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MINISTRY OF SCIENCE AND TECHNOLOGY



MK Yadav Sir

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GAGANYAAN MISSION

(Syllabus: GS Paper 3 – Science and Technology)

ISRO tests engine for Gaganyaan mission

The Hindu Bureau
BENGALURU

The Indian Space Research Organisation has successfully completed the CE20 E13 engine hot test for Gaganyaan qualification and 22-tonne thrust qualification.

The engine was tested at the ISRO Propulsion Complex (IPRC), Mahendragiri on September 22.

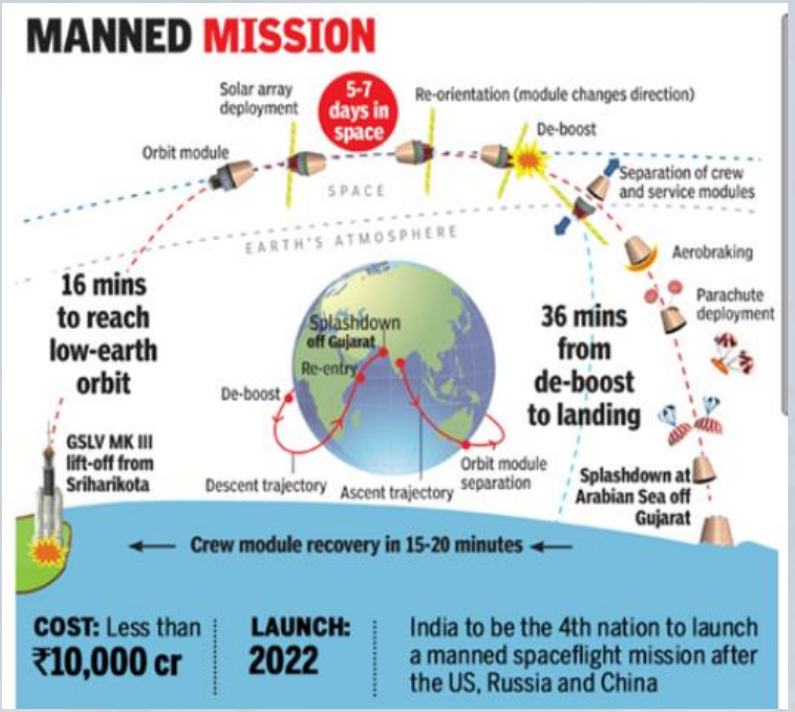
The CE20 engine is a vital component, serving as the powerhouse of the Cryogenic Upper Stage (CUS) responsible for propelling the upper stage (C25) of the LVM3 vehicle. It has demonstrated its capability by successfully operating at a thrust level of 19 tonnes in six successive LVM3 missions and two commercial OneWeb missions.

"To enhance the payload capacity of the LVM3 vehicle, ISRO is upgrading the CE20 engine. The upper cryogenic stage is being transformed into the C32 stage with increased propellant loading capacity, and the engine is being modified to operate at a higher thrust level of 22 tonnes," the space agency

Context: The Indian Space Research Organisation (ISRO) has successfully completed the **CE20 E13 engine** hot test for the **Gaganyaan qualification and 22-tonne thrust** qualification.

Gaganyaan Mission

- **About**: The Gaganyaan project envisages **demonstration of human spaceflight** capability by launching a crew of 3 members to an orbit of 400 km for a 3 days mission and bringing them back safely to Earth.
- **Expected Launch**: In 2025)
- **Part of:** Indian Human Spaceflight Programme (IHSP), which was initiated (2007) by the ISRO to develop the technology needed to launch crewed orbital spacecraft into low earth orbit (LEO).
- **Launch Vehicle:** GSLV Mk-lll (Geosynchronous Satellite Launch Vehicle) the three-stage heavy-lift launch vehicle will be used for carrying the orbital module.
  - **India's heaviest rocket** consists of a solid stage, liquid stage, and cryogenic stage.
- **Objective**: To demonstrate the capability to send humans to low earth orbit on board an Indian launch vehicle and bring them back to Earth safely.



