

Factly Monthly

Compilation

2024

**For UPSC CSE Prelims
Exam**

June, 2024

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UPSC Syllabus: Environment

Canopy Bridges for Gibbons in Assam

Why in News?

The Northeast Frontier Railway (NFR) has allocated funds to build canopy bridges, allowing India's only ape to safely traverse a railway track that divides its primary habitat in eastern Assam.

About Canopy Bridges for Gibbons in Assam

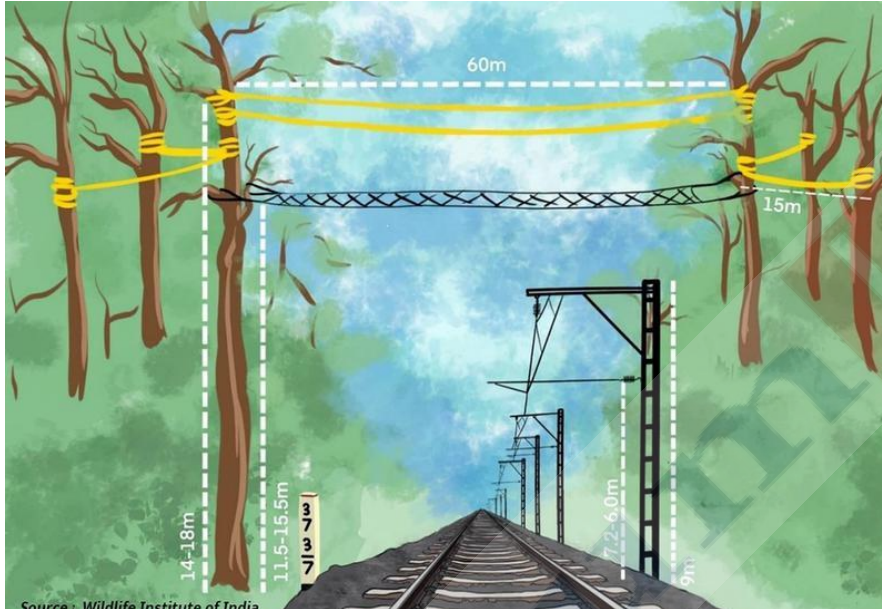


Figure 1. Source: The Hindu

1. About: Northeast Frontier Railway (NFR) will construct canopy bridges in Assam's gibbon habitat.

2. Purpose: To facilitate the movement of Hoolock gibbons across a railway track that divides their prime habitat in [Hollongapar Gibbon Sanctuary](#).

3. Designed by: Canopy bridges are designed by the [Wildlife Institute of India \(WII\)](#) in collaboration with [NFR](#). The project

involves [NFR](#), [Assam State Forest Department](#), [WII](#), and other stakeholders.

4. These bridges will be **installed at strategic points** to ensure the safe movement of gibbons between the divided sections of the sanctuary.

5. **High-grade fastening materials and techniques** will be used to secure the bridges. **Safety nets** will be installed below the bridges as a fail-safe mechanism.

6. **Lianas and creepers** will be **guided along the bridges** to make them look natural.

7. Previous Efforts: Past efforts included an artificial canopy bridge by NFR and a natural canopy bridge by the Assam State Forest Department and Aaranyak. Gibbons preferred the natural bridge over the artificial one.

About Hoolock Gibbons

Aspects	Description
About	Gibbons are the smallest and fastest of all apes.
Characteristics	Hoolock gibbons are known for their intelligence, distinct personalities, and strong family bonds .
Habitat	1. They inhabit tropical and subtropical forests in Southeast Asia . 2. They are found in forested areas of Northeast India, Bangladesh, Myanmar, and Southern China .

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Population	The estimated current population of hoolock gibbons is approximately 12,000 individuals .
Threats	<ol style="list-style-type: none">1. All 20 gibbon species, including hoolock gibbons, face a high risk of extinction due to various conservation challenges.2. Habitat Decline: Gibbon populations and their habitats have significantly declined over the past century, now restricted to small areas in tropical rainforests.3. Primary Threat in India: The main threat to hoolock gibbons is habitat loss due to deforestation for infrastructure projects.
Conservation Status	1. International Union for Conservation of Nature's Red List: a) Western Hoolock Gibbon: Endangered b) Eastern Hoolock Gibbon: Vulnerable 2. Indian Wildlife Protection Act 1972: Both species are listed on Schedule 1.

Air of the Anthropocene Initiative

Why in News?

The “**Air of the Anthropocene**” project uses **light painting** to visualize air pollution in India, Ethiopia, and the UK. This emphasizes severe health risks and ignites global discussions on air quality.

About the ‘Air of the Anthropocene’ Initiative

1. The “Air of the Anthropocene” project is an **international effort** that combines art and science to show air pollution in a visual way using light painting.
2. Artists and researchers worked together to create **photographic evidence of air pollution by using digital light painting techniques** and low-cost air pollution sensors.
3. The “painting with light” team used low-cost air pollution sensors to measure PM mass concentrations. They used the sensors’ real-time data to control a moving LED array, which flashed more rapidly as PM concentrations increased.

About Particulate Matter

1. Particulate matter (PM) is a mixture of tiny solid particles and liquid droplets floating in the air. It includes things like **dust, pollen, soot, smoke, and liquid drops**.

PM10- inhalable particles, with diameters that are generally 10 micrometers and smaller; and

PM2.5- fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

2. These particles can be both **organic** (from living things) and **inorganic** (from non-living things) and come in various sizes and from different sources.

UPSC Syllabus: Environment

Przewalski horses

Why in News?

Przewalski horses were reintroduced to their native habitat in Kazakhstan.

About Przewalski horses

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Source: Smithsonian's National Zoo and Conservation Biology Institute

Aspects	Description
About	<ol style="list-style-type: none"> 1. Przewalski horses were found in Mongolia. They are the last truly wild horse. 2. Once thought to be the ancestor to the domestic horse, they are actually distant cousins. 3. Mitochondrial DNA suggests that they diverged from a common ancestor 500,000 years ago.
Physical Description	<ol style="list-style-type: none"> i) They are small, stocky, heavily built with a large head, thick neck, and short legs. ii) They have dun-colored with a dark zebra-like erect mane, no forelock, and a dark stripe along the backbone to a dark, plumed tail. iii) There are markings in their body which are of yellowish-white belly, dark lower legs, and zebra-like stripes behind the knees. iv) Horses can withstand harsh winters with temperatures dropping below minus 30 degrees Celsius.
Native Habitat	<ol style="list-style-type: none"> i) They were originally found across Europe and Asia. Now they are found at reintroduction sites in Mongolia, China, and Kazakhstan. ii) There are now 2,000 Przewalski horses around the world, mainly in China and Mongolia but, they are also found in France, Russia and living wild in the Chernobyl exclusion zone between Belarus and Ukraine.
Diet	Grass and leaves from shrubby trees
Social Structure	Typically consist of several mares, a dominant stallion, and their offspring. Younger stallions form bachelor herds and must defeat the dominant stallion to breed. Offspring are chased out upon reaching breeding age.
Distinction	Wild Status: It is the only true wild horses left. Other "wild" horses are actually feral domestic horses.
Conservation status	IUCN: Endangered

Four-horned Antelope

Why in the News?

