



## CAATSA

**For Prelims:** CAATSA, S-400 Missile System.

**For Mains:** Implications of CAATSA Waiver for India, US-India relations, Russia-India relations.

### Why in News?

Recently, the United States (US) House of Representatives has approved an amendment to the **National Defence Authorization Act (NDAA)**, proposing India-specific waiver under the [Countering America's Adversaries Through Sanctions Act \(CAATSA\)](#).

- It will **allow India to freely purchase [Russia's S-400 missile system](#)** without the fear of American sanctions.
- The National Defense Authorization Act (NDAA) is legislation that Congress passes each year to make changes to the policies and organization of United States defense agencies and provide guidance on how military funding can be spent.

### What is the Proposed Amendment?

- The amendment urges the US administration to use its authority to provide India with a Countering America's Adversaries Through Sanctions Act (CAATSA) waiver to help deter aggressors like China.
- The legislation says that the **United States-India Initiative on Critical and Emerging Technologies (ICET)** is a welcome and essential step to developing closer partnerships between governments, academia, and industry in the two countries to address the latest advances in artificial intelligence, quantum computing, biotechnology, aerospace, and semiconductor manufacturing.

### What is CAATSA?

- **About:**
  - **US Law:**
    - CAATSA is a law that **came into effect in the US in 2017**, and was **meant to punish countries having deep engagements with Russia, North Korea, and Iran** using economic sanctions.
    - **Title II of the Act primarily deals with sanctions on Russian interests** such as its oil and gas industry, defence and security sector, and financial institutions, in the backdrop of its [military intervention in Ukraine](#) and its alleged meddling in the 2016 US Presidential elections.
    - Section 231 of the Act **empowers the US President to impose at least five of the 12 listed sanctions** — enumerated in Section 235 of the Act — on persons engaged in a "significant transaction" with Russian defence and intelligence sectors.
      - As part of Section 231 of the Act, the US State Department has notified 39 Russian entities, dealings with which could make third parties liable to sanctions.

- **Sanctions that can Impact India:** There are only **two sanctions** that may impact either India-Russia relations or India-US relations.
  - **Prohibition of Banking transactions:** The first of these, which is likely to have an impact on India-Russia relations, is the **“Prohibition of Banking transactions”**.
    - This would mean difficulties for India in making payments in US Dollars to Russia for the purchase of the S-400 systems. It will also affect India’s purchase of spare parts, components, raw materials and other assistance.
      - In 2020, **Turkey was sanctioned** for its purchase of the S-400 system.
  - **Export Sanction:** The sanction will have greater consequences for India-US relations.
    - This is the “export sanction” which has the potential to completely derail the **India-US Strategic and Defence partnership**, as it will deny the license for, and export of, any items controlled by the US.
- **Waiver Criteria:**
  - The US President was **given the authority in 2018 to waive CAATSA sanctions on a case-by-case basis.**

## What is Russia’s S-400 Missile System?

- **About:**
  - It is a mobile, **Surface-to-Air Missile system (SAM)** designed by Russia.
  - It is the **most dangerous operationally deployed Modern Long-Range SAM (MLR SAM)** in the world, considered much ahead of the **US-developed Terminal High Altitude Area Defence system (THAAD)**.
  - It integrates a multifunction radar, autonomous detection and targeting systems, anti-aircraft missile systems, launchers, and command and control centre.
    - It is **capable of firing three types of missiles** to create a layered defence.
  - The system can engage all types of aerial targets including aircraft, **unmanned aerial vehicles (UAV) and ballistic and cruise missiles** within the range of 400km, at an altitude of up to 30km.
  - The system can track 100 airborne targets and engage six of them simultaneously.
- **Significance for India:**
  - From India’s point of view, China is also buying the system. In 2015, China signed an agreement with Russia to purchase six battalions of the system. Its delivery began in January 2018.
  - China’s acquisition of the **S-400 system has been viewed as a “game changer”** in the region. However, its effectiveness against India is limited.
  - India’s acquisition is crucial to counter attacks in a **two-front war**, including even high-end F-35 US fighter aircraft.

## What are the implications of CAATSA Waiver on India-US Relations?

- The NDAA amendment also urged the US to take more steps **to assist India’s pivot away from its reliance on Russia-made arms.**
- The amendment is **in sync with the tenor of the recent bilateral strategic relations.**
  - The watershed year was 2008 and since then cumulative US defence contracts with India add up to at least USD 20 billion. It was just USD 500 million in the period prior to 2008.
  - Furthermore, in 2016, the **US recognised India as a major defence partner.** Strategic ties have also been strengthened through groupings such as **Quad** and now **I2U2**.
- For India, a **transition away from Russian platforms is in its strategic interests.**
  - Russia’s dependence on China has increased significantly following its invasion of Ukraine, a situation that’s unlikely to change in future.
  - Already, China is next only to India as the second largest recipient of Russia’s arms exports.

- Given the unravelling of India's longstanding border management protocols with China, dependence on Russian arms platforms is unwise.