INDIAN EXPRESS Page 11

C-295 AIRCRAFT

(Syllabus: GS Paper 3 – Sci & Tech)

IAF inducts first C-295 transport aircraft

AMRITA NAYAK DUTTA
NEW DELHI, SEPTEMBER 25

THE INDIAN Air Force (IAF) on Monday formally inducted its first C-295 transport aircraft in a formal ceremony at Hindon Air Force Station, days after the aircraft was delivered at the Airbus facility in Seville, Spain.

The first of the 56 medium lift tactical aircraft set to be received by IAF was inducted into the No. 11 Squadron, also named The Rhinos in Vadodara.

The 'Sarv Dharm Puja' induction ceremony was attended by Defence Minister Rajnath Singh along with Air Chief Marshal VR Chaudhari. "This medium-lift tactical aircraft is capable of taking off and landing from unprepared landing grounds and will replace the HS-748 Avro aircraft. The induction of C-295 will bolster IAF's medium-lift tactical capability. The defence and aerospace sectors are the two important pillars that will make India self-reliant in coming years," Singh said on X.

In September 2021, India had formalised the acquisition of 56 Airbus C295 aircraft at a cost of Rs 21,935 crore. Earlier this month, IAF received the delivery of the first 56 C295 aircraft that will replace its ageing Avro-748 fleet.

The first 16 C295s of the 56 aircraft on order will be assembled at San Pablo Sur site in Seville, and the second aircraft will be delivered in May 2024, and the next 14 will be rolled out one in a month until August 2025.

The remaining 40 C295s of the IAF order will be manufactured and assembled in partnership with Tata Advanced Systems Ltd (TASL) at a Final Assembly Line (FAL) in Vadodara, Gujarat.

As reported by *The Indian Express* earlier, the production of components of these aircraft has already started in the main constituent assembly (MCA) facility in Hyderabad, from where these parts will be shipped to the final assembly line in Vadodara, which is set to be operational by November next year. The facility will be similar to the sprawling 1.2 million-sqm Airbus factory in Seville.

The aircraft will be manufactured under India's first-ever 'Make in India' Aerospace programme in the private sector. For the longest time, Hindustan Aeronautics Limited (HAL) had monopolised the manufacture of military aircraft in India.

The first India-made C295 will roll out of the Vadodara factory in September 2026, while the final aircraft is expected to be delivered to IAF by August 2031.

The defence minister also inaugurated the first ever drone exhibition, 'Bharat Drone Shakti 2023' at Hindon Air Force Station, Ghaziabad. "Drones today can be employed for a variety of military and civil applications. India will emerge as a major drone hub by 2030," he said on X.

In a statement, the defence ministry said Bharat Drone Shakti 2023 is a first-of-its-kind drone exhibition-cum-display jointly organised by IAF and Drone Federation of India (DFI). "The two-day event to be held on September 25 and 26–2023, features over 75 drone start-ups from across the country," the statement mentioned.

"By showcasing their capabilities through a series of aerial and static demonstrations, IAF and DFI seek to bolster the government's initiative to make India a major drone hub by 2030," it said.



Context: The **Indian Air Force (IAF)** formally inducted its **first C-295 transport aircraft in a ceremony** held at the **Hindan Air Force Station** in Uttar Pradesh, following its delivery from the Airbus facility in Seville, Spain.

C295 Aircraft

- **About**: It is a new-generation tactical airlifter in the light and medium segment that will replace the ageing Avro aircraft of the Indian Air Force.
- **Built by**: Airbus, a European multinational aerospace corporation.
- **Capacity**: 5-10 tonne capacity with contemporary technology.
- **Features**: The aircraft, with a flight endurance of up to 11 hours, can carry out multi-role operations under all weather conditions.
- **Replacement**: Indian Air Force's ageing fleet of Avro-748 planes

PIB Sept 25

GLOBAL BIOFUEL ALLIANCE
(Syllabus: GS Paper 3 – Env & Eco)

Indian Standards on Biofuel to Aid GBA's Clean Energy Goals

Context: Recently, the **Bureau of Indian Standards (BIS),** pledged to support the nation's green initiatives by creating relevant standards.

