



FIFA World Cup

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FIFA WORLD CUP

The most prestigious
Football tournament in the world;
takes place quadrennially



About FIFA:

- **Fédération internationale de Football Association**
- Highest governing body of football in the world
- Founded in 1904
- HQ - Zurich (Switzerland)



All-India Football Federation (AIFF) - Manages game of association football in India

FIFA World Cup:

- First - Held in Uruguay in 1930; Won by Uruguay
- Trophy - Jules Rimet Trophy (1930-70); FIFA WC Trophy (1970 - present)
- Jules Rimet - Frenchman who proposed Football tournament



FIFA World Cup 2022

Held in Qatar - First Arab Nation to host FIFA WC

Winner: **Argentina** won (defeated France) for the 3rd time (previously in 1978 & 1986)

Official Ball

- Al Rihla (the journey) *A reference to Ibn Battuta's travelogue*
- Al Hilal (the dream) *Official ball for semi-finals and final*



At the time of First FIFA World Cup (1930), there was no official football; the finalists brought their own balls - T Model ball (Uruguay) and Tiento (Argentina)



Semi-Automated
Offside Technology (SAOT)
and connected balls technology
are being used for the
first time in FIFA WC

FIFA WORLD CUP Qatar 2022

Official Mascot

- La'eeb (Arabic for 'super-skilled player')



Awards

- **Golden Boot** (Most number of goals) - **Kylian Mbappe** (France)
- **Golden Glove** - **Emiliano Martinez** (Argentina)
- **Golden Ball** (Performer of the Tournament) - **Lionel Messi** (Argentina)
- **Young Player** - **Enzo Fernandez** (Argentina)
- **FIFA Fair Play Award** - **England**



Drishti IAS

Deepfake Technology

For Prelims: Deepfake technology, deep synthesis technology, Artificial Intelligence technology,

For Mains: Impact of Deepfake Technology.

Why in News?

The **Cyberspace Administration of China**, the country's cyberspace watchdog, is rolling out new regulations to restrict the use of **deep synthesis technology** and curb disinformation.

- The policy requires deep synthesis service providers and users to ensure that any doctored content using the technology is explicitly labelled and can be traced back to its source.

What is Deep Synthesis?

- **Deep synthesis** is defined as the use of technologies, including **deep learning** and **augmented reality**, to generate text, images, audio and video to create virtual scenes.
 - One of the most notorious applications of the technology is **deepfakes**, where synthetic media is used to **swap the face or voice** of one person for another.
 - **Deepfakes** are getting harder to detect with the advancement of technology.

What is Deepfake Technology?

- **About:**
 - **Deepfake technology** is a method for manipulating **videos, images, audios** utilizing powerful computers and deep learning.
 - It is used to generate **fake news** and **commit financial fraud** among other wrong doings.
 - It overlays a digital composite over an already-existing video, picture, or audio; **cybercriminals** use **Artificial Intelligence technology**.
- **Origin of the Word:**
 - The term **deepfake** originated in **2017**, when an anonymous Reddit user called himself "**Deepfakes.**"
 - This user manipulated **Google's open-source, deep-learning technology** to create and post **pornographic videos**.
- **Misuse:**
 - **Deepfake technology** is now being used for **nefarious purposes** like scams and hoaxes, celebrity pornography, **election manipulation**, social engineering, **automated disinformation attacks**, identity theft and financial fraud etc.
 - Deepfake technology has been used to impersonate notable personalities like former U.S. Presidents Barack Obama and Donald Trump, India's Prime Minister Narendra Modi, etc.

What are other Countries doing to Combat Deepfakes?

- **European Union:**
 - The **European Union** has an updated **Code of Practice** to stop the spread of disinformation through deepfakes.

- The **revised Code** requires tech companies including **Google, Meta, and Twitter** to take **measures in countering deepfakes and fake accounts** on their platforms.
- They have **six months** to implement their measures once they have signed up to the Code.
- If found **non-compliant**, these companies can face fines as much as **6%** of their annual global turnover, according to the updated Code.
- Introduced in **2018**, the **Code of Practice** on Disinformation brought together for the first-time worldwide industry players to commit to counter disinformation.
- **United States:**
 - The **U.S.** introduced the **bipartisan Deepfake Task Force Act** to assist the Department of Homeland Security (DHS) to **counter deepfake technology**.
 - The measure directs the **DHS** to conduct an annual study of **deepfakes** assess the technology used, track its uses by foreign and **domestic entities**, and come up with available countermeasures to tackle the same.
 - **California and Texas** have passed laws that criminalize the publishing and distributing of deepfake videos that intend to influence the outcome of an election. The law in Virginia imposes criminal penalties on the distribution of nonconsensual deepfake pornography.
- **India:**
 - In **India**, however, there are **no legal rules against using deepfake technology**.
 - However, **specific laws** can be addressed for misusing the tech, which include **Copyright Violation, Defamation and cyber felonies**.

Way forward

- As **media consumers**, we must be able to **decipher, understand, translate**, and use the information we encounter.
- The best method to deal with this problem is with technical solutions supported by **artificial intelligence** that can **recognize and block deep fakes**.
- Prior to resolving the issues associated with **deep fakes, media literacy** has to be improved.
- There is also a need for **easy-to-use** and accessible technology solutions to detect **deep fakes, authenticate media, and amplify authoritative sources**.
- On the part of **society**, to **counter the menace of deep fakes**, there is a need to take the responsibility to be a **critical consumer** of media on the **Internet, think and pause before sharing on social media**, and be part of the solution.

[Source: TH](#)

Carbon Markets

For Prelims: Carbon Credit Market, NDCs, GHG, Kyoto Protocol, Net Zero, PLI Scheme, Energy Conservation.

For Mains: India's Evolving Carbon Market and its Significance.

Why in news?

The Parliament has passed the [Energy Conservation \(Amendment\) Bill, 2022](#) in order to establish [Carbon Markets](#) in India and specify a Carbon Trading Scheme.

- The Bill amends the Energy Conservation Act, 2001.

What is the Energy Conservation (Amendment) Bill, 2022?

▪ About:

- The Bill empowers the Centre to specify a carbon credits trading scheme.
- Under the Bill, the **central government or an authorised agency will issue carbon credit certificates to companies or even individuals** registered and compliant with the scheme.
- These carbon credit certificates **will be tradeable in nature**. Other persons would be able to buy carbon credit certificates on a voluntary basis.