A rare four-horned antelope has been sighted for the first time in the Veerangana Durgavati Tiger Reserve.

About four-horned antelope



Source: The Free Press Journal

Aspects	Description
About	<ol style="list-style-type: none">1. The four-horned antelope, also known as Chousingha, is a small bovid antelope.2. Its scientific name is Tetracerus quadricornis.3. These antelopes are the smallest found in Asia.
Characteristic features	<ol style="list-style-type: none">1. The four-horned antelope has a yellowish-brown to reddish coat, a slender build, small legs, and a short tail.2. One of their unique features is the presence of four horns. Only males grow horns, with one pair located between the ears and another on the forehead.3. These antelopes are typically diurnal and solitary, although they can sometimes be seen in loose groups of three to four.
Distribution	The four-horned antelope is endemic to India and Nepal. In India, their range extends from the foothills of the Himalayas in the north to the Deccan Plateau in the south.
Habitat	They predominantly inhabit open, dry, deciduous forests in hilly terrain. They prefer areas with significant grass cover or heavy undergrowth and are usually found close to water bodies.
Conservation Status	IUCN Red List: Vulnerable on the IUCN Red List.

About Veerangana Durgavati Tiger Reserve

Aspects	Description
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About	<ol style="list-style-type: none">1. Veerangana Durgavati Tiger Reserve is spread across Sagar, Damoh, and Narsinghpur districts in Madhya Pradesh.2. It is the seventh tiger reserve in Madhya Pradesh.3. The reserve will encompass areas within the Nauradehi Wildlife Sanctuary and Durgavati Wildlife Sanctuary.
Characteristic Features	<ol style="list-style-type: none">1. The Singorgarh Fort is located within the reserve.2. The reserve will include areas within the Nauradehi Wildlife Sanctuary and Durgavati Wildlife Sanctuary.3. A green corridor will be developed to connect Panna Tiger Reserve (PTR) with Durgavati facilitating the natural movement of tigers to the new reserve.
Rivers	Parts of the reserve fall under the Narmada and Yamuna River basins.
Vegetation	The vegetation in the reserve is of the dry deciduous type.
Flora	The chief floral elements include Teak, Saja, Dhaora, Ber, Amla, and others.
Fauna	The reserve is home to a variety of animals, including tigers, leopards, wolves, jackals, Indian foxes, striped hyenas, Nilgai, Chinkara, Chital, Sambhar, Black Buck, Barking deer, Common Langur, and Rhesus Macaque.

Report on Nitrous Oxide Emissions

Why in the News?

A new report published by the Global Carbon Project reveals that planet-warming nitrous oxide (N₂O) emissions increased by 40 percent between 1980 and 2020.

Highlights of the Report on Nitrous Oxide Emissions

1. Global Impact

- i) Nitrous oxide is the third most significant greenhouse gas, after carbon dioxide and methane.
- ii) Over 100 years, nitrous oxide is 273 times more potent than carbon dioxide.
- iii) The increase in greenhouse gases has already raised the Earth's average surface temperature by 1.15 degrees Celsius compared to the 1850-1900 average.
- iv) Anthropogenic nitrous oxide emissions contribute to about 0.1 degrees Celsius of this warming.

2. Emission Trends

- i) Nitrous oxide emissions grew by 40% between 1980 and 2020.
- ii) China is the largest emitter, followed by India and the United States. The top 10 emitters are China, India, the United States, Brazil, Russia, Pakistan, Australia, Indonesia, Turkey, and Canada.

3. Major Sources

- i) Seventy-four percent of nitrous oxide emissions over the last decade originated from agricultural practices, specifically the use of nitrogen fertilizers and animal manure.
- ii) Other significant sources include industrial activities and the burning of forests or agricultural waste.

4) Atmospheric Concentration

- i) In 2022, the concentration of nitrous oxide in the atmosphere reached 336 parts per billion.

ii) This concentration is 25% higher than the levels seen before the industrial age (1850-1900) and significantly surpasses the predictions made by the Intergovernmental Panel on Climate Change (IPCC).

About Nitrous oxide

1. Nitrous oxide is commonly known as laughing gas or happy gas.
2. It is a colorless, odorless, and non-flammable gas. While nitrous oxide is not flammable, it supports combustion similarly to oxygen. It leads to a state of euphoria, explaining its nickname 'laughing gas.'
3. Nitrous oxide is soluble in water, and its vapors are heavier than air.

4. Applications:

i) Medical Use: Nitrous oxide is commonly used by dentists and medical professionals to sedate patients undergoing minor medical procedures.

ii) Food Industry: The gas is also used as a propellant in food aerosols.

iii) Automotive Industry: It is used in the automotive industry to enhance engine performance.

MD2 Pineapple

Why in the News?

The Agricultural and Processed Food Products Export Development Authority (APEDA) has facilitated the successful export of the first consignment of MD 2 variety pineapples to the United Arab Emirates (UAE). The consignment included 8.7 metric tons (650 boxes) of MD 2 pineapples.

About MD2 Pineapple

Aspects	Description
About	<ol style="list-style-type: none">1. The MD 2 pineapple, also known as "Golden Ripe" or "Super Sweet."2. It was developed by Del Monte in the 1980s through selective breeding.
Production	<ol style="list-style-type: none">1. It is largely cultivated in Costa Rica, the Philippines, and Thailand.2. In India, it is produced in the Sindhudurg district of the Konkan region in Maharashtra.
Unique features	<ol style="list-style-type: none">1. MD2 pineapples are known for their exceptionally sweet flavor, with a sugar content higher than that of traditional pineapples.2. They have lower acidity, making them more palatable and easier on the stomach for those sensitive to acidic fruits.3. These pineapples contain more vitamin C than traditional varieties, making them a healthier choice.
Appearance	MD2 pineapples have a uniform cylindrical shape and a golden-yellow skin when ripe. Their flesh is also more golden compared to other varieties.
Shelf Life	They have a longer shelf life, which makes them ideal for export and extended storage.
Uses of MD2 Pineapple	<ol style="list-style-type: none">i) Nutritional Value: High in vitamins, especially vitamin C, and minerals.ii) Digestive Aid: Contains bromelain, an enzyme that aids in digestion and has anti-inflammatory properties.iii) Versatility: Can be used in a variety of dishes, including salads, desserts,