[Source: IE](#)

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## Build - Operate - Transfer Model

**For Prelims:** Models of Investment, NHAI, Public Private Partnership

**For Mains:** Different models on investment, Significance and challenges in Public Private Partnership, Role of models of investment in building infrastructure

### Why in News?

[National Highway Authority of India \(NHAI\)](#) plans to offer at least two highway upgradation projects to private players using the **build-operate-transfer (BOT)** model under **Public-Private Partnership**, during the third quarter of 2022.

### What do we know about the Build-Operate-Transfer (BOT) Model?

#### ▪ About:

- Under the BOT model, a **private player is granted a concession** to finance, build and operate a project for a **specified period of time** (20 or 30 year concession period), with the **developer recouping the investments by way of user charges or tolls charged** from customers using the facility, and thereby taking on a certain amount of financial risk.
- It is a conventional **Public-Private Partnership** model in which a private partner is responsible to **design, build, operate** (during the contracted period) and **transfer back** the facility to the public sector.
  - Private sector partner has to **bring the finance for the project and take the responsibility** to construct and maintain it.
- The government has decided to assess the revenue potential of a project **every five years during the concession period as against every 10 years earlier**.
  - This would mean that the concession period (or period till which road developers can collect toll) is extended early in the tenure of the contract, **ensuring surety of revenue for the private company**.

#### ▪ Working Process:

- **Build:**
  - A private company (or consortium) **agrees with a government to invest in a public infrastructure project**. The company then secures their own financing to construct the project.
- **Operate:**
  - The private developer then **operates, maintains, and manages** the facility for an agreed concession period and recoups their investment through charges or tolls.
- **Transfer:**
  - After the concessionary period the **company transfers ownership** and operation of the facility to the government or relevant state authority.

### What are the Advantages & Challenges in BoT Model?

#### ▪ Advantages:

- The Government gets the benefit of the **private sector to mobilize finance** and to use the **best management skills** in the construction, operation and maintenance of the project.
- The private participation also ensures **efficiency and quality by using the best equipment.**
- BOT provides a mechanism and incentives for enterprises to **improve efficiency through performance-based contracts and output-oriented targets.**
- The projects are **conducted in a fully competitive bidding situation and are thus completed at the lowest possible cost.**
- The risks of the project are **shared by the private sector.**
- **Challenges:**
  - There is a **profit element in the equity portion of the financing,** which is **higher** than the debt cost. This is the price paid for passing the risk to the private sector.
  - It may take a **long time and considerable up front expenses to prepare and close a BOT financing deal** as it involves multiple entities and requires a relatively complicated legal and institutional framework. There the BOT may not be suitable for small projects.
  - It may take time to **develop the necessary institutional capacity to ensure that the full benefits of BOT are realized,** such as **development and enforcement of transparent and fair bidding and evaluation** procedures and the resolution of potential disputes during implementation.

## What do we mean by Public-Private Partnership?

- **About:**
  - PPP is an **arrangement between government and private sector** for the provision of **public assets and/or public services.**
  - Public-private partnerships allow **large-scale government projects,** such as roads, bridges, or hospitals, to be completed with private funding.
  - In this type of partnership, **investments are undertaken by the private sector entity,** for a specified period of time.
  - These partnerships **work well when private sector technology and innovation combine with public sector incentives** to complete work on time and within budget.
  - As PPP involves **full retention of responsibility by the government for providing the services,** it doesn't amount to privatization.
  - There is a well defined **allocation of risk between the private sector and the public entity.**
- **Challenges:**
  - PPP projects have been **stuck in issues such as disputes in existing contracts, non-availability of capital and regulatory hurdles** related to the acquisition of land.
  - Metro projects become sites of **crony capitalism** and a means for **accumulating land by private companies.**
  - Loans for infrastructure projects are believed to comprise a large share of the **non-performing asset** portfolio of public sector banks in India.
  - PPP firms use **every opportunity for renegotiating contracts** by citing reasons like lower revenue or rise in costs which becomes a norm in India.
  - Frequent renegotiations also resulted in the **drain of a larger share of public resources.**

## What are some other Models of PPP?

<b>Engineering, Procurement, and Construction (EPC)</b>	<ul style="list-style-type: none"> <li>▪ Under this model, the cost is completely borne by the government. Government invites the private players. Procurement of raw material and construction costs are met by the government.</li> </ul>
<b>Hybrid Annuity Model (HAM)</b>	<ul style="list-style-type: none"> <li>▪ In India, the new HAM is a mix of BOT-Annuity and EPC models. As per the design, the project cost in the first five years through annual payments (annuity). The remainder is paid by the government.</li> </ul>

	of the assets created and the performance of the developer.
<b>Build-Own-Operate (BOO)</b>	<ul style="list-style-type: none"> <li>▪ In this model ownership of the newly built facility will rest with the private party.</li> <li>▪ On mutually agreed terms and conditions, public sector partner agrees to 'purchase' the project.</li> </ul>
<b>Build-Own-Operate-Transfer (BOOT)</b>	<ul style="list-style-type: none"> <li>▪ In this variant of BOT, after the negotiated period of time, the project is transferred to operator.</li> <li>▪ BOOT model is used for the development of highways and ports.</li> </ul>
<b>Build-Own-Lease-Transfer (BOLT)</b>	<ul style="list-style-type: none"> <li>▪ In this approach, the government gives a concession to a private entity to build a facility, own the facility, lease the facility to the public sector and then at the end of the lease transfer the facility to the government.</li> </ul>
<b>Design-Build-Finance-Operate (DBFO)</b>	<ul style="list-style-type: none"> <li>▪ In this model, the entire responsibility for the design, construction, finance, and operation concession lies with the private party.</li> </ul>
<b>Lease-Develop-Operate (LDO)</b>	<ul style="list-style-type: none"> <li>▪ In this type of investment model either the government or the public sector entity retains the infrastructure facility and receives payments in terms of a lease agreement with the private party in the development of airport facilities.</li> </ul>