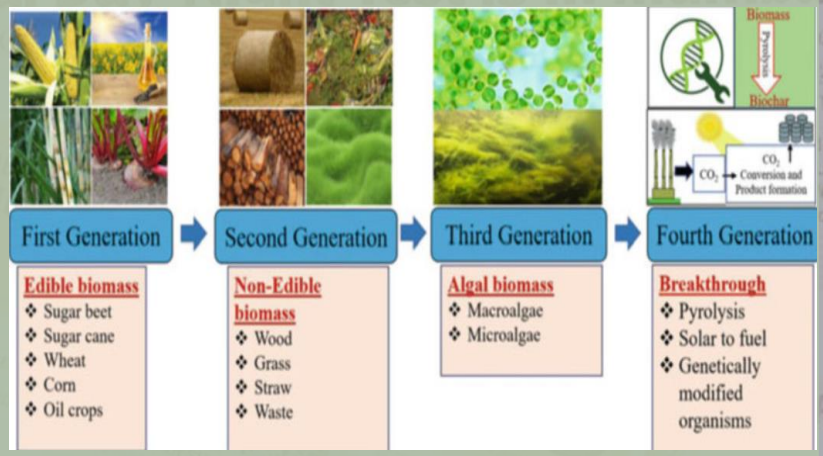
- BIS also revealed that these Indian Standards will align closely with the **goals of the Global Biofuel Alliance (GBA),** a multilateral forum introduced by Prime Minister Narendra Modi during the recent G20 leaders' summit in New Delhi.

Global Biofuel Alliance

- **About:** It is an initiative by India as the G20 Chair. The Alliance intends to **expedite the global uptake of biofuels** by facilitating technology advancements, intensifying the utilization of sustainable biofuels, and shaping robust standard setting and certification through the participation of a wide spectrum of stakeholders.
- **Aim:** To serve as a catalytic platform, fostering global collaboration for the advancement and widespread adoption of biofuels.
- **Function:** The alliance will also act as a central repository of knowledge and an expert hub.
- **Countries involved:** India, Singapore, Bangladesh, Italy, USA, Brazil, Argentina, Mauritius and UAE.

Bureau of Indian Standards (BIS)

- **About**: "It is the National Standards Body of India responsible for the harmonious development of standardization, marking, and quality certification activities for goods, along with related matters."
- **Establishment**: Under the BIS Act 2016
- **Headquarters**: New Delhi and its 05
- **Regional Offices**: Kolkata (Eastern), Chennai (Southern), Mumbai (Western), Chandigarh (Northern) and Delhi (Central)



Biofuels and Types

- **About:** Any hydrocarbon **fuel that is produced from an organic matter** (living or once living material) in a short period of time (days, weeks, or even months) is considered a biofuel.
- **Examples:** Ethanol, biodiesel and biogas.
- **Types:** 1st,2nd , 3rd and 4th Generation of biofuel depending upon the their source of origin and production process.
- **Steps taken in India for biofuels:** National Biofuel Policy (2018), Pradhan Mantri JI-VAN Yojana (2019), GOBAR-DHAN (Galvanizing Organic Bio-Agro Resources) scheme,(2018) etc.

HIDUSTAN TIMES Page 3

ASOLA BHATTI WILDLIFE SANCTUARY

(Syllabus: GS Paper 3 – Env & Eco)

Study at Asola sanctuary to ascertain impact of dumping in old mining pits

Jasjeev Gandhiok
letters@hindustantimes.com

NEW DELHI: Delhi's Ridge Management Board (RMB) has approved a proposal to conduct a comprehensive biodiversity study at the Asola Bhatti Wildlife Sanctuary in south Delhi, officials said.

The proposal, drafted by Wildlife Institute of India (WII), Dehradun, will also prepare a management plan for the sanctuary, assess the possible impact of dumping inert material in the mining pits and also find out how feral animals likely affect the local flora and fauna, they added.

"It was informed that during an earlier meeting of the Ridge Management Board held on June 28, 2022, the board had desired that the forest department may write to the Wildlife Institute of India, Dehradun for conducting a comprehensive study of biodiversity of Asola Bhatti Wildlife Sanctuary as well as the preparation of a management plan for the sanctuary. Accordingly, WII has submitted a proposal for an amount of Rs 91.88 lakh. The study's objectives include baseline information on the soil and groundwater properties, along with a biodiversity assessment," said the minutes of the meeting, dated September 18.