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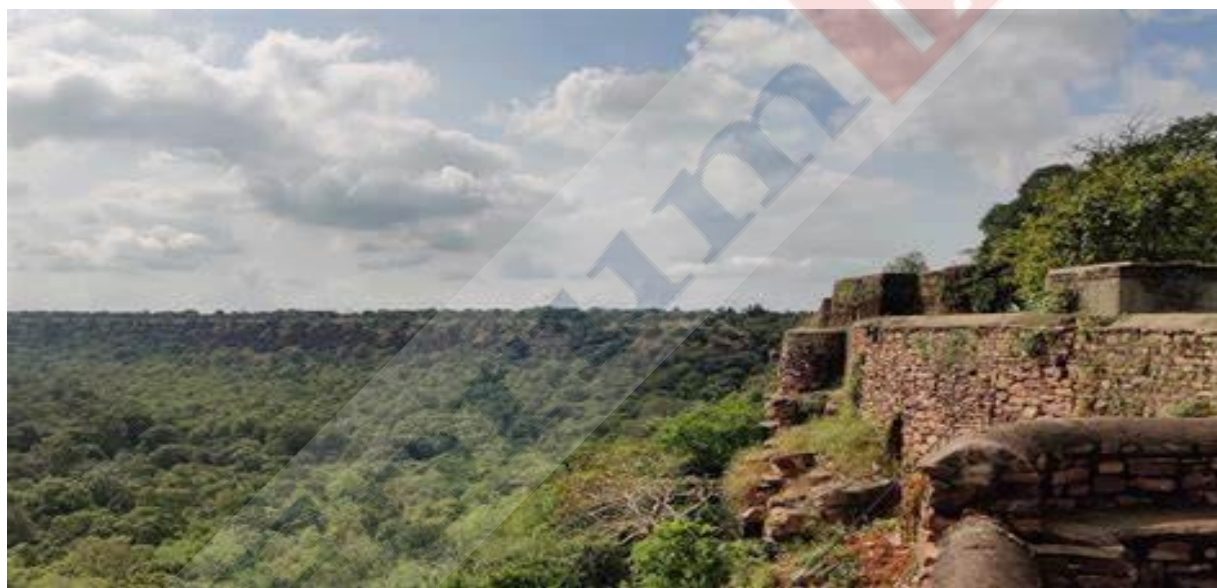
	juices, and as a garnish.
Consumption	i) They are eaten fresh as a snack or in fruit salads. ii) They are used in recipes for cooking and baking, adding a sweet and tangy flavor to dishes. iii) They are also made into fresh juice or smoothies.

Gandhi Sagar Wildlife Sanctuary

Why in the News?

Recently it was announced that the Gandhi Sagar Wildlife Sanctuary will be the second home for cheetahs in India.

About Gandhi Sagar Wildlife Sanctuary



Source: Nature inFocus

Aspects	Description
About	1. It is located on the northern boundary of the Mandsaur and Nimach districts in Madhya Pradesh. 2. It is named after the Gandhi Sagar Dam which is situated on the Chambal River. 3. It was notified in the year 1974 and added to the list of sanctuaries in 1984.
River flowing through it	The Chambal River flows through the sanctuary, dividing it into two distinct parts.
Topography	The sanctuary boasts a varied landscape, featuring hills, plateaus, and the catchment area of the Gandhi Sagar Dam on the Chambal River.
Vegetation	It lies in the Khathiar-Gir dry deciduous forests ecoregion.

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Cultural significance	The sanctuary is home to numerous sites of historical, archaeological, and religious importance, including Chaurasigarh, Chaturbhujnath Temple, Bhadkaji Rock Paintings, Narsinghjar Hinglajgarh Fort and Taxakeshwar Temple
Flora	The primary tree species in the sanctuary are Khair, Salai, Kardhai, Dhawda, Tendu and Palash
Fauna	The sanctuary supports a diverse range of wildlife, including chinkara, Nilgai, Spotted Deer, Indian Leopard, Striped Hyena, Jackal, Crocodiles, otters, turtles and various fishes.

India's Bio-Bitumen Initiative

Why in the news?

India is planning to initiate **large-scale production of bio-bitumen** derived from biomass or agricultural waste.

About India's Bio-Bitumen Initiative

- i) India is actively exploring large-scale production of bio-bitumen from biomass or agricultural waste.
- ii) This innovative approach aims to **reduce the country's dependence on imported bitumen** which is commonly used for road asphaltting, while also addressing the persistent issue of stubble burning.
- iii) **India currently imports about half of its annual bitumen requirement.** The goal is to replace these imports with bio-bitumen over the next decade.

About Bio-Bitumen

- i) Bio-bitumen is a **sustainable alternative to traditional fossil-fuel-based bitumen.** It is petroleum-free and manufactured from organic materials such as bio-char, bio-oil, and similar substances. It is also known as **bio-asphalt.**
- ii) Bio-bitumen can be used to supplement bitumen or to **reduce the amount of bitumen in binder mixtures.**

How is Bio-Bitumen Made?

- i) Bio-bitumen is an **asphalt mixture made from lignins** which are natural biopolymers found in the plant cell wall. Lignins provide structural support and aid in plant growth.
- ii) The production process involves heating the waste mixture to around 500°C without oxygen in a process known as **pyrolysis.** This method is similar to the production of charcoal and biochar and is also used in biofuel manufacturing.

Benefits of Bio-Bitumen

- i) **Economic Impact:** Bio-bitumen production from biomass could lead to substantial savings in foreign exchange by reducing the need for imports. It would also make India self-reliant in bio-bitumen production.
- ii) **Environmental Impact:** This initiative provides an effective solution to the problem of stubble burning, promoting the sustainable use of agricultural waste and biomass.

UPSC Syllabus: Reports

UNESCO's State of Ocean Report 2024

Why in News?

Recently, UNESCO State of Ocean Report 2024 has been published by United Nations.

About the UNESCO State of Ocean Report 2024

1. The UNESCO 'State of the Ocean Report' was started by the Intergovernmental Oceanographic Commission (IOC-UNESCO) during the 2022 United Nations Ocean Conference.
2. This report provides an easy-to-understand overview of the ocean's current condition. It helps track the progress of the UN Decade of Ocean Science for Sustainable Development (2021–2030) and encourages efforts towards creating a sustainable future for our oceans.
3. The first report in 2022 included insights from over 100 marine science experts on topics like ocean acidification, pollution, and tsunami warnings.
4. New editions of the report are released every year on World Oceans Day (June 8). These reports align with the seven goals of the UN Ocean Decade.

Key Highlights of the report

1. **Ocean Warming:** The upper 2,000 meters of the oceans have been warming significantly. The rate of warming has increased from 0.32 ± 0.03 watts per square meter (W/m^2) to 0.66 ± 0.10 W/m^2 in the past 20 years.
2. **Energy Absorption:** Oceans are absorbing about 90% of the Earth's excess energy. This causes deoxygenation (loss of oxygen), which threatens marine ecosystems and human economies that rely on them.
3. **Ocean Acidification:** The acidity of the ocean is increasing globally, especially in the open ocean, with a notable drop in pH since the late 1980s.
4. **Sea Level Rise:** Sea levels have been rising steadily since 1993. Better monitoring systems are needed to track this at all levels.
5. **Marine Carbon Dioxide Removal:** There is growing interest in technologies to remove carbon dioxide from the ocean, but their effectiveness and environmental impact are still uncertain.

Child Nutrition Report 2024

Why in the News?

According to the recently released Child Nutrition Report 2024, severe food poverty affects one in four children under age 5 around the world.