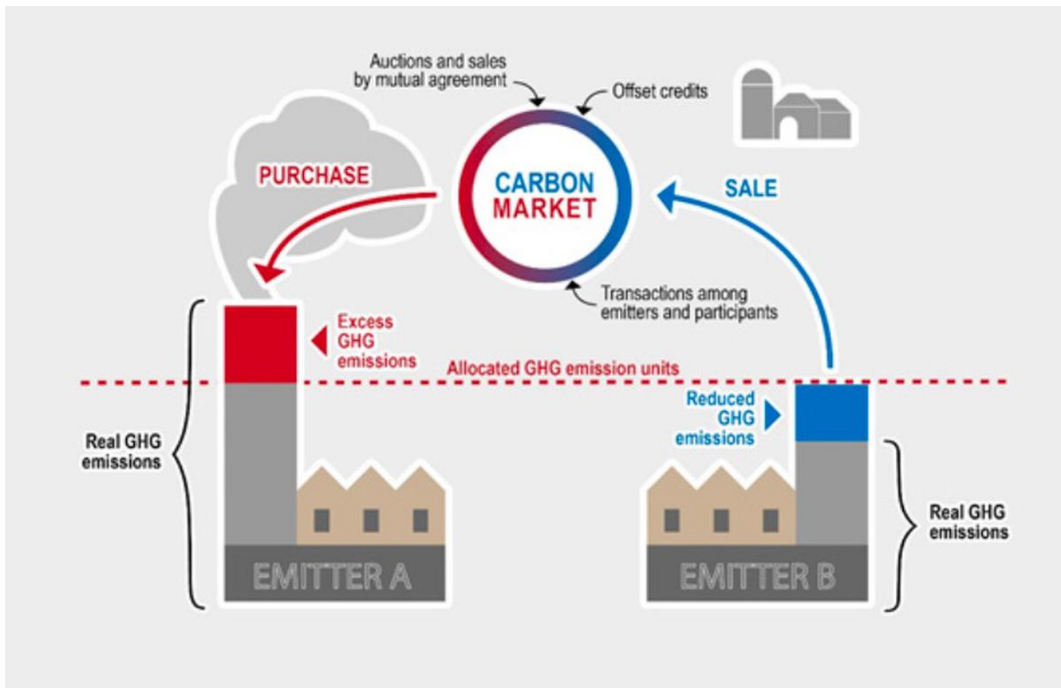
▪ Concerns:

- Bill does not provide **clarity on the mechanism to be used** for the trading of carbon credit certificates— whether it will be like the cap-and-trade schemes or use another method— and **who will regulate such trading**.
- It is not specified, which is the right ministry to **bring in a scheme of this nature**,
 - While carbon market schemes in other jurisdictions like the U.S., United Kingdom, and Switzerland are framed by their **environment ministries**, the Indian Bill was tabled by the power ministry instead of the **Ministry of Environment, Forest, and Climate Change (MoEFCC)**.
- The Bill does not specify **whether certificates under already existing schemes would also be interchangeable** with carbon credit certificates and tradeable for reducing carbon emissions.
 - Two types of tradeable certificates are already issued in India— Renewable Energy Certificates (RECs) and Energy Savings Certificates (ESCs).
 - These are issued when companies use renewable energy or save energy, which **are also activities which reduce carbon emissions**.

What are Carbon Markets?

▪ About:

- Carbon markets are **a tool for putting a price on carbon emissions**. It allows the **trade of carbon credits with the overall objective of bringing down emissions**.
- These markets create incentives to reduce emissions or improve energy efficiency.
 - For example, an industrial unit which outperforms the emission standards stands to gain credits.
 - Another unit which is struggling to attain the prescribed standards can buy these credits and show compliance to these standards. The unit that did better on the standards earns money by selling credits, while the buying unit is able to fulfill its operating obligations.
- It establishes **trading systems** where **carbon credits or allowances** can be bought and sold.
 - A **carbon credit** is a kind of tradable permit that, per United Nations standards, equals one tonne of carbon dioxide removed, reduced, or sequestered from the atmosphere.
 - **Carbon allowances or caps**, meanwhile, are determined by countries or governments according to their emission reduction targets.
- **Article 6 of the Paris Agreement** provides for the use of **international carbon markets by countries** to fulfill their **NDCs (Nationally Determined Contributions)**.
 - NDCs are climate commitments by countries setting targets to achieve **net-zero emissions**.



▪ Types of Carbon Markets:

◦ Compliance Markets:

- Compliance markets are **set up by policies at the national, regional, and/or international level and** are officially regulated.
 - Today, compliance markets mostly operate under a principle called **'cap-and-trade'**, **most popular in the European Union (EU)**.
 - Under the EU's emissions trading system (ETS) launched in 2005, member countries set a cap or limit for emissions in different sectors, such as power, oil, manufacturing, agriculture, and waste management. This cap is determined as per the climate targets of countries and is lowered successively to reduce emissions.
- Entities in this sector are issued **annual allowances or permits by governments equal to the emissions they can generate**.
- If companies produce emissions beyond the capped amount, **they have to purchase additional permits**. This makes up the 'trade' part of cap-and-trade.
- The market price of carbon gets determined by market forces when purchasers and sellers trade in emissions allowances.

◦ Voluntary Markets:

- Voluntary markets are those in which **emitters— corporations, private individuals, and others— buy carbon credits to offset the emission** of one tonne of CO₂ or equivalent greenhouse gases.
- Such carbon credits **are created by activities which reduce CO₂ from the air, such as afforestation**.
- In this market, a corporation looking to compensate **for its unavoidable GHG emissions purchases carbon credits from an entity engaged in projects** that reduce, remove, capture, or avoid emissions.
 - For Instance, in the aviation sector, airlines may purchase carbon credits to offset the carbon footprints of the flights they operate. In voluntary markets, credits are verified by private firms as per popular standards. There are also traders and online registries where climate projects are listed and certified credits can be bought.

▪ Status of Global Carbon Markets:

- In 2021, the value of global markets for tradeable carbon allowances or permits **grew by 164% to a record 760 billion euros (USD 851 billion)**, according to an analysis by Refinitiv.
- The EU's ETS contributed the most to this increase, accounting for 90% of the global value at 683 billion euros.

- As for voluntary carbon markets, **their current global value is comparatively smaller at USD 2 billion.**
- The World Bank estimates that trading in carbon credits could reduce the cost of implementing NDCs by more than half — by as much as USD 250 billion by 2030.

What are the Challenges to Carbon Markets?

