Finance**.
- Functions:** Enforces the provisions of the **Customs Act, 1962** and over fifty other allied Acts including the **Arms Act, NDPS Act, COFEPOSA, Wildlife Act, Antiquities Act** etc.
  - It undertakes **collection, collation, analysis and dissemination of intelligence** relating to smuggling, carries out investigations, etc.



### Kerch Strait

Recently, Ukraine claimed responsibility for the underwater explosion that damaged the Kerch bridge.

- The 19km Bridge over the **Kerch Strait** is the direct link between the transport network of **Russia** and the **Crimean peninsula**.

#### About Kerch Strait

- Location:** The Kerch Strait connects the **Sea of Azov** and the **Black Sea**.
  - A strait is a narrow body of water that connects two larger bodies of water.
- Significance:** Key route for exports of Russian grain and crude oil, fuel oil, LNG, etc.

### Place in News



### Vietnam (Capital: Hanoi)

Vietnam scraps Two-Child policy as it experienced historically low birth rates.

#### Political Features

- Location:** Located on the **Indochina peninsula in Southeast Asia**.
- Territorial Border:** China, Laos and Cambodia.
- Maritime Border:** Eastern Sea (South China Sea or SCS) of Pacific Ocean to the East.

#### Geographical Features

- Climate:** Tropical (high temperature and humidity all year round)
- Major Rivers:** **Mekong** in the south and the **Red** in the north (both end at the South China Sea)
- Ha Long Bay-Cat Ba Archipelago**, is listed by **UNESCO** as a **World Natural Heritage site**.
- Economy:** It is among the top 5 producer of tungsten, cement, and fluorspar in the world (as of 2022)



AHMEDABAD



BENGALURU



BHOPAL



CHANDIGARH



DELHI



GUWAHATI



HYDERABAD



JAIPUR



JODHPUR



LUCKNOW



PRAYAGRAJ



PUNE



RANCHI