About Child Nutrition Report 2024

1. **Published by:** UNICEF.
2. **Objective:** It examines the status, trends, inequities, and drivers of child food poverty in early childhood.
3. It addresses the impact of global and local food and nutrition crises.

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4. It concentrates on low- and middle-income countries where most children experiencing food poverty reside.
5. It explores the effects of child food poverty on undernutrition and poor development.
6. UNICEF defines Child Food Poverty as children's inability to access and consume a nutritious and diverse diet in early childhood (first five years of life).

Highlights of the 2024 Report

- 1. Global Impact:** One in four children under age 5 worldwide (27% or 181 million) faces severe food poverty and is at risk of life-threatening malnutrition.
- 2. Regional Distribution:** Over two-thirds of the 181 million young children living in severe food poverty are in South Asia and sub-Saharan Africa.
- 3. Key Countries:** 20 countries account for 65% of children living in severe food poverty: – Afghanistan, Bangladesh, China, Côte d'Ivoire, Democratic Republic of the Congo, Egypt, Ethiopia, Ghana, India, Indonesia, Myanmar, Niger, Nigeria, Pakistan, Philippines, Somalia, South Africa, Uganda, United Republic of Tanzania, Yemen.
- 4. Household Impact:** Children in both poor and non-poor households face severe food poverty.
- 5. Economic Distribution:** About half (97 million) of the children in severe food poverty live in middle- and upper-income households.

Global Gender Gap Report 2024

Why in the News?

The World Economic Forum (WEF) has released the Global Gender Gap Report 2024, highlighting persistent gender inequality across various sectors worldwide.

About Global Gender Gap Report 2024

1. The Global Gender Gap Report 2024 is published by the **World Economic Forum**.
2. It assesses gender parity across **four key dimensions:** Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment.
3. It is the longest-standing index tracking the progress of numerous countries' efforts towards closing these gaps over time since its inception in 2006.

Key findings of the report

1. The global gender gap score for all 146 countries included in this edition stands at 68.5%.
2. Among the 101 countries continuously covered since 2006, the gap has also improved by +0.1 points to reach 68.6%.
3. Despite progress, no country has achieved full gender parity. However, 97% of economies included in this edition have closed more than 60% of their gender gap (compared to 85% in 2006).

5. Top-Ranking Countries:

- i) Iceland maintained its position as the most gender-equal country for the 14th consecutive year, with a gender gap score of 91.2%.
- ii) Norway, Finland, and Sweden also rank high, consistently placing in the top five.

About India's Performance

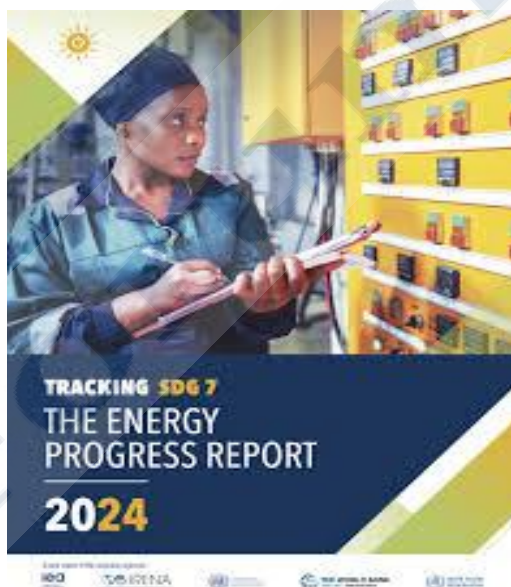
1. India is ranked 129 in this year's index. The ranking reflects a slight regression compared to the previous edition.
2. The decline is primarily due to **small decreases in 'Educational Attainment' and 'Political Empowerment.'** Despite the overall decline, there was a **slight improvement in 'Economic Participation and Opportunity.'**
3. **India ranks the third-lowest** among South Asian economies. India fares worse than Bangladesh, Nepal, Sri Lanka, and Bhutan.

Tracking SDG 7: The Energy Progress Report 2024

Why in News?

According to the recently released "**Tracking SDG 7: The Energy Progress Report 2024**", the world is **not on course** to achieve the Sustainable Development Goal (SDG) 7 for energy by 2030.

SDG 7 aims to ensure access to **affordable, reliable, sustainable and modern energy**. The SDG 7 goal includes reaching universal access to electricity and clean cooking, doubling historic levels of efficiency improvements, and substantially increasing the share of renewables in the global energy mix.



Source- WHO

About the Report and its important Findings

Released By	The Report is released annually by the five custodian agencies . The agencies are as follows- <ol style="list-style-type: none">1. The International Energy Agency (IEA)2. The International Renewable Energy Agency (IRENA)3. The United Nations Statistics Division (UNSD)4. The World Bank5. The World Health Organization (WHO)
Focus of the Report	This report summarizes global progress on energy access, energy efficiency, renewable energy, clean cooking, and international cooperation to advance SDG 7.

Highlights of the Report	<p>1. Insufficient Progress- While the share of renewables in global electricity consumption has increased to 28.2%, this is still insufficient to reach the targets set forth in the SDGs.</p> <p>2. Offtrack in achieving universal access to clean cooking- The world remains off track to achieve universal access to clean cooking by 2030. 2.1 billion people still live without access to clean cooking fuels and technologies, largely in Sub-Saharan Africa and Asia.</p> <p>3. Increase in the number of people living without electricity- The number of people living without electricity grew for the first time in over a decade.</p> <p>4. Premature Deaths- Household air pollution created by using polluting fuels and technologies for cooking results in 3.2 million premature deaths each year.</p> <p>5. Increase in per-capita installed energy-generating capacity- The installed renewable energy-generating capacity per capita has reached a new record in 2022 at 424 watts per capita globally. However considerable disparities exist between the developed and the developing countries. Developed countries (at 1,073 watts per capita) have 3.7 times more capacity installed than developing countries (at 293 watts per capita).</p>
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UPSC Syllabus: Geography

Ghataprabha River

Why in the News?

Recently, nine people were rescued by locals after a tractor overturned and fell into the Ghataprabha River.

About Ghataprabha River

1. The Ghataprabha River is a significant **tributary of the Krishna River**, which flows through the state of Karnataka.
2. The river **originates in the Western Ghats** at an elevation of 884 meters.
3. It flows eastward for a distance of 283 kilometers before **merging with the Krishna River**.
4. The river descends by 53 meters at Gokak Falls in Belgaum (Belagavi) District, Karnataka.
5. The river basin spans 8,829 square kilometers, covering regions in both Karnataka and Maharashtra.
6. **Key tributaries** of the Ghataprabha include the Hiranyakeshi River and the Markandeya River.

About Krishna River

1. The Krishna River is a prominent river in south-central India.
2. The Krishna River rises in western Maharashtra, specifically in the Western Ghats near the town of Mahabaleshwar.
3. It flows through the states of Maharashtra, Karnataka, Telangana, and Andhra Pradesh, eventually emptying into the Bay of Bengal at Hamasaladevi in Andhra Pradesh.
4. The Krishna River Basin covers an area of about 258,948 square kilometers, accounting for nearly 8 percent of India's total geographical area.