- **Poor Market Transparency:**
 - The **UNDP (United Nations Development Programme)** points out serious concerns pertaining to carbon markets- ranging from **double counting of greenhouse gas reductions and quality and authenticity of climate projects** that generate credits to poor market transparency.
- **Greenwashing:**
 - Companies may buy credits, **simply offsetting carbon footprints instead of reducing their overall emissions** or investing in clean technologies.
- **May Increase Net Emission through ETS:**
 - As for regulated or compliance markets, **ETSs (Emissions Trading System)** may not automatically reinforce climate mitigation instruments.
 - The **International Monetary Fund (IMF)** points out that including high emission-generating sectors under trading schemes to offset their emissions by buying allowances may increase emissions on net and provide no automatic mechanism for prioritizing cost-effective projects in the offsetting sector.

What is the Related Indian Initiative?

- **Clean Development Mechanism:**
 - In India, the clean development mechanism under the Kyoto Protocol provided a primary carbon market for the players.
 - The secondary carbon market is covered by the **perform-achieve-trade scheme** (which falls under the energy efficiency category) and the renewable energy certificate.

Way Forward

- In order to keep global warming within 2°C, ideally no more than 1.5°C, global greenhouse gas (GHG) emissions need to be reduced by 25 to 50% over this decade. Nearly 170 countries have **submitted their nationally determined contributions (NDCs) so far as part of the 2015 Paris Agreement**, which they have agreed to update every five years.
- The UNDP emphasises that for carbon markets to be successful, “emission reductions and removals **must be real and aligned with the country’s NDCs**”.
- There must be “**transparency in the institutional and financial infrastructure for carbon market transactions**”.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q1. The concept of carbon credit originated from which one of the following? (2009)

- (a) Earth Summit, Rio de Janeiro
- (b) Kyoto Protocol
- (c) Montreal Protocol
- (d) G-8 Summit, Heiligendamm

Ans: (b)

Q2. Regarding “carbon credits”, which one of the following statements is not correct? (2011)

- (a) The carbon credit system was ratified in conjunction with the Kyoto Protocol
- (b) Carbon credits are awarded to countries or groups that have reduced greenhouse gases below their emission quota
- (c) The goal of the carbon credit system is to limit the increase of carbon dioxide emission
- (d) Carbon credits are traded at a price fixed from time to time by the United Nations Environment Programme.

Ans: (d)

Mains

Q1. Should the pursuit of carbon credits and clean development mechanisms set up under UNFCCC be maintained even though there has been a massive slide in the value of a carbon credit? Discuss with respect to India’s energy needs for economic growth. (2014)

Q2. Discuss global warming and mention its effects on the global climate. Explain the control measures to bring down the level of greenhouse gases which cause global warming, in the light of the Kyoto Protocol, 1997. (2022)

[Source: TH](#)

Black Carbon

For Prelims: Black Carbon, ISRO, carbon dioxide, greenhouse gas emissions, climate change.

For Mains: Environmental Pollution & Degradation, Conservation

Why in News?

In [Lok Sabha](#), the Minister of State for Environment, Forest and Climate Change outlined the various measures taken to counter black carbon.

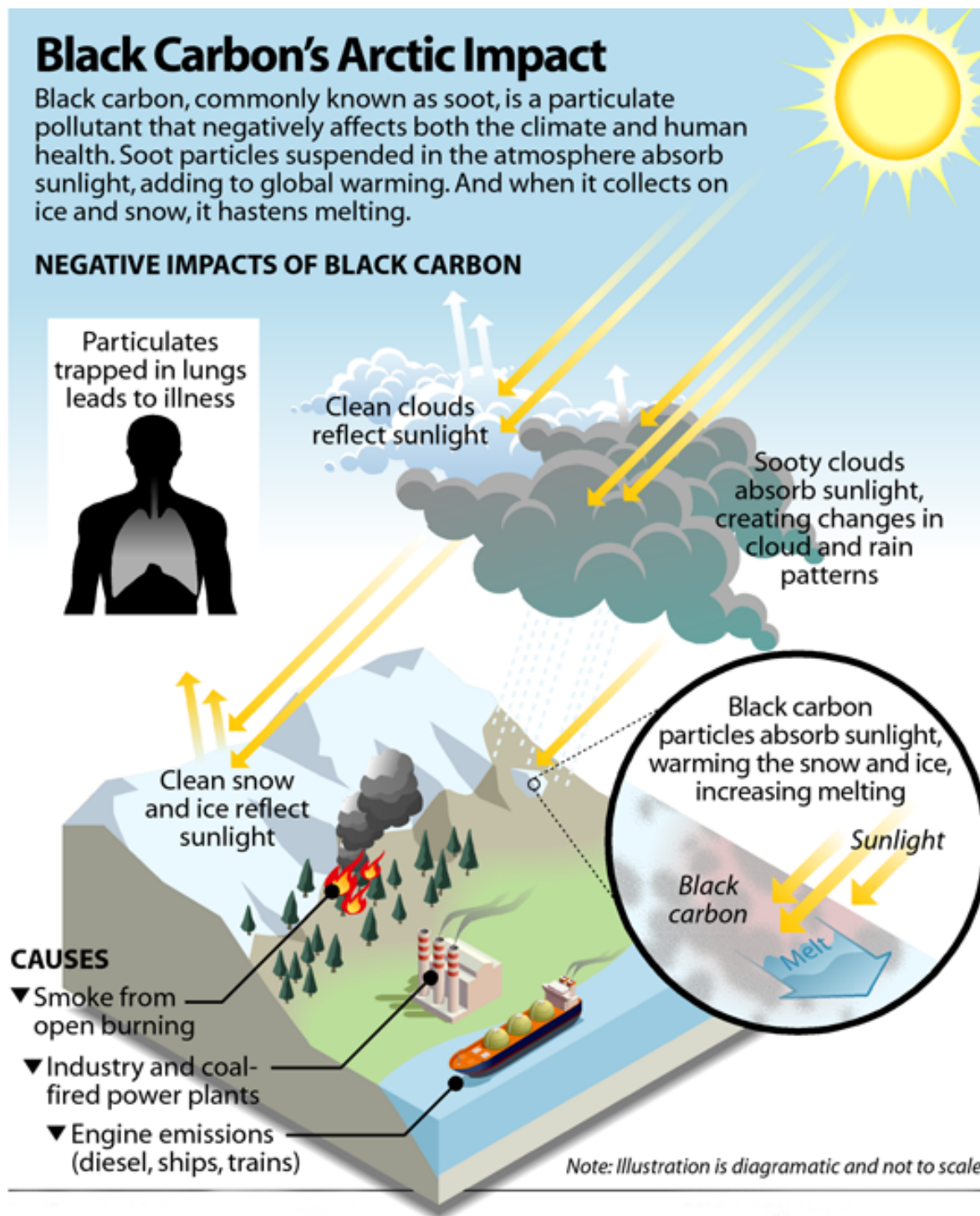
- Under the [Indian Space Research Organization \(ISRO\)](#) Geosphere Biosphere Programme, the ISRO operates a network of aerosol observatories and black carbon mass concentration is one of the parameters being measured.