WII's proposal, submitted to the RMB, stated all mining pits at the sanctuary will be delineated and marked with their geophysical features. The proposal said biological attribute maps of different flora and fauna will be created, with critical habitats in the sanctuary to be highlighted for focused efforts.

"WII will develop an integrated management plan for the holistic preservation of the Aravalli ridge, while maintaining the corridor connectivity with the neighbouring states," said an official part of the RMB meeting, on condition of anonymity.

Abandoned mining pits at the sanctuary emerged as a possible dumping ground for 'inert' material being generated at Delhi's three landfills. Inert material is generated after the municipal solid waste is passed through large sieve-like machines.

In its proposal to RMB, WII stated that it will submit an interim report on the biodiversity study and management plan after one year, while the final management plan will be submitted six months after that.

"The assessment will give an understanding on how many butterfly species, insects, avifauna and mammals are present there," said Faiyaz Khudsar, scientist-in-charge of DDA's biodiversity parks programme.

What will WII do at Asola



- Carry out biodiversity assessment, which includes mapping of flora and fauna
- Collect baseline information on soil and groundwater in the area
- Delineate and define the mined-out pits at the sanctuary, mapping them alongside flora and fauna
- Identify and evaluate potential socio-economic changes in the life quality of nearby villages in relation to the ecological system at Asola
- Study impacts on the flora and fauna if inert material is dumped in the mining pits

Study possible impact of feral animals on the local flora and fauna | Develop an integrated management plan for the sanctuary

ASOLA BHATTI WILDLIFE SANCTUARY is spread over 32.71 square kilometres and is at the end of an important wildlife corridor that starts from Sariska National Park in Alwar, Rajasthan, and passes through Mewat, Gurgaon and Faridabad in Haryana



Eco-sensitive zone
The Union government has notified an area of up to 1km around the boundary of the sanctuary in Faridabad and Gurgaon as eco-sensitive zone

Villages in eco-sensitive zone
Lakadpur (Surajkund), Pali, Mangar, Bandhwari, Gwal Pahari, Balola, GGothda Mohbtabad, Badkhal, Ankhir, Mewla Mahrajpur, Anangpur

These are banned
Commercial mining, stone quarrying and crushing units, polluting industries, discharge of untreated effluent, saw mills, brick kilns

Regulated activities
Hotels and resorts, construction, small scale non-polluting industries, felling of trees, civic infrastructure, commercial extraction of water

These are allowed
Rainwater harvesting, organic farming, cottage industries, use of renewable energy and fuels, agro-forestry, use of eco-friendly transport

Context: The **Delhi Ridge Management Board (RMB)** recently approved a proposal to initiate a comprehensive biodiversity study at the **Asola Bhatti Wildlife Sanctuary** in south Delhi.

- The proposal, **drafted by Wildlife Institute of India (WII), Dehradun**, will also prepare a management plan for the sanctuary

Asola Bhatti Wildlife Sanctuary

- **Coverage Area:** 32.71 km2 area on the Southern Delhi Ridge of Aravalli hill range.
- **Location**: Delhi-Haryana border lies in Southern Delhi as well as northern parts of Faridabad and Gurugram districts of Haryana state.
- It is also part of the **Sariska-Delhi Wildlife Corridor**, which runs from the **Sariska Tiger Reserve** in Rajasthan to Delhi Ridge.
- **Vegetation**: Dry deciduous,
- **Flora**: Consists of Prosopis juliflora as the dominant exotic species and Diospyros montana as the dominant native species in the sanctuary.
- **Fauna:** Golden Jackals, Striped-Hyenas, Indian crested-Porcupines, Civets, Jungle Cats, Snakes, Monitor Lizards, Mongoose etc.

Wildlife Institute of India (WII)

- **About**: It is an autonomous institution under the Ministry of Environment, Forest and Climate Change.
- **Establishment**: 1982.
- **Headquarters**: Dehradun, Uttarakhand.
- **Objective**: It offers training programs, academic courses, and advisory in wildlife research and management.