5. The Tungabhadra River, formed by the confluence of the Tunga and Bhadra Rivers originating in the Western Ghats.

These include the Koyna River, Bhima River, Kundali River, Malaprabha River, Ghataprabha River, Yerla River, Warana River, Dindi River, Musi River, and Dudhganga River.

6. In terms of water inflows and river basin size, the Krishna River ranks as the fourth largest river in India, following the Ganga, Godavari, and Brahmaputra rivers.

Notified Disasters

What are Notified Disasters?

Why in news?

The ongoing extreme heat in many parts of the country has reignited discussions on including heatwaves as one of the notified disasters under the Disaster Management (DM) Act, 2005.

About Notified Disaster

1. The Disaster Management Act, 2005, defines a disaster as a “catastrophe, mishap, calamity or grave occurrence” arising from natural or man-made causes.
2. Disasters result in substantial loss of life, destruction of property, or damage to the environment.

Categories of Notified Disasters

1. The Act includes 12 categories of notified disasters which are Cyclone, Drought, Earthquake, Fire, Flood, Tsunami, Hailstorm, Landslide, Avalanche, Cloudburst, Pest attack, Frost and cold waves.
2. Notified disasters are eligible for relief assistance under the State Disaster Response Fund (SDRF) and National Disaster Response Fund (NDRF).
3. The SDRF is primarily used for immediate relief to victims of notified disasters.
4. The NDRF supplements the SDRF in cases of severe disasters where funds are insufficient.

Exclusion of Heatwaves

1. Heatwaves are not currently included as a notified disaster under the Act.
2. Despite being a significant concern in certain regions of India, the Finance Commission has not expanded the list to include heatwaves.
3. If classified as a disaster, States can use up to 10% of their SDRF allocation for local disasters, including heatwaves, which some states have done.

Role of NDMA

1. The National Disaster Management Authority (NDMA) plays a crucial role in disaster management in India.
2. NDMA lays down policies, plans, and guidelines for disaster management.
3. It aims to promote a national resolve to mitigate the damage and destruction caused by natural and man-made disasters through sustained and collective efforts.

UPSC Syllabus: Disaster management

Delos Island

Why in the news?

An expert has warned that the remarkable ancient site on the small Greek island of Delos is “**at risk of vanishing**” within decades due to rising sea levels and geological processes.

About Delos Island



Source: ancientwisdom.com

Aspects	Description
About	<ol style="list-style-type: none"> 1. It is a rocky island and part of the Cyclades archipelago in the Aegean Sea. It was first settled in the 3rd millennium B.C. and significant in the 1st millennium B.C. 2. Delos is now largely uninhabited, but its rugged granite landscape covers approximately 1.3 square miles.
Mythology and History	<ol style="list-style-type: none"> 1. Delos was considered a holy sanctuary for a millennium before it became known as the birthplace of Apollo and Artemis in Olympian Greek mythology. 2. The island's Sacred Harbour features three conical mounds associated with a goddess (possibly Athena). 3. UNESCO recognized Delos as a World Heritage Site due to its exceptional archaeological remains, its influence on Greek architecture, and its sacred importance throughout Ancient Greece

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Archaeological Significance	<ol style="list-style-type: none">1. Extensive excavations have revealed artifacts that are now displayed at the Archaeological Museum of Delos and the National Archaeological Museum of Athens.2. The island was inhabited since the third millennium BCE and served as a major cult center for gods like Dionysus and Leto.3. Delos underwent purification rituals to ensure proper worship of the gods, including the removal of graves within sight of the temple.
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Key Facts about the Aegean Sea

1. It is located in the **East Mediterranean Basin**, with the Greek peninsula to the west and Anatolia (Asian side of Turkey) to the east.
2. The Bosphorus and Dardanelles Straits connect the Aegean Sea to the Black Sea and the Marmara Sea, respectively.
3. Most Aegean Islands belong to Greece. Turkey's notable possessions in the Aegean Sea are Imbros (Gökçeada) and Tenedos (Bozcaada) in the northeastern part.

Climate of the Aegean Sea

1. It is characterized by hot, **dry summers and mild**, wet winters, typical of Western Turkey and Greece.
2. It is defined by **drier and hotter summers** with milder winters. It is classified as cold semi-arid, with cooler summers.
3. The **Etesian wind significantly influences** the weather in the Aegean basin.

Impact of the Hunga Tonga-Hunga Ha'apai Eruption

Why in News?

Recently, a study was conducted in the Journal of Climate to investigate the climatic effects caused by the eruption of Hunga Tonga-Hunga Ha'apai volcano. It erupted on January 15, 2022, in Tonga, generating a tsunami and triggering warnings across the Pacific basin.

Findings of the study

1. Ozone Layer Effect: From August to December 2023, there was a large hole in the ozone layer partly because of the Hunga Tonga eruption. This effect on the ozone was short-term and not expected to last past 2023.

2. Weather Changes: The eruption caused some unusual weather changes:

- i) Australia had a wetter summer in 2024, which is not usual for an El Niño year when it's typically drier.
- ii) The global average temperature only went up by a tiny bit, around 0.015 degrees Celsius.

3. Regional Climate Effects:

- i) Northern Australia might experience colder and wetter winters than usual up to 2029.
- ii) North America could see warmer winters during the same period.
- iii) Scandinavia might have colder winters.

4. Atmospheric Changes: The eruption changed the way air moves in the atmosphere, which could affect weather patterns.

How is Hunga Tonga Different from Typical Volcanic Eruptions?

- 1. Unique Eruption:** Hunga Tonga-Hunga Ha'apai is an underwater volcano that erupted on January 15, 2022. This eruption was extraordinary because it shot a huge amount of water vapor high into the sky, into the stratosphere (about 15-40 kilometers above the Earth).
- 2. Usual Volcanic Effects:** Typically, volcanoes release smoke and sulfur dioxide which leads to a cooling effect on Earth. This happens because sulfur dioxide turns into tiny particles that float in the air and reflect sunlight away from Earth.
- 3. Hunga Tonga's Impact:** Being underwater, Hunga Tonga didn't produce much smoke but sent 100-150 million tonnes of water vapor into the stratosphere instead.
- 4. Effects of Water Vapor:** In the stratosphere, water vapor can harm the ozone layer and act like a greenhouse gas, which might warm the Earth.

About Hunga Tonga-Hunga Ha'apai volcano

- 1) Location:** The Hunga Tonga-Hunga Ha'apai volcano is situated in the western South Pacific Ocean, west of Tonga's main inhabited islands.
- 2) Type of Volcano:** It is a submarine volcano, one of twelve along the Tofua Arc, part of the larger Tonga-Kermadec volcanic arc.
- 3) Geological Formation:** This arc is formed by the subduction of the Pacific Plate beneath the Indo-Australian Plate.
- 4) Composition:** The volcano includes two small, uninhabited islands named Hunga-Ha'apai and Hunga-Tonga.

UPSC Syllabus: World geography, Environment

Sunkoshi River

Why in News?