What is Black Carbon?

- **About:** Black Carbon (BC) is a **short-lived pollutant that is the second-largest contributor** to warming the planet behind [carbon dioxide \(CO₂\)](#).
 - Unlike other [greenhouse gas emissions](#), BC is quickly washed out and can be eliminated from the atmosphere if emissions stop.
 - Unlike historical carbon emissions it is also a localised source with greater local impact.
 - Black carbon is a kind of an aerosol.
- **General Impacts:** Among aerosols (such as brown carbon, sulphates), Black Carbon has been

recognized as the **second most important anthropogenic agent for climate change** and the **primary marker to understand the adverse effects caused by air pollution**.

- Black carbon absorbs solar energy, it warms the atmosphere. When it falls to earth with precipitation, it darkens the surface of snow and ice, reducing their albedo (the reflecting power of a surface), warming the snow, and hastening melting.
- **Emission:** It gets **emitted from gas and diesel engines, coal-fired power plants**, and other sources that burn **fossil fuel**. It comprises a significant portion of particulate matter or PM, which is an air pollutant.



What are the Various Measures taken?

- **Pradhan Mantri Ujjwala Yojana:**
 - Under this initiative, the government is promoting use of **cleaner household cooking fuels**.

- **BS VI Emission Norms:**
 - Leapfrogging from BS-IV to [BS-VI norms](#) for fuel and vehicles from 1st April, 2020.
- **Introducing Cleaner Fuels:**
 - Introduction of cleaner / alternate fuels like gaseous fuel (**CNG, LPG** etc.), [ethanol blending](#).
- **SATAT Scheme:**
 - A new initiative, [“Sustainable Alternative Towards Affordable Transportation \(SATAT\)”](#), has been launched to set up 5000 [Compressed Bio-Gas \(CBG\)](#) production plants and make CBG available in the market for use.
- **Managing Crop Residue:**
 - Agricultural machines and equipment for in-situ crop residue management in Punjab, Haryana, Uttar Pradesh and NCT of Delhi are promoted under the Central Sector Scheme on **Promoting Agricultural Mechanization** for in-situ Crop Residue Management with 50% subsidy to individual farmers and 80% subsidy to the establishment of Custom Hiring Centres.
- **National Clean Air Programme:**
 - The Central Government is implementing the [National Clean Air Programme](#) as a long-term, time-bound, national-level strategy to tackle the air pollution problem across the country in a comprehensive manner.
 - The Centre has set a new target of a **40% reduction in particulate matter concentration in cities covered under the scheme by 2026**, updating the earlier goal of 20 to 30% reduction by 2024.
- **City specific Clean Air Action Plans:**
 - The [Central Pollution Control Board \(CPCB\)](#) has identified 131 cities based on ambient air quality levels exceeding national ambient air quality standards, and cities with a million plus population.
 - City specific Clean Air Action Plans **have been prepared and rolled out for implementation in these cities.**
 - **These plans define time bound targets to control city specific air polluting sources** (soil & road dust, vehicles, domestic fuel, municipal solid waste burning, construction material and industries, etc.).
- **FAME Scheme:**
 - [Faster Adoption and Manufacturing of Electric Vehicles \(FAME\)](#) phase-2 scheme has been rolled out.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Consider the following which can be found in the ambient atmosphere: (2010)

1. Soot
2. Sulphur hexafluoride
3. Water vapour

Which of the above contribute to the warming up of the atmosphere?

- (a) 1 and 2 only
 (b) 3 only
 (c) 2 and 3 only
 (d) 1, 2 and 3

Ans: (d)

Exp:

- Soot, also known as black Carbon, is a black, carbonaceous substance produced during incomplete combustion of coal, wood, etc. Black Carbon contributes to climate warming in two ways.
 - First, black soot particles in the air absorb sunlight and directly heat the surrounding air

- Second, soot falling on snow changes the reflecting surfaces into absorbing ones, i.e., soot decreases the albedo and therefore, increases the melting rate of snow and ice. **Hence, 1 is correct.**

- As per IPCC, Sulphur Hexafluoride (SF₆) is the most potent greenhouse gas, with a global warming potential of 23,900 times that of CO₂ over a 100 year of time period. **Hence, 2 is correct.**
- Water vapor is known to be Earth's most abundant greenhouse gas, which results in heating of the atmosphere. **Hence, 3 is correct. Therefore, option (d) is the correct answer.**

Mains

Q. Mumbai, Delhi and Kolkata are the three mega cities of the country but the air pollution is much more serious problem in Delhi as compared to the other two. Why is this so? **(2015)**

Source: PIB

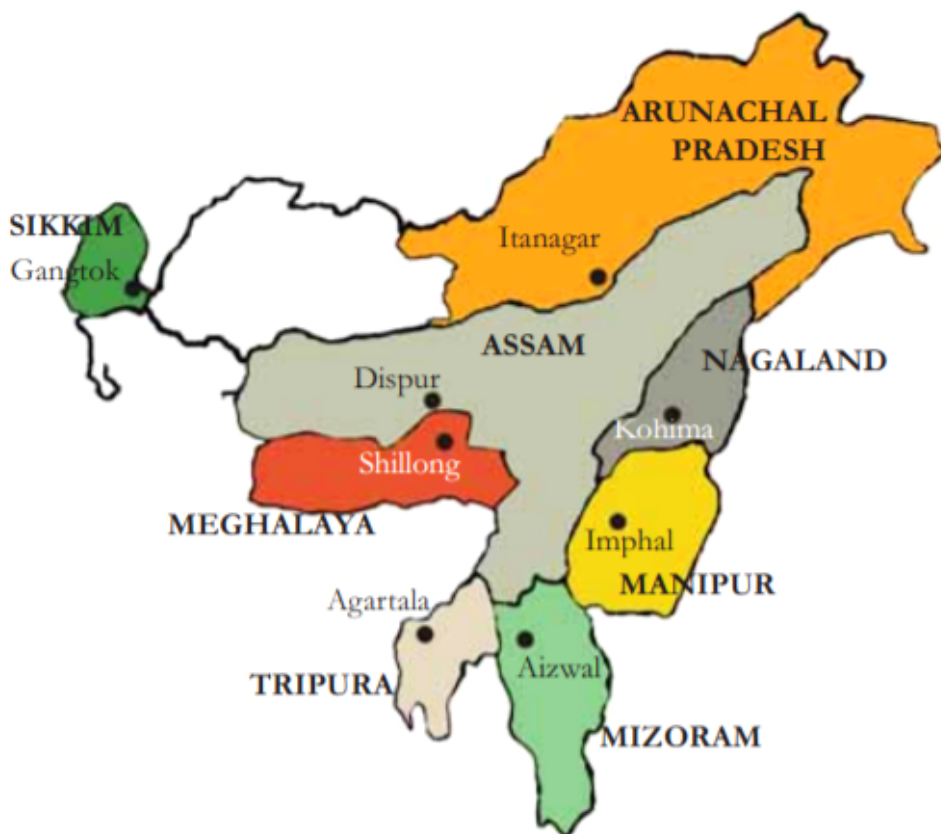
Peace in North East India

For Prelims: North East India, Key Agreements in North East India, Armed Forces Special Powers Act, Operations to Bring Back Indians in Distress

For Mains: Key Peace Developments in North East India, Significance of North East India, Initiatives for Development of North East India

Why in News?