[Source: IE](#)

## Pradhan Mantri Fasal Bima Yojana (PMFBY)

**For Prelims:** Pradhan Mantri Fasal Bima Yojana (PMFBY), Zero Premium, Subsidies, Crop Insurance

**For Mains:** Pradhan Mantri Fasal Bima Yojana, Government Policies & Interventions

### Why in News?

Recently, after opting out in 2019-20, the Andhra Pradesh government has returned to the crop insurance scheme [Pradhan Mantri Fasal Bima Yojana \(PMFBY\)](#).

### What is Pradhan Mantri Fasal Bima Yojana?

- **About:**
  - Launched in 2016 and is being **administered by the Ministry of Agriculture and Farmers Welfare**.
  - It replaced the **National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS)**.
- **Eligibility:**
  - Farmers including **sharecroppers and tenant farmers** growing notified crops in the

notified areas are eligible for coverage.

▪ **Objectives:**

- To provide **insurance coverage and financial support to the farmers in the event of failure** of any of the notified crops as a result of natural calamities, pests & diseases.
- To **stabilize the income of farmers** to ensure their continuance in farming.
- To encourage farmers to adopt innovative and modern agricultural practices.
- To ensure the flow of credit to the agriculture sector.

▪ **Premium:**

- There will be a **uniform premium of only 2% to be paid by farmers** for all Kharif crops and 1.5% for all Rabi crops.
- In the case of **annual commercial and horticultural crops**, the premium to be paid by farmers will be only 5%.
- The premium rates to be paid by farmers are very low and the balance premium will be paid by the Government to provide full insured amount to the farmers against crop loss on account of natural calamities.
- **There is no upper limit on Government subsidies. Even if the balance premium is 90%, it will be borne by the Government.**
  - Earlier, there was a **provision of capping the premium rate** which resulted in low claims being paid to farmers.
  - This capping was done to **limit Government's outgo on the premium subsidy.**
  - This capping has now been removed and farmers will get a claim against the full sum insured without any reduction.