Live Mint

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NON-BASMATI RICE

(Syllabus: GS Paper 3 – Economy)

Nod to non-basmati rice export to UAE

The government on Monday cleared exports of 75,000 tonnes of non-basmati white rice to the UAE through National Cooperative Exports Ltd (NCEL).

Though there is a ban on rice exports, India is shipping rice to friendly and neighbouring countries on their request to meet their food security demands.

"Export of 75,000 MT of non-basmati white rice (under HS code 1006 30 90) to the UAE is permitted through NCEL," the directorate general of foreign trade (DGFT) said in a notification.

Earlier, the government permitted the export of broken rice to Senegal (500,000 tonnes), Gambia (5 lakh tonnes), Indonesia (200,000 tonnes), Mali (100,000 tonnes), and Bhutan (48,804 tonnes).

The government has also allowed exports of non-basmati rice to Bhutan (79,000 tonnes), Mauritius (14,000 tonnes) and Singapore (50,000 tonnes) through the NCEL. PTI

India's Status in Rice Exports

- **India is the second-largest producer** of rice in the world, after China.
- India has become the **largest rice exporter globally**, accounting for nearly 40% of global rice exports in 2022/23.
- **Non-basmati white rice constitutes** approximately 25% of the total rice exported from the country.

Context: The Government of India gave a green signal to the **export of 75,000 tons** of **non-basmati white rice to the UAE**.

- The Government of India has the commitment that in case of f**ood insecure, vulnerable countries and neighboring countries** request, it will provide with the required quantity of rice or wheat.
- **The government permitted** exports of broken rice to Senegal , Gambia, Indonesia, Mali, and Bhutan.
- The **development comes** as India **banned the export of non-basmati white rice** in order to boost domestic supply amid sticky inflation and the expectation of an erratic monsoon.

Key Points

- **The export of non-Basmati white rice** was prohibited on July 20, 2023, citing increasing domestic prices of rice.
- **In September 2022**, the Centre had banned exports of broken rice.
- **In August 2023**, the Centre imposed a 20% export duty on par-boiled non-basmati rice.
- The Agricultural & Processed Food Products Export Development Authority **(APEDA)** is the agency responsible for the regulation of the export of Basmati rice.

Impact of the Ban

- **IMF predicts a potential** rise of 10-15% this year in international rice prices.
- **Countries in Asia and Sub-Saharan Africa**, which heavily rely on India as a major supplier of rice, may face vulnerability due to potential disruptions in the rice market.

PIB

Sept 24

EXERCISE YUDH ABHYAS
(Syllabus: GS Paper 2 – IR)

"EXERCISE YUDH ABHYAS-23" SET TO COMMENCE IN FORT WAINWRIGHT, ALASKA, USA – INDIAN CONTINGENT DEPARTS

Context: The **19th edition of "EXERCISE YUDH ABHYAS"** is set to take place in Fort Wainwright, **Alaska, USA**, from September 25th to October 8th, 2023, as recently announced.

EXERCISE YUDH ABHYAS

- **About:** It is the largest running joint military training and defense cooperation endeavor between India and the US.
- **Focus**: The exercise focuses on enhancing understanding, cooperation, and interoperability between the two armies.
- **Started**: 2004.
- **18th Edition**: Auli in Uttarakhand.

Other Exercises between India and the US

- **Army**: Yudh Abhyas and Vajra Prahar
- **Navy**: MALABAR (Multilateral)
- **Air Force**: Cope India, Red Flag (Multilateral)

Joint Exercises conducted by Army:

S. No.	Country	Exercise
1.	Australia	Ex AUSTRA HIND
2.	Bangladesh	Ex SAMPRITI
3.	China	Ex HAND IN HAND
4.	France	Ex SHAKTI
5.	Indonesia	Ex GARUDA SHAKTI
6.	Kazakhstan	Ex PRABAL DOSTYK
7.	Kyrgyzstan	Ex KHANJAR
8.	Maldives	Ex EKUVERIN
9.	Mongolia	Ex NOMADIC ELEPHANT
		Ex KHAN QUEST
10.	Nepal	Ex SURYA KIRAN (BIANNUAL)
11.	Oman	AL NAGAH (SUCCESS)
12.	Russia	Ex INDRA
13.	Seychelles	Ex LAMITIYE
14.	Singapore	Ex AGNI WARRIOR
		Ex BOLD KURUKHESTRA
15.	Sri Lanka	Ex MITRA SHAKTI
16.	Thailand	Ex MAITREE
		Ex COBRA GOLD (Observer Plus)
17.	UK	Ex AJEYA WARRIOR
18.	USA	Ex YUDHABHAYAS
		Ex VAJRA PRAHAR

