

SETU BANDHAN SCHEME

Recently, the Union Minister for Road Transport and Highways said that Setu Bandhan Scheme approval has been granted for seven bridge projects in Arunachal Pradesh under the Central Road and Infrastructure Fund (CRIF).



About the Setu Bandhan Scheme:

- It is an initiative of the **Ministry for Road Transport and Highways**.
- **Objective:** It has been introduced to improve inter-state connectivity, especially in rural areas at the borders where state roads do not get the required attention.
- It is aimed at replacing **railway line Level Crossings (LCs)** with **Road Over Bridges (ROBs)/ Rail Under Bridges (RUBs)** in states.

Key facts about Central Road and Infrastructure Fund

- It was established in 2000 under the **Central Road Fund Act, 2000**.
- It was previously known as **Central Road Fund**.
- Its subject matter **belongs to the Ministry of Finance**.
- The fund consists of a **cess imposed along with excise duty on petrol and diesel**.
- The Central Road Fund Act, 2000, was amended in 2018 and its objectives are as follows
 - To use proceeds of the road cess under CRIF to finance other infrastructure projects such as **waterways, some portion of the railway infrastructure, and even social infrastructure, including education institutions and medical colleges.**

WHAT IS IRON BEAM?



Videos have recently surfaced online allegedly showing Israel testing its new laser-based missile defence system, known as Iron Beam.

About Iron Beam:

- The Iron Beam, also known as **Magen or Light Shield**, is a new **laser-based missile defence system developed by Israel**.

- It is a **directed-energy** weapon air defence system that **fires powerful beams of light** that can **destroy fast-moving projectiles**.
 - **Built by Rafael Advanced Defense Systems**, Iron Beam was first **unveiled in 2014**.
 - The system can **intercept hostile rockets, drones, artillery**, and even mortar shells.
 - Its operational **range extends up to 7 km (4.3 miles)**.
 - **Advantages:**
 - With a **continuous energy supply** for the laser, the advantage lies in **never depleting ammunition**, ensuring a sustained capability for defence.
 - The **absence of conventional ammunition** will directly result in **significant cost savings**.
 - **Disadvantages:**
 - **Diminished effectiveness during restricted visibility**, such as heavy cloud cover or adverse weather conditions.
 - It **cannot operate effectively in wet conditions**—the more moisture in the atmosphere, the more water particles absorbs the laser’s energy.
 - Iron Beam **requires a direct line of sight** between the system and its target, making its placement far more critical.
 - It also has a **much slower rate of fire**, requiring five seconds or so to transmit sufficient energy to destroy its target.
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KEY FACTS ABOUT AMAZON RIVER

The Amazon River fell to its lowest level in over a century recently.



About the Amazon River:

- It is the **world's largest river by water volume and width**.
 - It is the **second-longest river in the world after the Nile**.
 - **Course:**
 - Its journey **begins high in the Andes Mountains**.
 - The river **then makes its way east through** thousands of miles of rainforests and **lowlands** until it empties into the Atlantic Ocean on the northeastern coast of Brazil.
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- **Length: 6,400 km**
- **Width:** During the dry season, the width of the Amazon River can be 4 km to 5 km in some places – and in the wet season, this can increase to 50 km.
- **Drainage:**
 - It has the **largest drainage area of any river system.**
 - Its **watershed** spans the countries of **Brazil, Peru, Ecuador, Colombia, Venezuela, and Bolivia.**
 - Roughly **two-thirds of the Amazon's main stream** and by far the largest portion of its basin are within **Brazil.**
- **Water Discharge:**
 - The Amazon releases high amounts of freshwater into the **Atlantic Ocean at 300,000 m³ per second.**
 - It accounts for **one-fifth of the total volume of freshwater entering the oceans globally.**
- **Tributaries:**
 - It has **more than 1,100 tributaries,** of which **seventeen measures over 1,500-kilometers long.**
 - Notable tributaries include the **Rio Negro, the Madeira River, and the Xingu River,** among many others.
- The **Amazon Rainforest,** which represents about **half of the Earth's remaining rainforest,** also constitutes its **single largest reserve of biological resources.**
- It is sometimes **referred to as the "lungs of the Earth"** due to its role in regulating the planet's oxygen and carbon cycles.

WHAT IS NIOBIUM?