Recently, the Union Government has reported that there has been an **80% decline in civilian deaths and 6,000 militants have surrendered** in North East India since 2014.



What are the Key Peace Developments in North East India?

▪ Important Agreements:

- **Assam-Meghalaya Inter State Boundary Agreement, 2022:**
 - The agreement is for a **closure in six disputed sectors** that were taken up for resolution in the first phase.
 - While **Assam will get 18.51 sq. km** of the disputed areas, **Meghalaya will get the remaining 18.28 sq.km.**
- **Karbi Anglong Agreement, 2021:**
 - **Karbi Anglong Agreement** is a tripartite agreement among five insurgent groups of **Assam**, the **Centre** and the **state government**.
 - 5 militant organizations (**KLNLF, PDCK, UPLA, KPLT and KLF**) laid down arms and more than 1000 of their armed cadres have given up violence and joined the mainstream of society.
- **Bodo Accord, 2020:**
 - The **central government**, the **Assam government** and the **Bodo groups**, including all factions of the militant **National Democratic Front of Bodoland (NDFB)**, signed the **Bodo Accord** to redraw and rename the Bodoland Territorial Area District (BTAD) as the **Bodoland Territorial Region (BTR)**, in Assam.
- **Bru-Reang Agreement, 2020:**
 - Bru or Reang is a community **indigenous to Northeast India**, living mostly in Tripura, Mizoram and Assam. In Tripura, they are recognised as a **Particularly Vulnerable Tribal Group**.
 - The **Centre**, the **governments of Mizoram and Tripura** and leaders of **Bru organisations** signed the quadripartite agreement, **Bru-Reang Agreement** in January (2020).
 - Under the pact, the Home Ministry has committed to **incur the whole expenditure** of settlement in Tripura.
- **NLFT-Tripura Agreement, 2019:**
 - **National Liberation Front of Tripura (NLFT)** has been banned under the **Unlawful Activities (Prevention) Act, 1967** since 1997 and has been involved in violence, operating from their camps across the international border.

- [NLFT Agreement 2019](#) resulted in the surrender of 88 cadres with 44 weapons.
- **Roll Back of Armed Forces Special Powers Act (AFSPA):**
 - Government withdrew AFSPA from a large part of the Northeast, including the whole of Tripura and Meghalaya.
 - In Arunachal Pradesh, [AFSPA](#) remains in force in only 3 districts.

What is the Significance of North East for India?

- **Strategic Significance:**
 - North-East India is the gateway to [South-East Asia](#) and beyond. It is India's **land-bridge to Myanmar**.
 - India's [Act East Policy](#) places the northeastern states on the **territorial frontier** of India's eastward engagement.
- **Cultural Significance:**
 - North East India is one of the most culturally diverse areas of the world. It is **home to over 200 tribes**. Popular festivals include the [Hornbill Festival of Nagaland](#), **Pang Lhabsol of Sikkim**, etc.
 - North-east India is a [Dowry-Free Zone](#).
 - The **rich tapestry of cultures of Northeast** is reflected in its highly developed Folk dance forms like [Bihu](#) (Assam).
 - Manipur has a tradition of **worshipping nature in sacred groves**, called **UmangLai**.
- **Economic Significance:**
 - Economically, the Region is **rich in natural resources of "TOT"** (Tea, Oil, and Timber).
 - It is a veritable powerhouse with a potential of 50000 MW of [hydroelectric power](#) and an abundant [reserve of fossil fuels](#).
- **Ecological Significance:**
 - North East is a part of **Indo-Burma biodiversity hotspot**. It represents one of the highest avian and plant biodiversity of the Indian subcontinent.
 - This area has the prestige of having all the bear species present in India.

What are the Government's Other Initiatives for the North East?

- **Infrastructure:**
 - [Bharatmala Pariyojana](#)
 - [Regional Connectivity Scheme \(RCS\)-UDAN](#)
- **Connectivity:**
 - [Kaladan Multi-Modal Transit Project](#)
 - [India-Myanmar-Thailand Trilateral Highway](#)
- **Tourism:**
 - [Swadesh Darshan Scheme](#)
- **Other:**
 - [Digital North East Vision 2022](#)
 - [National Bamboo Mission](#)

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Which Schedule of the Constitution of India contains special provisions for the administration and control of Scheduled Areas in several States? (2008)

- (a) Third
- (b) Fifth
- (c) Seventh
- (d) Ninth

Ans: (b)

Mains

Q1. Human rights activists constantly highlight the fact that the Armed forces (Special Powers) Act, 1958 (AFSPA) is a draconian act leading to cases of human rights abuses by security forces. What sections of AFSPA are opposed by the activists? Critically evaluate the requirement with reference to the view held by the Apex Court. **(2015)**

Q2. The North-East region of India has been infested with insurgency for a very long time. Analyze the major reasons for the survival of armed insurgency in this region. **(2017)**

Source: IE

Anticancer mRNA Vaccine

For Prelims: mRNA vaccine, mRNA-4157/V940, cancer, Covid-19, Programmed Death-1, types of vaccines.

For Mains: Types of Vaccine and Significance

Why in News?

Recently, the results of a trial of **messenger Ribonucleic Acid (mRNA-4157/V940) vaccine** made by Moderna and MSD (Merck & Co.) **when taken along with an immunotherapy drug Keytruda** has shown **promising results against advanced melanoma**, a kind of skin [cancer](#).

What is mRNA Vaccine Therapy for Advanced Melanoma?

▪ About:

- It is a **personalised cancer vaccine** i.e., tailor-made for every patient.
- To build the vaccine, researchers **took samples of patients' tumors and healthy tissue**.
 - After analysing the samples to **decode their genetic sequence and isolate mutant proteins associated only with the cancer**, that **information was used to design** the vaccine.
- The personalised cancer vaccine **uses the same [m-RNA technology](#)** that was used to **produce the [Covid-19 vaccine](#)**.
 - mRNA vaccines **use mRNA to teach** our cells how to **make a protein that triggers an immune response inside our bodies**.