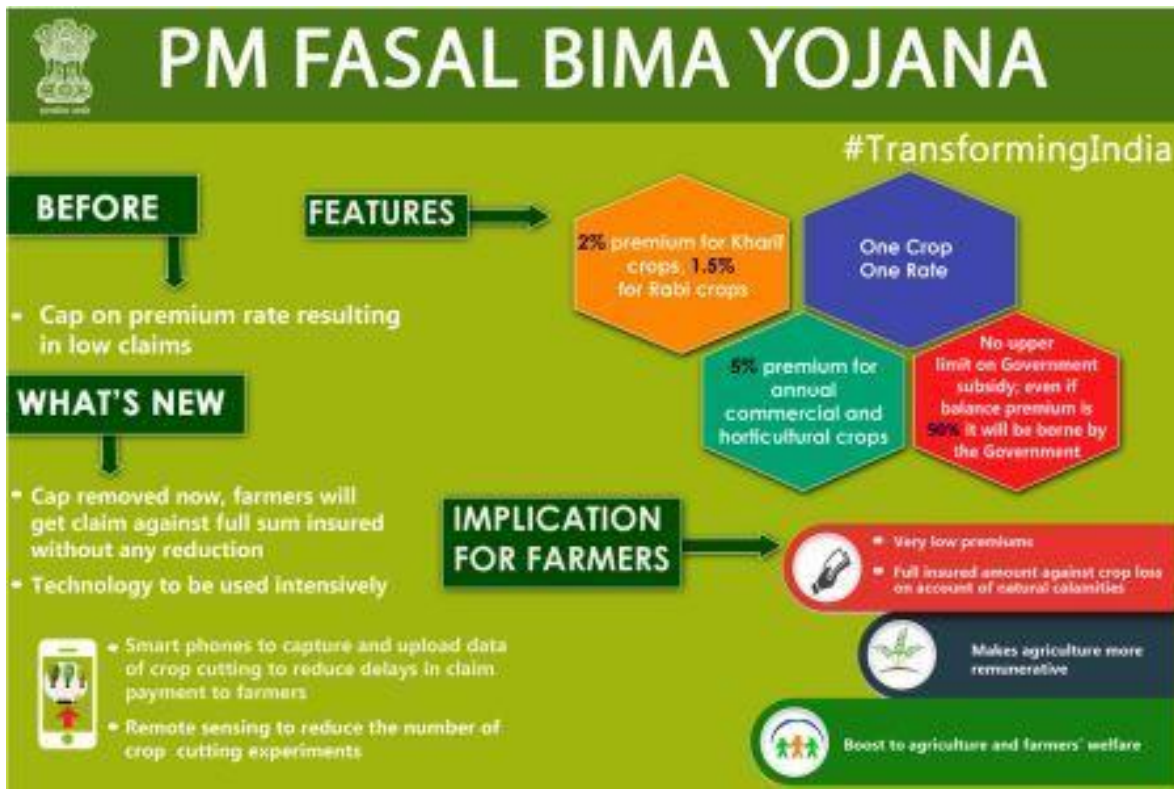
▪ **Use of Technology:**

- **Crop Insurance App:**
  - Provides for easy enrollment of farmers.
  - Facilitate easier reporting of crop loss within 72 hours of occurrence of any event.
- **Latest Technological Tools:** To assess crop losses, satellite imagery, remote-sensing technology, drones, artificial intelligence and machine learning are used.
- **PMFBY Portal:** For integration of land records.

▪ **Recent Changes:**

- The scheme was once **mandatory for loanee farmers**, but 2020, the Centre changed it to make it optional for all farmers.
  - Earlier the rate of average premium subsidy including the difference between the actuarial premium rate and the rate of the insurance premium payable by the farmer was shared by the state and center, further states and UTs were free to extend additional subsidies over and above the average subsidy from their budgets.
- The Centre decided in February 2020 to **limit its premium subsidy to 30% for unirrigated areas and 25% for irrigated ones** (from the existing unlimited). Previously, the central subsidy had no upper limit.





## What were the Issues Related to the Scheme?

- **Financial Constraints of States:** The financial constraints of the state governments and low claim ratio during normal seasons are the major reasons for non-implementation of the Scheme by these States.
  - States are **unable to deal with a situation** where insurance companies compensate farmers less than the premium they have collected from them and the Centre.
  - The State governments **failed to release funds on time** leading to delays in releasing insurance compensation.
  - This defeats the very purpose of the scheme which is to provide timely financial assistance to the farming community.
- **Claim Settlement Issues:** Many farmers are dissatisfied with both the level of compensation and delays in settlement.
  - The role and power of Insurance companies is significant. In many cases, **it didn't investigate losses** due to a localised calamity and, therefore, did not pay the claims.
- **Implementation Issues:** Insurance companies **have shown no interest in bidding** for clusters that are prone to crop loss.
  - Further, it is in the nature of the insurance business for entities to make money when crop failures are low and vice-versa.

## Way Forward

- There is a need for comprehensive rethinking among states and the central governments to further resolve all the pending issues around the scheme so that the farmers could get benefit from this scheme.
- Further, rather than paying subsidies under this scheme, **the state government should invest that money in a new insurance model.**

## UPSC Civil Services Examination Previous Year Question (PYQ)

Q. With reference to 'Pradhan Mantri Fasal Bima Yojana', consider the following statements: (2016)

1. Under this scheme, farmers will have to pay a uniform premium of two percent for any crop they cultivate in any season of the year.
2. This scheme covers post-harvest losses arising out of cyclones and unseasonal rains.

**Which of the statements given above is/are correct?**

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**ANS: (b)**

**Exp:**

- **Pradhan Mantri Fasal Bima Yojana is a crop insurance scheme launched by the Union Government.** It covers pre-harvest and post-harvest losses arising out of natural calamities (cyclones and unseasonal rains), pests, and diseases. Hence, statement 2 is correct.
- **Key Features**
  - Uniform premium of only 2% to be paid by farmers for all Kharif crops and 1.5% for all Rabi crops. Hence, statement 1 is not correct.
  - A premium of 5% is to be paid for annual commercial and horticultural crops.
  - The premium rates to be paid by farmers are very low and the balance premium will be paid by the Government.
  - There is no upper limit on Government subsidies. Even if the balance premium is 90%, it will be borne by the Government.
  - Capping on the premium has now been removed and farmers will get a claim against the full sum insured without any reduction.
  - The use of technology is encouraged to a great extent. Smartphones will be used to capture and upload data of crop cutting to reduce the delays in claim payments to farmers. Remote sensing will be used to reduce the number of crop-cutting experiments. Therefore, option (b) is the correct answer.

**Source: IE**

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## Tropical Ozone Hole

**For Prelims:** Ozone Layer, Layers of Atmosphere, Ozone Layer Depletion, Greenhouse Gases, Good Ozone, Bad Ozone, Initiatives to tackle Depletion

**For Mains:** Fundamentals of Atmosphere, Science behind Ozone Layer Depletion, Effects of ozone layer depletion, Related Initiatives

## Why in News?

According to a recent study, a new [ozone](#) hole has been detected over the tropics, at latitudes of 30 degrees South to 30 degrees North.



## What has the Study Revealed?

- The tropical ozone hole is about **seven times larger than [Antarctica](#)**.
  - **It also appears across all seasons**, unlike that of Antarctica, which is visible only in the spring.
- The tropical ozone hole, **which makes up 50% of Earth's surface**, could cause a **global concern** due to the risks associated with it.
  - It is likely to cause **skin cancer, cataracts and other negative effects** on the health and ecosystems in tropical regions.