The Union Cabinet recently approved royalty rates in respect of three critical and strategic minerals, namely, lithium, niobium, and Rare Earth Elements.



About Niobium:

- It is a rare, soft, malleable, ductile, gray-white metal.
- Atomic symbol: Nb

- It has a **body-centered cubic crystalline structure**.
- It **must be placed in a protective atmosphere** when processed at even moderate temperatures because it **tends to react with oxygen, carbon, the halogens, nitrogen, and sulphur**.
- **Melting point: 2,477 degrees Celsius**
- **Boiling point: 4,744 degrees Celsius**
- **In air, an oxide layer forms over it, whose colour depends on its thickness. Shades of blue, green, and yellow are typical.**
- **Niobium resists corrosion** due to the oxide film.
- The metal **starts to oxidise rapidly in the air at 200 degrees Celsius**.
- The metal is **inert to acids**, even to aqua regia at room temperature, **but is attacked by hot, concentrated acids**, and especially by alkalis and oxidizing agents.
- It is **one of the five major refractory metals** (metals with very high resistance to heat and wear).
- It has the property of becoming **superconducting at low temperatures**.

Sources:

- It is **not found free in nature** but **in minerals such as columbite and tantalite**.
- Commercially, niobium is **extracted by first forming the oxide (Nb_2O_5)**. The oxide is then **reduced using carbon or hydrogen**.
- **Major Producers: Brazil** is the world's largest supplier, with **Canada a distant second**.

Applications:

- It is used for the **production of high-temperature-resistant alloys and special stainless steels**.
- It is also used in its pure form to **make superconducting accelerating structures for particle accelerators**.
- Niobium alloys are **used in surgical implants** because they do not react with human tissue.
- **Niobium carbide is used in cutting tools**.
- **Niobium-tin and niobium-titanium alloys are used as wires for superconducting magnets capable of producing exceedingly strong magnetic fields**.

AFTER 40 YEARS, INDIA SRI LANKA FERRY SERVICES RESTARTED

Why in News?

- An age-old sea route between India and Sri Lanka has been rejuvenated with the inauguration of a passenger ferry service - a High Speed Craft, named ‘Cheriyapani’, from Nagapattinam (TN) to Kankesanthurai in Jaffna, Northern Sri Lanka.
- The initiative is aimed at bolstering bilateral ties, boosting tourism, increasing people-to-people relations and is expected to benefit local traders on both shores.

Maritime Linkage Between India and Sri Lanka:

- **The Indo-Ceylon Express or Boat Mail** - a train - ran between Chennai and Colombo via the Thoothukudi port from the early 1900s up until 1982.
 - Passengers from Chennai would get onto the train and then transfer to a coal-powered steam ferry in Dhanushkodi, which would take them to Talaimannar in roughly two hours.
 - However, **the civil war in Sri Lanka** resulted in the halting of these services.
- **The resumption of ferry services** has been on the cards for quite some time, especially after the war ended in 2009.
- **A MoU concerning passenger transportation** by sea was signed in 2011 and a similar service was launched.
 - However, it did not last for more than six months due to poor response.
- Attempts were also made to establish services from Rameswaram to Talaimannar and Karaikal to Kankesanthurai. Various challenges kept these proposals from materialising.

Potential Impact of the New Service:

- By providing a transportation option, the ferry **can amplify religious tourism** in the coastal regions of both countries.
- From India, **travellers can access significant religious sites in Colombo** and the southern parts of Sri Lanka.

- **Indian pilgrim centres** such as Nagapattinam, Nagore, Velankanni, Thirunallar, and temple towns such as Thanjavur, Madurai, and Tiruchi are expected to see an influx of Lankan tourists.
- Beyond religious tourism, the services would **boost regional commerce and trade**.
- Anticipating the influx of travellers, the state government of Tamil Nadu is **ramping up infrastructural developments**.
 - **For example**, the Nagapattinam port, under the Tamil Nadu Maritime Board, was upgraded recently with funds worth Rs 8 crore from the Union Ministry of External Affairs.
- Launching the service, the Indian PM said that connectivity is not only about bringing two cities closer but also **brings two countries, its people closer**.
- Sri Lankan President called the revival of the ferry service **an important step towards strengthening connectivity between India and Sri Lanka**.