▪ Mechanism:

- It **allows the body's immune system** to seek and **destroy cancerous cells**.
- The personalised cancer vaccine **works in concert with Keytruda, to disable a protein called [Programmed Death 1 \(PD-1\)](#)**, that **helps tumors to evade the immune system**.
- When injected into a patient, the **patient's cells act as a manufacturing plant, producing perfect copies of the mutations** for the immune system to recognise and destroy.
- Having been **exposed to the mutations** without the virus, the **body learns to fight off the infection**.

▪ Efficacy:

- The vaccine showed a **44% reduction in the risk** of dying of cancer or having the cancer progress.
- The **combination of mRNA-4157/V940 and Keytruda** was generally **safe and demonstrated the benefit compared with Keytruda alone** after a year of treatment.

What are Different Types of Vaccines?

▪ Inactivated Vaccines:

- Inactivated vaccines use the **killed version of the germ** that causes a disease.
- Vaccines of this type are created by **inactivating a pathogen, typically using heat or chemicals such as formaldehyde or formalin**. This destroys the pathogen's ability to replicate, but keeps it **"intact" so that the immune system can still recognize it**. ("Inactivated" is generally used rather than "killed" to refer to viral vaccines of this type, as viruses are generally not considered to be alive.)
- They usually don't provide immunity (protection) **that's as strong as live vaccines**. So, you may need several doses over time (booster shots) in order to get ongoing immunity against diseases.
 - **They are Used to protect:** [Hepatitis A](#), [Flu \(shot only\)](#), [Polio \(shot only\)](#), [Rabies](#).

▪ Live-attenuated Vaccines:

- Live vaccines use a **weakened (or attenuated) form of the germ** that causes a disease.
- Because these vaccines are so similar to the natural infection that they help prevent, they create a **strong and long-lasting immune response**.
- The limitation of this approach is that **these vaccines usually cannot be given to people with weakened immune systems**.
- **Live vaccines are used against:** [Measles](#), Mumps, Rubella (MMR combined vaccine), Rotavirus, Smallpox among others.

▪ Messenger (m) RNA Vaccines:

- mRNA vaccines **make proteins in order to trigger an immune response**. mRNA vaccines have several benefits compared to other types of vaccines, **including shorter manufacturing times** and, because they do not contain a live virus, no risk of causing disease in the person getting vaccinated.
- The vaccines are used to protect against: Covid-19.

▪ Subunit, Recombinant, Polysaccharide, and Conjugate Vaccines:

- They use **specific pieces of the germ** - like its protein, sugar, or capsid (a casing around the germ). They give a very strong immune response.
- They can also be used on people with weakened immune systems and long-term health problems.
- These vaccines are used to protect against: Hib (Haemophilus influenzae type b) disease, [Hepatitis B](#), HPV (Human papillomavirus), [Pneumococcal disease](#) among others.

▪ Toxoid Vaccines:

- They use a toxin (harmful product) made by the germ that causes a disease. They **create immunity to the parts of the germ that cause a disease instead of the germ itself**. That means the immune response is targeted to the toxin instead of the whole germ.
- Toxoid vaccines are used to protect against: **Diphtheria, Tetanus**.

▪ Viral Vector Vaccines:

- Viral vector vaccines use a **modified version of a different virus as a vector** to deliver protection.
- Several different viruses have been used as vectors, including influenza, **vesicular stomatitis virus (VSV), measles virus, and adenovirus, which causes the common cold**.
 - Adenovirus is **one of the viral vectors used in some Covid-19 vaccines** being studied in clinical trials.
- The vaccines are used to protect against: **Covid-19**

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q1. With reference to recent developments regarding 'Recombinant Vector Vaccines', consider the following statements:

1. Genetic engineering is applied in the development of these vaccines.
2. Bacteria and viruses are used as vectors.

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: (c)

Q2. In the context of vaccines manufactured to prevent COVID-19 pandemic, consider the following statements: (2022)

1. The Serum Institute of India produced COVID-19 vaccine named Covishield using mRNA platform.
2. Sputnik V vaccine is manufactured using vector based platform.
3. COVAXIN is an inactivated pathogen based vaccine.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Exp:

- COVISHIELD vaccine is based on the platform which uses a recombinant, replication-deficient chimpanzee adenovirus vector encoding the SARS-CoV-2 Spike (S) glycoprotein. Following administration, the genetic material of part of coronavirus is expressed which stimulates an immune response. **Hence, statement 1 is not correct.**
- Sputnik V is the world's first registered vaccine based on a well-studied human adenovirus vector platform. It has been approved for use in 71 countries with a total population of 4 billion people. The vaccine is named after the first Soviet space satellite. The vaccine's efficacy is 97.6%, based on the analysis of data on the incidence of coronavirus among Russians vaccinated with both vaccine components between December 5, 2020 and March 31, 2021. **Hence, statement 2 is correct.**
- Covaxin is an inactivated viral vaccine. This vaccine is developed with Whole-Virion Inactivated Vero Cell-derived technology. They contain inactivated viruses, which cannot infect a person but still can teach the immune system to prepare a defence mechanism against the active virus. **Hence, statement 3 is correct.**
- **Hence, option (b) is correct.**

Mains

Q. What is the basic principle behind vaccine development? How do vaccines work? What approaches were adopted by the Indian vaccine manufacturers to produce COVID-19 vaccines? (2022)

Eastern Zonal Council Meeting

Why in News?

Union Home and Cooperation Minister presided over the **25th Eastern Zonal Council meeting in Kolkata.**

What are Zonal Councils?

▪ About:

- Zonal Councils are the **statutory (and not the constitutional) bodies.**
- They are established by an Act of the Parliament, that is, [States Reorganisation Act of 1956.](#)
- The act divided the country into **five zones- Northern, Central, Eastern, Western and Southern** and provided a zonal council for each zone.
- While forming these zones, **several factors have been taken into account** which include:
 - The natural divisions of the country.
 - The river systems and means of communication.
 - The cultural and linguistic affinity.
 - The requirements of economic development, security and law and order.
- In addition to the above-mentioned Zonal Councils, a North-Eastern Council was created by a separate Act of Parliament, the **North-Eastern Council Act of 1971.**
 - Its members include Assam, Manipur, Mizoram, Arunachal Pradesh, Nagaland, Meghalaya, Tripura and Sikkim.