## What do we know about Ozone Layer?

- **About:**
  - It is a special form of oxygen with the chemical formula O<sub>3</sub>.
    - The oxygen we breathe and that is so vital to life on earth is O<sub>2</sub>.
  - **Most ozone resides high up in the atmosphere**, between 10 and 40 km above Earth's surface. This region is called the **stratosphere** and it contains about 90% of all the ozone in the atmosphere.
- **Classification:**
  - **Good Ozone:**
    - **Ozone occurs naturally** in the Earth's upper atmosphere (Stratosphere) where it forms a **protective layer** that shields us from the sun's harmful ultraviolet rays.
    - This "good" ozone is gradually being destroyed by man-made chemicals referred to as **[Ozone-Depleting Substances \(ODS\)](#)**, including **chlorofluorocarbons (CFCs)**, **[hydrochlorofluorocarbons \(HCFCs\)](#)**, **halons, methyl bromide, carbon tetrachloride, and methyl chloroform.**
  - **Bad Ozone:**
    - In the Earth's lower atmosphere (troposphere) near ground level, ozone is formed when **pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources react chemically in the presence of sunlight.**
    - Surface level ozone is a harmful air pollutant.



## Why do we know about Ozone Layer Depletion?

- **About:**
  - **[Ozone Layer Depletion](#)** refers to chemical destruction of the stratospheric ozone layer

beyond natural reactions.

- Stratospheric Ozone is constantly being created and destroyed through natural cycles.
  - Various **Ozone Depleting Substances (ODS)**, however, **accelerate** the destruction process, resulting in lower than normal ozone levels.
  - ODSs include **chlorofluorocarbons (CFCs), bromine-containing halons and methyl bromide, HCFCs, carbon tetrachloride (CCl<sub>4</sub>), and methyl chloroform.**
  - These substances were formerly used and sometimes still are used in **coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants.**
    - Once released into the air these ozone-depleting substances **degrade very slowly.**
    - In fact, they can **remain intact for years** as they move through the troposphere until they reach the stratosphere.
    - There they are **broken down by the intensity of the sun's UV** rays and release **chlorine and bromine molecules**, which destroy the stratospheric ozone.
- **Effects of Depletion:**
  - **On Human Health:**
    - It increases the amount of **UV that reaches the Earth's surface.**
      - **UV** causes non-melanoma skin cancer and plays a major role in malignant melanoma development.
      - In addition, UV has been linked to the development of **cataracts**, a clouding of the eye's lens.
  - **On Plants:**
    - UV radiation affects the **physiological and developmental processes of plants.** Despite mechanisms to reduce or repair these effects, plant growth can be directly affected by UV radiation.
    - Indirect changes caused by UV (**such as changes in plant form, how nutrients are distributed within the plant, timing of developmental phases and secondary metabolism**) may be equally or sometimes more important than damaging effects of UV.
  - **On Marine Ecosystem:**
    - **Phytoplankton** form the foundation of **aquatic food webs.** Phytoplankton productivity is limited to the **euphotic zone**, the upper layer of the water column in which there is sufficient sunlight to support net productivity.
      - Exposure to solar UV radiation has been shown to affect both **orientation and motility in phytoplankton**, resulting in reduced survival rates for these organisms.
  - **On Biogeochemical Cycles:**
    - Increases in UV radiation could affect **terrestrial and aquatic biogeochemical cycles**, thus altering both sources and sinks of **greenhouse and chemically important trace gases** (e.g., carbon dioxide, carbon monoxide, carbonyl sulfide, ozone, and possibly other gases).
  - **On Materials:**
    - **Synthetic polymers**, naturally occurring biopolymers, as well as some other materials of commercial interest are adversely affected by UV radiation.
      - Increases in UV levels will accelerate their breakdown, limiting the length of time for which they are useful outdoors.

## What are the Initiatives for Tackling Ozone Layer Depletion?

- **Vienna Convention:**
  - [The 1985 Vienna Convention for the Protection of the Ozone Layer](#) was an international agreement in which **United Nations members recognized the fundamental importance of preventing damage to the stratospheric ozone layer.**
  - India became a Party to the Vienna Convention for the Protection of the Ozone Layer on 18<sup>th</sup> March 1991.
- **Montreal Protocol:**

- **The 1987 Montreal Protocol** on Substances that deplete the Ozone Layer and its succeeding amendments were subsequently negotiated to control the consumption and production of **anthropogenic (ODSs) and some hydrofluorocarbons (HFCs)**.
- India became Party to the Montreal Protocol on substances that deplete the Ozone layer on 19<sup>th</sup> June 1992.
- **Kigali Amendment:**
  - The adoption of the **2016 Kigali Amendment to the Montreal Protocol will phase down the production and consumption of some HFCs** and avoid much of the projected global increase and associated climate change.
- **EU Regulation:**
  - EU legislation on ozone-depleting substances is **among the strictest and most advanced in the world**. Through a series of regulations, the EU has not only implemented the Montreal Protocol but has often phased out dangerous substances faster than required.
  - **The EU Ozone Regulation** sets licensing requirements for all exports and imports of ozone-depleting substances and regulates and monitors not only substances covered by the Montreal Protocol (over 90 chemicals), but also some that are not covered (five additional chemicals called 'new substances').
- **India's regulations for safe use of hydrocarbons as non-ODS alternatives:**
  - Hydrocarbons including **isobutane and cyclopentane are available as non-ODS alternatives for use in aerosols, foam-blowing and refrigeration sectors**.
  - Safe use of hydrocarbons is regulated by petroleum laws in India.
    - **The Petroleum Act, 1934** and **Petroleum Rules, 1976** relate to handling of a variety of petroleum products.
    - The latter also specifies licensing requirements for handling hydrocarbons.
    - **The Gas Cylinder Rules, 1981**, addresses filling, possession, import and transport of cylinders.