DTE

Sept 26

NIGERIA

(Syllabus: GS Paper 1 – Geography)

Gender gaps in agricultural sector cost Nigeria dearly

Report estimated forgone earnings from the gender gap in agricultural productivity at $2.3 billion annually





Context: According to a **new World Bank report**, the **Nigerian economy can earn** an additional $8.1 billion annually **by closing gender gaps** prevailing in the country's agricultural sector.

- **The gender gap is the difference** between women and men as reflected in social, political, intellectual, cultural, or economic attainments or attitudes.

Key Points of Report

- In Nigeria, **women are 10 per cent less likely to work** in the agricultural sector than men and women farmers produce 3**0 per cent less per hectare** than their male counterparts.
- In Nigeria, **women primarily grow** staple food crops, while **men engage more** in cash crops.
- **Gender gaps** are significantly wider regarding the quantity of pesticide used per hectare (in kilograms).

Nigeria

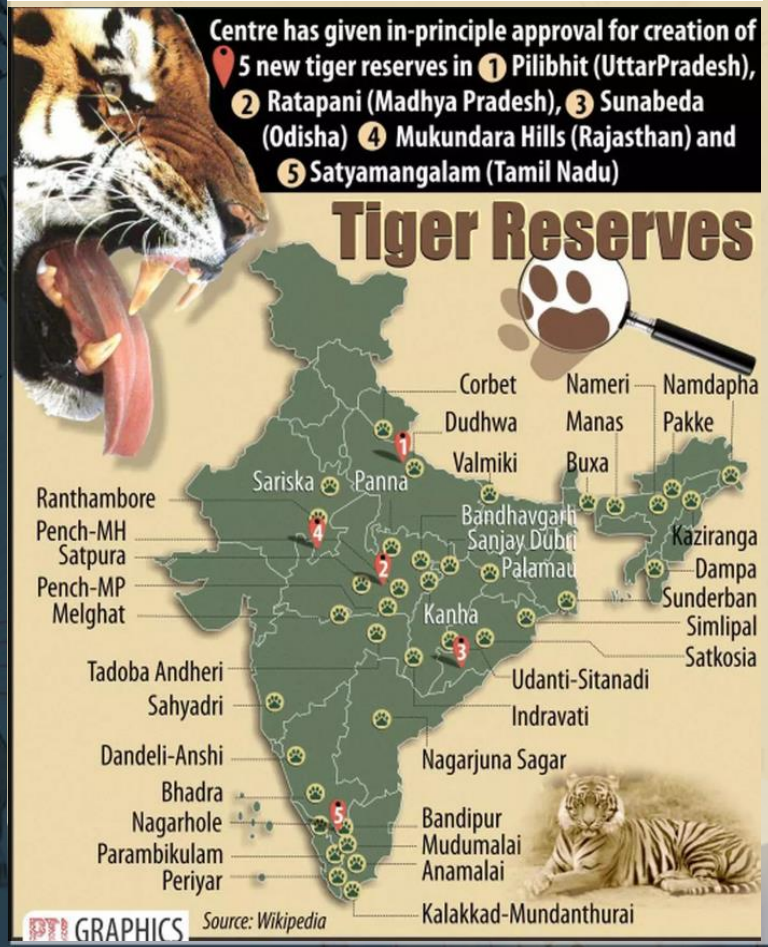
- **About:** It is an African country on the Gulf of Guinea, has many natural landmarks and wildlife reserves
- **Capital**: Abuja
- **Currency**: Naira
- **Protected Areas:** Cross River National Park and Yankari National Parks
- **Vegetation**: Savanna and rare primate habitats.
- **Shares borders with**: Niger in the North, Chad in the North-East, Cameroon in the East & Benin in the West.