▪ Composition:

- **Northern Zonal Council:** It comprises the States of Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, National Capital Territory of Delhi, Union Territory of Chandigarh and Ladakh.
 - **Headquarter:** New Delhi
- **Central Zonal Council:** It comprises the States of Chhattisgarh, Uttarakhand, Uttar Pradesh and Madhya Pradesh.
 - **Headquarter:** Allahabad
- **Eastern Zonal Council:** It comprises the States of Bihar, Jharkhand, Orissa, Sikkim and West Bengal.
 - **Headquarter:** Kolkata
- **Western Zonal Council:** It comprises the States of Goa, Gujarat, Maharashtra and the Union Territories of Daman & Diu and Dadra & Nagar Haveli.
 - **Headquarter:** Mumbai
- **Southern Zonal Council:** It comprises the States of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and the Union Territory of Puducherry.
 - **Headquarter:** Chennai

▪ Organizational Structure:

- **Chairman:** The union home minister is the Chairman of each of these Councils.
- **Vice Chairman:** The Chief Ministers of the States included in each zone act as Vice-Chairman of the Zonal Council for that zone by rotation, each holding office for a period of one year at a time.
- **Members:** Chief Minister and two other Ministers as nominated by the Governor from each

of the States and two members from Union Territories included in the zone.

- **Advisers:** One person nominated by the Planning Commission (now NITI Aayog) for each of the Zonal Councils, Chief Secretaries and another officer/Development Commissioner nominated by each of the States included in the Zone.

What are the Objectives and Functions of the Council?

▪ Objectives:

- Bringing out national integration.
- Arresting the growth of acute State consciousness, regionalism, linguism and particularistic tendencies.
- Enabling the Centre and the States to co-operate and exchange ideas and experiences.
- Establishing a climate of co-operation amongst the States for successful and speedy execution of development projects.

▪ Functions of the Councils:

- Any matter of common interest in the field of economic and social planning,
- Any matter concerning border disputes, linguistic minorities or inter-State transport,
- Any matter connected with or arising out of, the reorganization of the States under the States Reorganisation Act.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. Which of the following bodies does not/do not find mention in the Constitution? (2013)

1. National Development Council
2. Planning Commission
3. Zonal Councils

Select the correct answer using the codes given below:

- (a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (d)

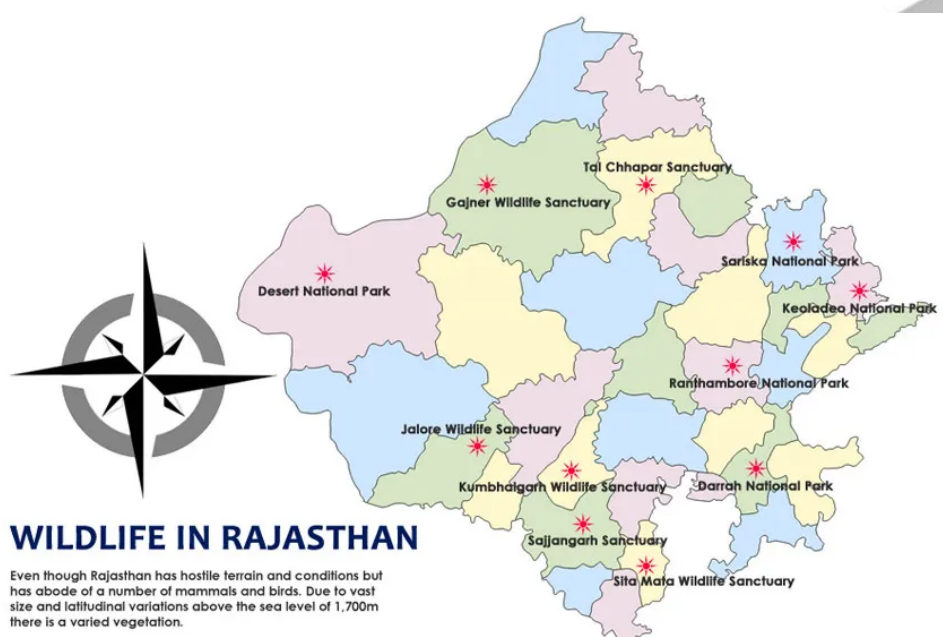
- National Development Council is an executive body (neither constitutional nor statutory body) set up in 1952 to strengthen and mobilize the effort and resources of the nation in support of the plan, to promote common economic policies in all vital spheres, and to ensure the balanced and rapid development of all parts of the country. **Hence, 1 is correct.**
- Planning Commission was set up by an executive order of the Government of India in 1950. The Commission was responsible to formulate India's five years plans for social and economic development in India. Prime minister of India acted as the ex-officio Chairman of the planning commission. Planning Commission was dissolved in 2014 and NITI Aayog was formed to replace the earlier think tank of Gol. **Hence, 2 is correct.**
- Zonal Councils are not Constitutional Bodies. These are statutory bodies set up under the States Reorganisation Act, 1956 and the North-Eastern Council Act, 1972 and each zonal councils is chaired by the Union Home Minister. **Hence, 3 is correct.**
- The main objectives of the Zonal Councils are:
 - Bringing out national integration.
 - Arresting the growth of acute State consciousness, regionalism, linguism and particularistic tendencies.
 - Enabling the Centre and the States to cooperate and exchange ideas and experiences.
 - Establishing a climate of cooperation amongst the States for successful and speedy execution of development projects. Therefore, option (d) is the correct answer.

Tal Chhapar Sanctuary

Why in News?

Recently, the famous **Tal Chhapar Blackbuck Sanctuary in Churu, Rajasthan** received a **protective cover** against a proposed move of the State government to reduce the size of its **Eco Sensitive Zone (ESZ)**.

- The **World Wildlife Fund for Nature (WWF)** has also taken up a major project for the **conservation of raptors** in the sanctuary, spread in an area measuring 7.19 sq. Km.



WILDLIFE IN RAJASTHAN

Even though Rajasthan has hostile terrain and conditions but has abode of a number of mammals and birds. Due to vast size and latitudinal variations above the sea level of 1,700m there is a varied vegetation.

What are the Key Facts about Tal Chhapar Sanctuary?