## UPSC Civil Services Examination, Previous Year Questions (PYQs)

**Q. Which one of the following is associated with the issue of control and phasing out of the use of ozone depleting substances? (2015)**

- (a) Bretton Woods Conference
- (b) Montreal Protocol
- (c) Kyoto Protocol
- (d) Nagoya Protocol

**Ans: (b)**

**Exp:**

- **The Bretton Woods Conference**, officially known as the United Nations Monetary and Financial Conference was a gathering of delegates from 44 nations that met in 1944 in Bretton Woods (USA) to agree upon a series of new rules for the post-World War-II international monetary system.
- The two major accomplishments of the conference were the creation of the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD).
- **The Montreal Protocol** is an international environmental agreement to protect the earth's ozone layer by eliminating the use of ozone depleting substances. Adopted on 15th September 1987, the protocol is to date the only UN treaty that ever has been ratified by every country on Earth – all 197 UN member states.
- **The Kyoto Protocol** is an international agreement linked to the UNFCCC, which commits its Parties by setting internationally binding GHGs (Greenhouse Gases) emission reduction targets.
  - The Kyoto Protocol was adopted in Kyoto, Japan on 11th December 1997 and entered into force on 16th February 2005.
  - The detailed rules for the implementation of the protocol were adopted as CoP7 in Marrakesh, Morocco in 2001 and referred as the Marrakesh Accord.
  - India has ratified the second commitment period (2008-2012) of the Kyoto protocol, that commits countries to contain emissions of greenhouse gases, reaffirming its stand on

climate action.

- **The Nagoya Protocol** on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization provides a transparent legal framework for the effective implementation of one of the three objectives of the Convention on Biological Diversity: the fair and equitable sharing of benefits arising out of the utilization of genetic resources, to promote sustainable use of biological diversity. India signed the protocol in 2011.
- **Therefore, option (b) is the correct answer.**

[Source: DTE](#)

## Y - 3023 Dunagiri

### Why in News?

Recently, the Defence Minister of India launched **Y- 3023 Dunagiri**, a [Project 17A](#) frigate built by **Garden Reach Shipbuilders Limited (GRSE)** in Kolkata.

### What do we know about Y-3023?

- **'Dunagiri'** is the **fourth ship of Project 17A Frigates**.
- It is named after a **mountain range in the state of Uttarakhand**.
- **'Dunagiri'** is the reincarnation of the erstwhile 'Dunagiri', the **Leander Class ASW Frigate**, which in her 33 years of service had witnessed various challenging operations and multinational exercises.



### What do we know about Project 17A Frigates?

- **About:**

- Project 17A frigates are **follow-on of the P17 Frigates (Shivalik Class)** with improved stealth features, advanced weapons and sensors and platform management systems.
- There will be **seven frigates built under P-17 A for the Indian Navy** which will be equipped with advanced stealth capability, four at Mazagon Dock Shipbuilders (MDL), Mumbai and three at Garden Reach Ship Builders Limited (GRSE), Kolkata.
- **Features:**
  - The main **advanced stealth features** of P-17A pertain to the **smaller Radar cross-section** of the ship achieved through the use of a special super structure shape which reduces radar wave reflections.
  - The P17A frigates incorporate new design concepts for **improved survivability, sea keeping, stealth and ship manoeuvrability.**
  - Another important feature is regarding the ship's **low acoustic noise emanating from propellers, operating machinery like Diesel Generators etc.**, which helps sonars on other ships to detect its presence.
    - Such stealth features play an important role in improving the ship's survivability in any hostile environment during operations.
- **Weapon Systems onboard:**
  - The main weapon and sensor suite of P-17A ships indicated are **BrahMos SSM, LRSAM (Forward & Aft configuration) with MF STAR radar, indigenous Sonar, and Triple tube Heavy Torpedo launcher.**
  - **The first three ships under Project 17A were:**
    - [INS Nilgiri](#)
    - INS Himgiri
    - [INS Udaygiri](#)

[Source: PIB](#)

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## Sodium-Ion Battery

### Why in News?

Recently, University of Houston (US) scientists developed an electrolyte that contributes significantly to making sodium ion batteries more commercially viable.

- Sodium-based battery technology might soon be a viable alternative to lithium-based ones.

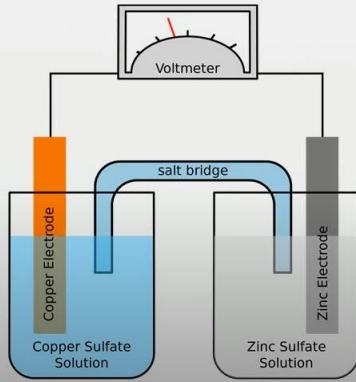
### What are the Key highlights of the Study?