TIMES OF INDIA Sept 25

VEERANGANA DURGAVATI TIGER RESERVE

(Syllabus: GS Paper 3 – Env & Eco)

Madhya Pradesh notifies 'Veerangana Durgavati Tiger Reserve' as its 7th Tiger Sanctuary



Context: The Madhya Pradesh Government has officially announced the establishment of the "**Veerangana Durgavati Tiger Reserve** " marking the 7th tiger reserve in the state and 54th in the country.

Veerangana Durgavati Tiger Reserve

- **About:** It is the 7th Tiger Reserve in the State of Madhya Pradesh and 54th in the country.
- **Location**: It is spread across Sagar, Damoh and Narsinghpur districts of Madhya Pradesh.
  - It is spread over an area of 2,339 square kilometres.
- **Areas**: Nauradehi Wildlife Sanctuary and Durgavati Wildlife Sanctuary.
- **Rivers**: Parts of the reserve fall under the Narmada and Yamuna River basins.
- The **Singorgarh Fort** is located within the reserve.
- **Vegetation**: Dry deciduous type
- **Flora**: The chief floral elements include Teak, Saja, Dhaora, Ber, Amla, etc.
- **Fauna**: Tiger, leopard, wolf, jackal, Indian fox, striped hyena, Nilgai, Chinkara, Chital, Sambhar, Black Buck, Barking deer, Common Langur Rhesus Macaque etc.

NCLAT AND CCI
(Syllabus: GS Paper 3 – Economy)



Google vs CCI Case: NCLAT Grants Four Wks to Respondents

Google will receive 2 weeks to file a rejoinder after respondents reply

Suryash.Kumar
@timesgroup.com

New Delhi: The National Company Law Appellate Tribunal (NCLAT) on Monday granted four weeks to respondents in an appeal filed by Google against a Competition Commission of India (CCI) order imposing a ₹936.44 crore penalty on the US technology giant for abusing its dominant position through its Google Play Store policies. The tribunal will next hear the matter on November 28. Google will receive two weeks to file a rejoinder after the respondents submit their replies.

The counsel for Google demanded that the bench hear the matter on a daily basis, but the tribunal noted that it will hear the appeal on a rolling basis "if required".

While Google had approached the NCLAT on December 23, 2022, for immediate relief against the CCI order, the tribunal on January 11 refused and asked the company to deposit 10% of the penalty with the Registrar, NCLAT. The matter was then listed for April 17, when one of the members recused from the case. Last year, the anti-trust regulator imposed a fine on Google after it found in its investigation that Google was forcing companies to adopt its Google Play billing system "exclusively and mandatorily", denying them permission to list their

CASE FILES

Google moves NCLAT on December 23, 2022, for immediate relief against the CCI order

The tribunal on January 11 asks the co to deposit 10% of the penalty with the Registrar, NCLAT

Matter gets listed for April 17, when one of the members recuses from the case

Google and CCI files appeals with the Supreme Court

Hearing to be held on October 3

rily use Google Play's Billing System (GPBS) not only for receiving payments for Apps (and other digital products like audio, video, games) distributed/sold through the Google Play Store but also for certain in-app purchases, i.e. purchases made by users of Apps after they have downloaded/ purchased the App from the Play Store," the CCI order had noted.

"Google shall also not discriminate or otherwise take any adverse measures against such apps using third-party billing/ payment processing services, in any manner," CCI said at the time, pointing out that it disturbs innovation incentives.

In February, Google said it would allow app developers to offer alternate billing systems from April 26.

Google has been at odds with the CCI in another case related to abusing its dominant position in the strea-ming and search market

Context: Recently, the **National Company Law Appellate Tribunal (NCLAT)** requested responses from both Google and the **Competition Commission of India (CCI)** in Google's plea challenging the ₹936.44 crore penalty.

- **In 2018**, Android users moved the competition watchdog (CCI) alleging that Google was abusing its dominant position in the mobile operating system-related market.
- **In October 2022**, based on the report of DG, the commission imposed a penalty of Rs 1,337.76 crore on Google.