- **About:**
 - The Tal Chhapar Sanctuary is situated on the **border of the Great Indian Thar Desert**.
 - Tal Chhapar is a **distinctive shelter** of the most graceful Antelope seen in India, **“the Blackbuck”**.
 - It was given the **status of a sanctuary in 1966**.
 - Tal Chhapar was a **hunting reserve of the erstwhile royal family of Bikaner**.
 - The **“Tal”** word is Rajasthani word **means plane land**.
 - This Sanctuary has **nearly flat territory and combined thin low-lying region**. It has got **open and wide grasslands** with spread **Acacia and Prosopis plants** that offer it a **look of a characteristic Savanna**.
- **Fauna:**
 - Tal Chhapar is an **ideal place to see Blackbucks** which are more than a thousand in number here. It is a **good place to see the desert animals and reptile species**.
 - The sanctuary is host to about **4,000 blackbucks, over 40 species of raptors and more than 300 species of resident and migratory birds**.
 - Migratory birds in the sanctuary are **harriers, eastern imperial eagle, tawny eagle,**

short-toed eagle, sparrow, and little green bee-eaters, black ibis and demoiselle cranes. Other than that, skylarks, crested larks, ring doves, and brown doves can be seen throughout the year.

What are Blackbucks?

- **About:**
 - The **Blackbuck (Antelope cervicapra), or the Indian Antelope**, is a species of antelope **native to India and Nepal**.
 - It is widespread in Rajasthan, Gujarat, Madhya Pradesh, Tamil Nadu, Odisha, and other areas throughout peninsular India.
 - It is **considered as the epitome of grassland**.
 - The blackbuck is a **diurnal antelope (active mainly during the day)**.
 - It has been **declared as the State Animal** of Punjab, Haryana, and Andhra Pradesh.
 - **Cultural Importance:** It is a **symbol of purity for Hinduism** as its skin and horns are regarded as a sacred object. For **Buddhism**, it is a symbol of **good luck**.
- **Protection Status:**
 - **Wildlife Protection Act 1972:** Schedule I
 - **IUCN Status:** Least Concern
 - **CITES:** Appendix III
- **Threat:**
 - Habitat Fragmentation, Deforestation, Natural Calamities, Illegal Hunting.
- **Related Protected Areas:**
 - Velavadar Blackbuck Sanctuary - Gujarat
 - Point Calimere Wildlife Sanctuary - Tamil Nadu
 - In 2017, the **Uttar Pradesh** State Government approved the plan of setting up the **Blackbuck Conservation Reserve** in the trans-Yamuna belt near Prayagraj. It would be the first conservation reserve dedicated to the blackbuck.

What are Eco-Sensitive Zones (ESZs)?

- ESZs are **areas notified by the Ministry of Environment, Forest, and Climate Change (CC)**, under the **Environment Protection Act, 1986**.
- The basic aim is **to regulate certain activities around National Parks and Wildlife Sanctuaries** so as to minimise the negative impacts of such activities on the fragile ecosystem encompassing the protected areas.
- In June, 2022, the **Supreme Court directed** that every protected forest, national park and wildlife sanctuary across the country should **have a mandatory eco-sensitive zone (ESZ) of a minimum one km** starting from their demarcated boundaries.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q1. Which one of the following protected areas is well-known for the conservation of a sub-species of the Indian swamp deer (Barasingha) that thrives well on hard ground and is exclusively graminivorous? (2020)

- (a) Kanha National Park
- (b) Manas National Park
- (c) Mudumalai Wildlife Sanctuary
- (d) Tal Chhapar Wildlife Sanctuary

Ans: (a)

Exp:

- Hard ground swamp deer or Barasingha (*Rucervus duvaucelii*), the state animal of Madhya Pradesh, is seeing a revival in the Kanha National Park and Tiger Reserve (KNPTR).
- Swamp Deer was close to extinction in the Kanha National Park. However, with the conservation efforts, the population currently numbers around 800.
- The deer is endemic to the Kanha National Park and Tiger Reserve on the Maikal Range of Satpura Hills. Measures like captive breeding and habitat improvement were used.
- **Therefore, option (a) is the correct answer.**

Q2. With reference to 'Eco-Sensitive Zones', which of the following statements is/are correct? (2014)

1. Eco-Sensitive Zones are the areas that are declared under the Wildlife (Protection) Act, 1972.
2. The purpose of the declaration of Eco-Sensitive Zones is to prohibit all kinds of human activities in those zones except agriculture.

Select the correct answer using the code given below:

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

Ans: (d)

[Source: TH](#)

District Mineral Foundation Scheme

Why in News?

Odisha's Keonjhar district is **India's highest recipient of funds under the District Mineral Foundation (DMF) scheme**, and has spent ₹3,000 crore under the scheme over the past seven years.

- Keonjhar is **hugely rich in mineral reserves**, especially iron ore. The district has **2,555 million tonnes of iron ore** available beneath its soil, of which **approximately 50 million tonnes is extracted each year**, a key driver of Odisha's economy.

What is DMF Scheme?

- **About:**
 - As per the **Mine and Minerals Development Regulation (Amendment) Act, 2015**, in **every district affected by mining-related operations**, the **state government** shall, by notification, **establish a trust as a non-profit body** to be called the **District Mineral Foundation**.
- **DMF Funds:**
 - Funds every **mining lease holder of will pay a fraction of royalty, not exceeding one-third of the royalty**, to the DMF as per rates prescribed by Central Government.
 - This fund will be **used for welfare of the people affected in the mining affected areas**.
 - **In Keonjhar, the total DMF fund collection** has touched an astounding **₹8,840**

crore, the highest for any district in India.

- **Objective:**
 - The idea behind the contribution is that local mining-affected communities, **mostly tribal and among the poorest** in the country, also **have the right to benefit from natural resources extracted from where they live.**
- **Functioning:**
 - The functioning of the DMF trusts and the fund use governed by states' DMF Rules incorporate the mandates of a **central guideline, Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY).**

What is PMKKY?

- **About:**
 - It is a scheme by the **Ministry of Mines** for the welfare of people & affected areas by using the funds accrued under District Mineral Foundation (DMF).
- **Objectives:**
 - To **implement various developmental and welfare projects/programs in mining affected areas** that complement the existing ongoing schemes/projects of State and Central Government.
 - To **minimize/mitigate the adverse impacts, during and after mining,** on the environment, health and socio-economics of people in mining districts.
 - To ensure **long-term sustainable livelihoods** for the affected people in mining areas.
- **Implementation:**
 - At least **60% the fund will be utilized for "High Priority Areas"** like Drinking water supply, Environment preservation & pollution control measure, Health care, Education, etc.
 - **Rest of the fund** will be utilized for **"Other Priority Areas"**, such as Physical infrastructure, Irrigation, Energy & watershed development and Measures for enhancing environmental quality.

UPSC Civil Services Examination, Previous Years Question (PYQ)

Q. What is/are the purpose/purposes of 'District Mineral Foundations' in India? (2016)

1. Promoting mineral exploration activities in mineral-rich districts
2. Protecting the interests of the persons affected by mining operations
3. Authorizing State Governments to issue licences for mineral exploration

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Source: TH