- The study concluded that with the help of the novel electrolyte, ambient temperature solid-state sodium-sulfur battery technology can be **employed for grid-level energy storage systems.**
- The novel structural and compositional design methodologies establish a new paradigm for the creation of safe, low-cost, energy-dense, long-life solid-state sodium batteries.

### What is Sodium Ion Battery?

- They are rechargeable batteries which require **sodium ion movement between electrodes** during the charging and discharging of the battery, **the cathode for these batteries is manufactured from sodium.**

# Sodium-ion battery



## What are the issues with Lithium-Ion?

- **Lithium-Ion** extraction led to environment harming mining practices.
- **It releases harmful chemicals** which further spill into the rivers and its ecosystem.
- **Non reusable** as its recycling process is very expensive.

## What are the Benefits of Sodium-Ion?

- It's **cheaper to produce** than their lithium counterparts because of the **abundance of the raw materials** required to make them.
- They are energy dense, non-flammable, and operate well in colder temperatures.
- Further they can store more energy per unit weight, this could make them well-suited for larger applications such as electric vehicles.
- They are less likely to experience thermal runaway, a condition that can cause fires in lithium-ion batteries.

[Source: DTE](#)

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## NIRF Rankings 2022

**For Prelims:** Higher Education Institutions, Ministry of Education

**For Mains:** National Institutional Ranking Framework, Government Policies & Interventions

## Why in News?

Recently, the Ministry of Education has released **7<sup>th</sup> Edition of [National Institutional Ranking Framework \(NIRF\) Rankings 2022](#)**.

## What is the National Institutional Ranking Framework?

- **Launch:** The National Institutional Ranking Framework (NIRF) was approved by the Ministry of Education (Erstwhile Ministry of Human Resource Development) in September 2015.
  - It is the first-ever effort by the government to rank **Higher Education Institutions (HEIs)**



in the country.

- Participation in NIRF was made compulsory for all government-run educational institutions in 2018.
- **Assessment on Five Parameters:**
  - Teaching, Learning and Resources (TLR)
  - Research and Professional Practice (RP)
  - Graduation Outcomes (GO)
  - Outreach and Inclusivity (OI)
  - Peer Perception.
- **11 Categories:** Best institutions across **11 categories are listed out** - overall national ranking, universities, engineering, college, medical, management, pharmacy, law, architecture, dental and research.
- **Reason for Launch:** The subjectivity in the ranking methodology developed by [QS World University Rankings](#) and the [Times Higher Education World University Ranking](#) led India to start its own ranking system for Indian HEIs on the line of Shanghai Rankings.
  - The long-term plan of NIRF is to make it an international league table.
- **No. of Participating Institutions in 2022:** More than **7,000 institutes participated** in NIRF Rankings.

## What are the Highlights of the Ranking 2022?

- **Overall:** IIT-Madras, IISc-Bangalore, and IIT-Bombay the country's top three higher education institutions
- **University:** IISc, Bengaluru tops the category.
- **Colleges:** Miranda College retains 1st position amongst colleges for the 6th consecutive year, followed by Hindu College, Delhi and Presidency College Chennai.
- **Research Institution:** IISc, Bengaluru is ranked the best research institution followed by IIT Madras.
- **Engineering:** Among engineering institutions, IIT-Madras remained number one.
- **Management:** Indian Institute of Management (IIM) Ahmedabad was ranked one followed by IIM Bengaluru.
- **Medical:** All India Institute of Medical Sciences, New Delhi occupies the top slot in Medical for the fifth consecutive year.
- **Pharmacy:** Jamia Hamdard tops the list in Pharmacy subject for the fourth consecutive.
- **Architecture:** IIT Roorkee takes the top slot **for the second time** in Architecture subject.
- **Law:** National Law School of India University, Bengaluru retains its first position in Law for the fifth consecutive year.
- **Dental:** Saveetha Institute of Medical and Technical Sciences, Chennai got the 1st Rank.

[Source: IE](#)

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## Great Indian Bustard

### Why in News?

Only four Female [Great Indian Bustards \(GIB\)](#) are left in Gujarat.

- According to a 2018 count, India has fewer than **150 GIBs, of which 122 are in Rajasthan.**





## What is the Great Indian Bustard?

### ▪ About:

- It is the State bird of Rajasthan and is considered **India's most critically endangered bird**.
- It is considered the **flagship grassland species**, representing the health of the grassland ecology.
- Its population is confined **mostly to Rajasthan and Gujarat**. Small populations occur in Maharashtra, Karnataka and Andhra Pradesh.

### ▪ Threats:

- The bird is under constant threats **due to collision/electrocution with power transmission lines**, hunting (still prevalent in Pakistan), habitat loss and alteration as a result of widespread agricultural expansion, etc.