Under the **PLEASE (Plastic Free Rivers and Seas of South Asia)** program, a river cleanup campaign has **successfully removed 24,575 kg of waste from the Sunkoshi River banks** and waste hotspots.

About Sunkoshi River

Aspects	Description
About	<ol style="list-style-type: none">1. It is also known as the "river of gold," the Sunkoshi is located in Nepal and is part of the Koshi or Saptkoshi River system.2. This river is among the longest and most rafted in Nepal.
Course	<ol style="list-style-type: none">1. The Sunkoshi originates from the Zhangzangbo Glacier in Tibet.2. It merges with the Saptkoshi River and eventually joins the Ganga (known as the Ganges) in the Katihar district of Bihar, India.3. It drains into the Bay of Bengal in Bangladesh.

About Koshi River

Aspects	Description
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About	<ol style="list-style-type: none">1. The Koshi River is a transboundary river that flows through China, Nepal, and India.2. It serves as a prominent tributary of the Ganges.3. The Kosi River has earned the nickname "the sorrow of Bihar" due to its history of flooding and frequent alterations in its course as it flows from Nepal to Bihar
Course	<ol style="list-style-type: none">1. It originates from the Tibetan Plateau and crosses the Himalayas and flows through the Mahabharat range and Siwalik hills.2. It reaches the plains of eastern Nepal and finally meets the Ganges in Bihar, India.3. The Kosi drains an area of 74,500 sq.km, with only 11,070 sq.km lying within Indian Territory. The Koshi River system drains about 45% of Nepal.4. The Kosi River valley is bounded by steep margins, disconnecting it from other rivers such as the Yarlung Zangbo River, Mahananda River, Gandaki, and Ganga.5. The Koshi River is known for its tendency to change course, often flowing westward. Over the last 200 years, it has shifted westwards by approximately 112 km, causing significant changes to agricultural land.
Tributaries	The Koshi River has seven major tributaries : Sun Koshi, Tama Koshi (or Tamba Koshi), Dudh Koshi, Indravati, Likhu, Arun, and Tamore (or Tamar).

UPSC Syllabus: Geography

Mount Kanlaon

Why in News?

Recently, Mount Kanlaon on Negros island exploded sending a plume of ash, rocks and gases five kilometres.

Mount Kanlaon

About	Description
About	<ol style="list-style-type: none">1. Mount Kanlaon is a stratovolcano located in the north-central part of Negros Island in the Philippines.2. It is the highest mountain on Negros Island and the 42nd tallest peak on an island worldwide.3. Kanlaon is one of the active volcanoes in the Philippines and is part of the Pacific Ring of Fire.4. The volcano has several pyroclastic cones and craters.
Geological Features	<ol style="list-style-type: none">1. The summit of Kanlaon features a broad, elongated caldera with a crater lake, and a smaller, more active crater to the south.2. It is made up of tropical volcanic materials, including sheeted lava flows, lahar deposits, airfall tephra, and apron pyroclastic materials.3. Mount Kanlaon is home to a wide variety of flora and fauna.4. The slopes of Kanlaon serve as headwater catchments for major river systems on Negros Island.

Eruptions	<ol style="list-style-type: none">1. Kanlaon has erupted several times since 1886.2. These eruptions typically involve phreatic explosions of small to moderate size, producing minor ashfalls near the volcano.
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About Phreatic Eruption

1. A phreatic eruption is a steam-driven explosion that occurs when water beneath the ground or on the surface is heated by volcanic activity.
2. **Process:** The heated water begins to boil or can even flash into steam, causing an explosion. Phreatic eruptions can occur before, during, or after a more traditional volcanic eruption.
3. **Causes:** Groundwater near volcanic vents gets heated as magma rises to the surface, leading to these phreatic eruptions.

UPSC Syllabus: Polity and nation

Facial Authentication Technology for EPS Pensioners

Why in News?

Recently, Facial Authentication Technology has been introduced for EPS Pensioners

About Facial Authentication Technology for EPS Pensioners

1. The Employees' Provident Fund Organisation (EPFO) serves over 78 lakh pensioners who are required to submit an annual life certificate to continue receiving their pension.
2. **Implementation of Digital Life Certificate (DLC):** In 2015, EPFO introduced the Digital Life Certificate allowing pensioners to submit their certificates via biometric authentication, which initially required visiting a facility equipped with the necessary technology.
3. In July 2022, the Ministry of Electronics and Information Technology (MeitY) and the Unique Identification Authority of India (UIDAI) developed Face Authentication Technology. EPFO adopted this and this enabled pensioners to submit their life certificates from home using any Android smartphone.
4. Pensioners can verify their identity through a facial scan using their smartphone camera, which compares the scan against UIDAI's Aadhaar database. This method eliminates the need for physical visits to banks or post offices.
5. During the 2022-23 fiscal year, 2.1 lakh pensioners used FAT for their DLCs. This number increased to 6.6 lakh in 2023-24, marking a 200% growth in usage. FAT-based DLCs accounted for about 10% of all DLCs received last year, with around 60 lakh DLCs submitted in total.
6. **Application Requirements:** Pensioners need to install two apps: "Aadhaar Face RD" and "Jeevan Pramaan". Authentication is performed via Aadhaar-linked mobile numbers, with detailed guidelines provided within the apps to facilitate a successful scan.
7. **Promotional and Support Initiatives:** Detailed instructions were disseminated to all field offices to popularize the new method. The EPFO also conducts regular sessions at the 'Nidhi Apke Nikat' programme across all districts to educate pensioners about the technology.

About Facial Recognition technology

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1. About: Facial recognition technology identifies or verifies a person using an image, video, or any audiovisual element of their face. It is a method of biometric identification that uses facial and head measurements to authenticate identity.

2. How it Works: It captures unique biometric data of each person's face and facial expressions. It uses the collected data to identify, verify, and authenticate individuals.

Benefits of Facial Recognition

- i) It offers fast and smooth remote identity verification.
- ii) It provides a unique, smooth, and fast user experience, reducing the need for in-person visits or video conferences.
- iii) Each face has unique and inimitable characteristics which enhances security through biometric comparison.
- iv) It is recognized as a standard for remote identity verification for high-risk operations, such as opening bank accounts and signing contracts.

Powers of Lok Sabha Speaker

Why in News?

As the 18th Lok Sabha prepares to convene, the TDP and JD(U) are reportedly vying for the position of Speaker.

About Speaker's Constitutional Mandate

1. Under the Article 93 of the Constitution of India, the Constitution mandates the election of the Speaker and Deputy Speaker "as soon as may be" after the House convenes.
- 2. Election Process:** The Speaker and Deputy Speaker are elected by a simple majority of the House members. There are no specific qualifications required to become the Speaker.
3. Under Article 94 of the Constitution of India, the Speaker is chosen from among the members of the House and vacates the office upon ceasing to be a member of the House.
- 4. Speaker's Salary:** The salaries of the Speaker are drawn from the Consolidated Fund of India.