Operational Challenges:

- The Shipping Corporation of India's (SCI) initial plan to run services every day for 10 days has been rescheduled to operate thrice a week.
- While the onset of the northeast monsoon is one of the reasons being cited, sources at Nagapattinam port said the **ticket fare** (~Rs 7,670) and **poor ticketing systems** are also a challenge.
- Therefore, the ticket rates should be reduced and booking should be made available on popular travel sites if the service is meant to succeed.

[THE INDIAN HIMALAYAN REGION NEEDS ITS OWN EIA](#)

Context

- Recent Teesta dam breach in Sikkim and floods and landslides in Himachal Pradesh are a stark reminder of the havoc **India's development model is wreaking on environment and ecology especially in the mountains**.
- Therefore, it is imperative to **assess the worthiness of any significant human endeavour in terms of its impact on the environment**.

Environment Impact Assessment (EIA) And Its Basis

- **Environment Impact Assessment (EIA)**
 - This is a process defined by the UN Environment Programme (UNEP) as a tool to **identify the environmental, social, and economic impacts of a project before it is implemented.**
 - This tool compares various **alternatives for the proposed project, predicts and analyses all possible environmental repercussions** in various scenarios.
 - The EIA also helps decide appropriate mitigation strategies.
- **Basis of an EIA**
 - The EIA process would need comprehensive, reliable data and would deliver results only if it is designed to seek the most appropriate, relevant, and reliable information regarding the project.
 - Hence, **the base line data based on which future likely impacts are being predicted are very crucial.**

Conclusion

- The increasing frequency with which the Himalayan States are witnessing devastation every year after extreme weather conditions shows that **the region is already paying a heavy price for this indifference.**
- If used diligently, **the EIA could be the most potent regulatory tool in the arsenal of environmental governance to further the vision of sustainable development in the country.**

BRIGHT TRANSIENT SURVEY BOT (BTSBOT)

For the first time, artificial intelligence (AI) completely automated the process of detecting a supernova with no human intervention.



About the Bright Transient Survey Bot:

- It is a **machine-learning algorithm** which has been trained by using over 1.4 million images from nearly 16,000 sources.
- It detected the newly **discovered supernova named SN2023tyk** in data from the Zwicky Transient Facility (ZTF)

How does it work?

- It automatically requested the potential supernova's spectrum from Palomar Observatory, where another robotic telescope, the Spectral Energy Distribution Machine (SEDM), performed an in-depth observation to obtain the source's spectrum.
- This new system not only allows automation of the entire search for new supernovae across the night sky but also **eliminates human error and dramatically increases speed.**
- It searched, detected, confirmed, classified, and announced the findings without any human intervention

What is artificial intelligence?

- Artificial intelligence (AI) refers to the **simulation or approximation of human intelligence in machines.**
- The goals of artificial intelligence include computer-enhanced learning, reasoning, and perception.
- AI is being used today across different industries, from finance to healthcare.

CLARIFICATION OF CBDT ON ANGEL TAX FOR START-UPS

Why in news?

- Amid notices being sent to start-ups, the Central Board of Direct Taxes (CBDT) has stepped in.
- It has directed its officers to not carry out scrutiny of angel tax provisions for start-ups **recognised** by the Department for Promotion of Industry and Internal Trade (DPIIT).

What is Angel Tax?

- Angel Tax is a term basically used to refer to the income tax payable on the capital raised by unlisted companies via the issue of shares through off-market transactions.
- This tax is levied on the capital raised via the issue of shares by unlisted companies from an **Indian investor/ foreign investors from certain countries** if the share price of issued shares is seen in excess of the fair market value of the company.

- The excess realization is considered as income and therefore, taxed accordingly.
- E.g., If the fair market value of a start-up share is Rs 10 apiece, and in a subsequent funding round they offer it to an investor for Rs 20, then the difference of Rs 10 would be taxed as income.
- Angel tax gets its name from the wealthy individuals (“angels”) who invest heavily in risky, unproven business ventures and start-ups, in the initial stages when they are yet to be recognised widely.

What is the rationale behind introducing Angel Tax?

- Rule related to Angel Tax is described in Section 56(2) (viib) of the Income Tax Act, 1961.
 - This clause was inserted into the act in 2012 to prevent laundering of black money, round-tripping via investments with a large premium into unlisted companies.
 - **Rate of tax**
 - Currently, angel tax is levied at the rate of 30.6 per cent.
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