### ▪ Protection Status:

- [International Union for Conservation of Nature Red List](#): Critically Endangered
- [Convention on International Trade in Endangered Species of Wild Fauna and Flora \(CITES\)](#): Appendix I
- [Convention on Migratory Species \(CMS\)](#): Appendix I
- [Wildlife \(Protection\) Act, 1972](#): Schedule 1

### ▪ Measures taken to protect GIB:

- **Species Recovery Programme:**
  - It is kept under the species recovery programme under the [Integrated Development of Wildlife Habitats](#) of the Ministry of Environment, Forests and Climate Change (MoEFCC).
- **National Bustard Recovery Plans:**
  - It is currently being implemented by conservation agencies.
- **Conservation Breeding Facility:**
  - MoEF&CC, Rajasthan government and Wildlife Institute of India (WII) have also established a conservation breeding facility in Desert National Park at Jaisalmer in June 2019.
  - The objective of the programme is to build up a captive population of Great Indian Bustards and to release the chicks in the wild for increasing the population.
- **Project Great Indian Bustard:**
  - It has been launched by the Rajasthan government with an aim of constructing breeding enclosures for the species and developing infrastructure to reduce human

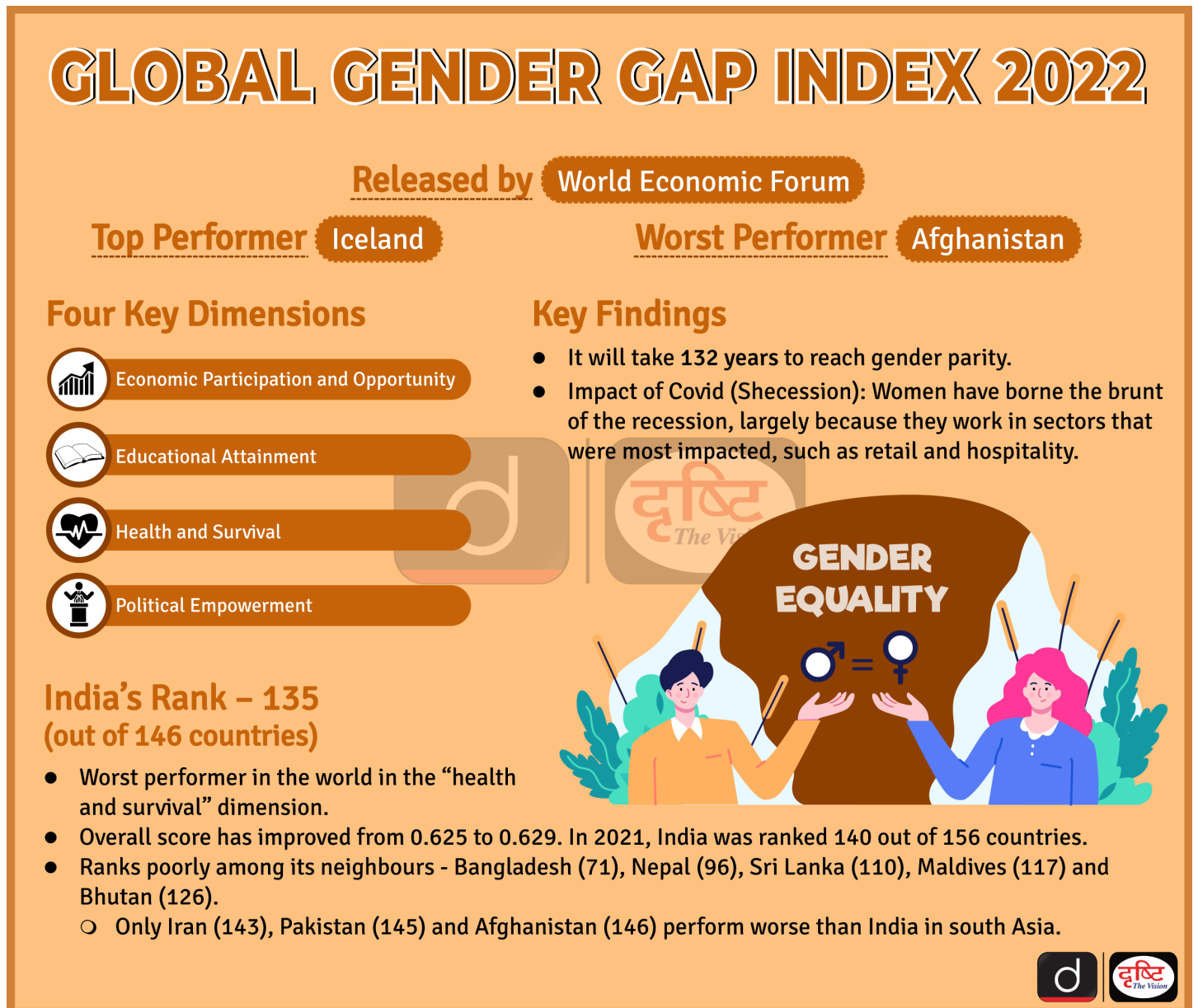
pressure on its habitats.

- **Eco-Friendly Measures:**

- Task Force for suggesting eco-friendly measures to mitigate impacts of power transmission lines and other power transmission infrastructures on wildlife including the Great Indian Bustard.

[Source: TOI](#)

## Global Gender Gap Index 2022



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