Role of the Speaker in Parliamentary Democracy

The Speaker of the Lok Sabha holds the highest authority in the lower house of the Parliament of India, playing several crucial roles:

- 1. Presiding over Proceedings:** The Speaker is responsible for chairing the sessions of the Lok Sabha and ensuring that debates and discussions are conducted in an orderly and respectful manner. The Speaker has the authority to rule on points of order and to enforce the rules of the parliament.
- 2. Acting as a Spokesperson:** The Speaker often represents the Lok Sabha and speaks on its behalf in public or at international events.
- 3. Maintaining Impartiality:** The Speaker is expected to be neutral and unbiased in discharging duties, ensuring that all members of the Lok Sabha are treated fairly and equally.
- 4. Ensuring Transparency and Accountability:** The Speaker is responsible for making sure that the proceedings of the Lok Sabha are open and transparent, and that the public has access to information about the work of the Lok Sabha.

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5. Involvement in the Legislative Process: The Speaker has several duties related to the passage of legislation. These include assigning bills to committees, deciding the order in which bills are considered, and certifying the final text of bills before they are presented to the President for assent.

6. Representation: The Speaker represents the Lok Sabha in its relations with other parliamentary bodies and institutions.

Powers of the Lok Sabha Speaker

The Speaker of the Lok Sabha performs several key functions as outlined in the Indian Constitution:

1. Presiding over Sittings (Article 95): The Speaker presides over the sittings of the Lok Sabha and is responsible for maintaining order and decorum in the house.

2. Participation in Proceedings (Article 96): The Speaker has the right to take part in the proceedings of the house and to speak in any sitting of the house or any committee of which he or she is a member. However, the Speaker does not have the right to vote in the first instance.

3. Certification of Bills (Article 97): The Speaker is responsible for the certification of money bills and financial bills, and has the power to direct that any other bill be treated as a money bill or a financial bill.

4. Casting Vote (Article 100): In the event of a tie in the voting in the house, the Speaker has the casting vote.

5. Committee Appointments: The Speaker appoints committees and chairpersons of committees, and refers matters to committees for consideration.

Competition Commission of India (CCI)

Why in the News?

Recently, The Competition Commission of India (CCI) has approved acquisition of Global Infrastructure Management, LLC by BlackRock Funding, Inc.

About Competition Commission of India (CCI)

Aspects	Description
About the CCI	The Competition Commission of India (CCI) is a statutory body of the Government of India responsible for enforcing the Competition Act, 2002. It was established in 2003.
Composition	A Chairperson and 6 Members appointed by the Central Government.
Headquarters	New Delhi.
Preceding agency	Monopolies and Restrictive Trade Practices Commission.
Mandate	It was established to prevent activities that have an adverse effect on competition, to promote and sustain competition in markets, to protect the interests of consumers, and to ensure freedom of trade in the markets of India.

Powers of Competition Commission of India (CCI)

1. Inquiry and Investigation: CCI has the power to inquire into any alleged contraventions of the anti-competitive agreements and abuse of dominant position. It can also investigate suo moto, or on receipt of a complaint from any person, consumer or their association, or trade association.

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2. Penalties and Orders: After an inquiry, CCI can pass orders and impose penalties on companies found in violation of the Competition Act. It can direct parties to modify or terminate agreements and even impose monetary penalties based on the nature of the violation.

3. Direction to Modify Practices: CCI has the authority to direct enterprises to discontinue anti-competitive practices and not to re-enter such agreements.

4. Division of Enterprises: In extreme cases, CCI can order the division of a dominant enterprise to ensure that it does not abuse its position or form monopolies.

5. Temporary Injunctions: CCI can issue interim orders, temporarily restraining parties from continuing with anti-competitive practices during an investigation.

6. Appeal: Decisions or orders passed by CCI can be appealed to the National Company Law Appellate Tribunal (NCLAT), and further appeal lies with the Supreme Court of India.

Functions of CCI

1. Advocacy: CCI engages in competition advocacy, creating awareness and imparting training on competition issues.

2. Research and Monitoring: It conducts studies and research, and monitors market practices and the operation of the competition laws in India.

3. Consultation: It consults with governmental and non-governmental entities on policies that may affect competition in the Indian market.

4. Regulation of Combinations: CCI regulates combinations (acquisition, acquiring of control, and Mergers and Acquisitions) through a process of notification to ensure that these combinations do not have an adverse effect on competition in India.

5. Partnerships: CCI collaborates with other regulatory authorities, enhancing the effective enforcement of the Competition Act.

6. Training and Capacity Building: CCI organizes training programs for its staff and other stakeholders to build capacity in dealing with competition issues.

National Highway Infra Trust (NHIT)

Why in the News?

Recently, the new corporate identity with the launch of a logo was unveiled at NHAI Headquarters in New Delhi.

About National Highway Infra Trust (NHIT)

1. NHIT is an infrastructure investment trust established to support the Government of India's National Monetization Pipeline (NMP).

2. NHIT was registered as a trust with SEBI in October 2020.

3. NHAI recently unveiled a new corporate identity for NHIT, including a new logo representing 'Agility' and 'Progress'.

4. The new identity aligns with NHIT's core values of Accountability, Agility, Continuous Learning, Excellence, Integrity, and Collaboration.

5. This launch marks a significant milestone in NHIT's evolution and aims to enhance its brand visibility among stakeholders.

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6. The new corporate identity and strategic initiatives position NHIT as a leading player in the InvIT space.

7. NHIT plays a critical role in channelizing financial capital for the further development of the National Highway network across India.

About New Logo

The new logo represents 'Agility' and 'Progress'. It aims to enhance NHIT's brand visibility among stakeholders and align its image with its core values: Accountability, Agility, Continuous Learning, Excellence, Integrity, and Collaboration.

About National Highway Authority of India (NHAI)

1. It is India's premier highway infrastructure creator, responsible for developing, maintaining, and managing National Highways.

2. It operates under the administrative control of the Ministry of Road Transport and Highways.

3. It was constituted under the National Highways Authority of India Act, 1998. It became operational in February 1995.

4. The authority consists of a full-time Chairman and up to five full-time Members. There are four part-time Members appointed by the Central Government, including Secretary (Road Transport & Highways), Secretary (Expenditure), Secretary (Planning) and Director General (Road Development) & Special Secretary

5. NHAI has several specialized wings at its headquarters, including Technical Wing, Finance Wing, Administrative Wing and Vigilance Wing.

National Commission for Indian System of Medicine (NCISM)

Why in the News?

Recently, The National Commission for Indian Medical Systems organized a two-day National Conference, 'PRANA' Protecting Rights and Novelties in ASUS (Mind to Market for Indian System of Medicines [ISM] Professionals).

About the conference

1. A two-day National Conference, 'PRANA' (Protecting Rights and Novelties in ASUS), was organized in collaboration with the All India Council for Technical Education (AICTE) and the Ministry of Education's Innovation Cell.

2. The seminar showcased numerous innovations with the potential for patents, commercialization, or technology transfer, suitable for startups.

3. The conference explored various aspects of supporting innovators in the Indian System of Medicine (ISM).

About National Commission for Indian System of Medicine (NCISM)

1. NCISM is a statutory body constituted under the NCISM Act, 2020, created by notification by the Central Government.

2. The Indian System of Medicine regulated under NCISM includes: Ashtang Ayurveda, Unani, Siddha and Sowa-Rigpa system of medicine.