National Company Law Appellate Tribunal (NCLAT)

- **Constituted**: Under Section 410 of the Companies Act, 2013 for hearing appeals against the orders of the National Company Law Tribunal(s) (NCLT), with effect from 1st June 2016.
- **Nodal Ministry**: Ministry of Corporate Affairs
- **Aim**: To promote competition and prevent activities that have an appreciable adverse effect on competition in India.
- **Functions:** Hearing appeals against the orders passed by NCLT(s) under Section 61 of the Insolvency and Bankruptcy Code, 2016 (IBC).
  - To hear and dispose of appeals against any direction issued or decision made or order passed by the Competition Commission of India (CCI).
  - It also hears and disposes of appeals against the orders of the National Financial Reporting Authority.

Competition Commission of India (CCI)

- **About**: It is a quasi-judicial body which gives opinions to statutory authorities and also deals with other cases.
- **Establishment**: March 2009 by the Government of India under the Competition Act, 2002for the administration, implementation, and enforcement of the Act.
- **Composition of the CCI:** One Chairperson and six Members who shall be appointed by the Central Government.
  - The Chairperson and other Members shall be whole-time Members

Objectives

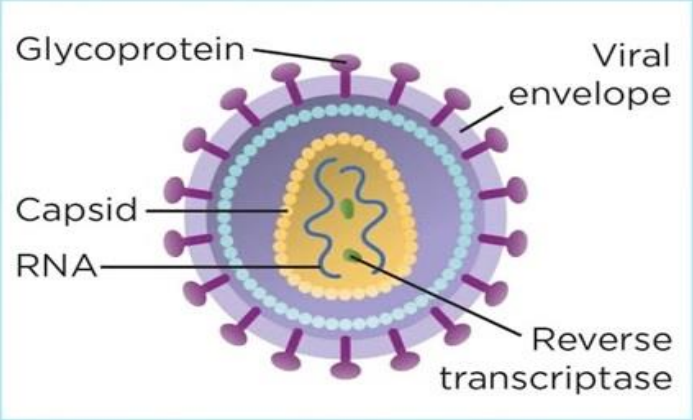
- It will eliminate practices having adverse effects on competition.
- To Promote and sustain competition.

HIV-1 VIRUS

(Syllabus: GS Paper 2 – Social Issues - Health)

IISER Bhopal scientists develop novel molecule that can hinder viral transcription of HIV-1 virus

Fig 1. **HIV virus structure**



RNA

- **About**: It is a nucleic acid present in all living cells that has structural similarities to DNA
- RNA is most **often single-stranded**
- An RNA molecule has a **backbone made of alternating phosphate groups** and sugar ribose.
- **Different types of RNA in cells:** Messenger RNA (mRNA), ribosomal RNA (rRNA) and transfer RNA (tRNA).

Context: Recently, researchers at the Indian Institute of **Science Education and Research (IISER)** in **Bhopal identified** a **Circular RNA virus(ciTRAN),** whose role in HIV-1 virus replication has remained unclear for a long time, and also developed a molecule that could hinder viral **transcription**.

Key Points

- **Benefit of the research:** Establishing how **ciTRAN** modulates the virus's transcription process, could potentially lead to novel drugs and therapies to fight HIV-1.
- **Transcription:** It is the synthesis of RNA from a DNA template where the code in the DNA is converted into a complementary RNA code.
- **Translation**: It is the synthesis of a protein from an mRNA template where the code in the mRNA is converted into an amino acid sequence in a protein.

HIV-1 Virus

- **About**: HIV stands for Human Immunodeficiency Virus, which is a virus that attacks the immune system in the human body.
- **Target**: It primarily targets and damages CD4 immune cells, which are essential for the body's ability to fight infections and diseases.
- **Transmission**: Exchange of certain bodily fluids such as blood, semen, vaginal fluids, and breast milk.
- **Infection**: Tuberculosis and fungal infections, severe bacterial infections and some cancers
- **HIV-1 viral protein R (VpR)**: It is a multifunctional protein that plays specific roles at multiple stages of the HIV-1 viral life cycle and affects anti-HIV functions of the immune cells

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