3. Composition of the Commission: It is composed of Chairperson, Fifteen ex-officio members and 23 part-time members.

4. Qualification of Chairperson: A person of outstanding ability, proven administrative capacity, and integrity, possessing a postgraduate degree in any discipline of the Indian System of Medicine from a recognized University.

4. Functions of NCISM:

i) It lay down policies to maintain high quality and standards in education of the Indian System of Medicine. It develop necessary regulations for educational standards.

ii) It lay down policies for regulating medical institutions, medical research, and medical professionals. It develop necessary regulations for these areas.

iii) It assess healthcare requirements, including human resources and infrastructure. It develops a roadmap to meet these requirements.

iv) It frames guidelines and policies for the proper functioning of NCISM, Autonomous Boards, and State Medical Councils of the Indian System of Medicine. It ensures coordination among Autonomous Boards.

v) It ensures State Medical Councils comply with guidelines and regulations for effective functioning.

vi) It promotes observance of professional ethics and ethical conduct among medical practitioners.

vii) It also exercises appellate jurisdiction over decisions made by Autonomous Boards.

viii) It frames guidelines for determining fees and other charges for 50% of seats in private medical institutions and deemed universities governed by the Act.

National Institute of Indian Medical Heritage (NIIMH)

Why in the News?

Recently, The World Health Organization (WHO) has designated the National Institute of Indian Medical Heritage (NIIMH), Hyderabad, as a WHO Collaborating Centre (CC) for “Fundamental and Literary Research in Traditional Medicine” (CC IND-177).

About NIIMH as Collaborating Centre for Traditional Medicine Research

1. The World Health Organization (WHO) has designated the National Institute of Indian Medical Heritage (NIIMH), Hyderabad as a WHO Collaborating Centre (CC) for “Fundamental and Literary Research in Traditional Medicine” (CC IND-177).

2. Duration: This recognition is granted for four years, starting from June 3, 2024.

3. India hosts approximately 58 WHO Collaborating Centres across various disciplines of biomedicine and allied sciences.

4. CCRAS-NIIMH, Hyderabad, is the third WHO Collaborating Centre in the domain of Traditional Medicine in India, alongside the Institute for Teaching & Research in Ayurveda, Jamnagar, and the Morarji Desai National Institute of Yoga (MDNIY), New Delhi.

5. As the first WHO Collaborating Centre for “Fundamental and Literary Research in Traditional Medicine,” NIIMH will assist WHO in standardizing terminologies for Ayurveda, Unani, Siddha, and Sowa-Rigpa, and updating the Traditional Medicine Module-II for the Eleventh edition of the International Classification of Diseases (ICD-11).

6. The WHO Collaborating Centre will support Member States in developing research methodologies for Traditional Medicine.

About National Institute of Indian Medical Heritage (NIIMH)



Source: ommcomnews.com

1. NIIMH was founded in 1956.
2. It is located in Gaddiannaram, Dilsuknagar, Hyderabad. It was previously known as the National Center of Indian Medical Heritage (NCIMH).
3. It operates under the administrative control of the Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, Government of India.
4. It is dedicated to documenting and showcasing medico-historical research in Ayurveda, Yoga Naturopathy, Unani, Siddha, Sowa-Rigpa, Homoeopathy, Biomedicine, and related healthcare disciplines in India.
5. It is known for its extensive collection of research materials on the History of Medicine, making it accessible globally.
6. It supplies resource materials for historians, scientists, and researchers interested in the historical aspects of AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, Homoeopathy, and Sowa Rigpa) along with Modern Medicine.
7. It is the only institution of its kind in Southeast Asia, dedicated to the medico-historical research of traditional and modern medicine.
8. NIIMH houses more than 500 physical manuscripts, alongside the Medical Heritage Museum and Library, featuring rare books and manuscripts dating back to the 15th century AD.

Manual of Tobacco Free Educational Institutions (ToFEI)

Why in News?

Recently, the Ministry of Education launches the implementation Manual of ToFEI on World No Tobacco Day, 2024.

About Manual of Tobacco Free Educational Institutions (ToFEI)

1. It was launched on the occasion of **World No Tobacco Day (WNTD) 2024**.
2. It was launched with the collaboration of the **Department of School Education & Literacy (DoSEL)**, the **Ministry of Education**, and the **Socio-Economic and Educational Development Society (SEEDS)**
3. This year's WNTD theme is "**Protecting children from tobacco industry interference**". The newly launched manual has been designed in line with the theme.

4. Manual Objectives

- a) Guidelines Adherence:** It assists schools in following the **Manual of Tobacco Free Educational Institutions(ToFEI) guidelines** issued by the **Ministry of Health and Family Welfare**
- b) Healthy Environment:** It aims **to create a tobacco-free environment** for students.
- c) Stakeholder Empowerment:** It encourages all stakeholders in **adoption and enforcement of guidelines** to protect students from tobacco dangers

5. Event Highlights

- a) All dignitaries took an oath against tobacco use, committing to creating a healthier, tobacco-free future for the nation's youth.
- b) Senior officials from the Ministry of Education, autonomous bodies, and States/UTs attended the event.

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Doctrine of Merger

Why in News?

The Supreme Court of India has noted that the **unique powers granted under Article 142 of the Indian Constitution are exceptions to two established legal principles**: the **Doctrine of Merger** and the **Doctrine of Stare Decisis**. This is done to ensure justice is comprehensively served in specific cases.

About Doctrine of Merger

- 1. Purpose:** The Doctrine of Merger **aims to maintain decorum and orderliness in the judicial system**.
- 2. Nature:** It is a **judicially created doctrine aimed at instilling discipline** across different levels of courts and authorities.
- 3. Principle:** When a higher court (appellate court) makes a ruling, **the original ruling by the lower court is absorbed or "merged" into the higher court's decision**.
- 4. Rationale:** This ensures that only one final ruling exists on any given issue, avoiding confusion over which order should be followed.
- 5. Application:** This doctrine applies to **decisions made by all levels of courts**, ensuring that the ruling of a higher court supersedes and absorbs that of a lower court.

About Doctrine of Stare Decisis

1. Stare Decisis" is Latin for **"to stand by things decided."** This doctrine mandates that courts follow the rulings made in earlier similar cases.
- 2. Importance of Precedents:** **Past decisions serve as precedents**, which are principles or rules that guide judicial decisions in future similar cases.
- 3. Role of Precedents:** These are used by **judges as references for making decisions in current cases with similar legal questions**.
- 4. Obligation:** Courts are obligated to consider these precedents in their rulings to maintain consistency and predictability in the law.
5. These doctrines collectively ensure that the legal system operates efficiently, maintaining consistency and hierarchy in judicial decisions.

Phenome India Project

Why in News?

Recently, CSIR completed the first phase of its **longitudinal health monitoring project**, Phenome India, and **hosted a special event called Phenome India Unboxing 1.0**.

About Phenome India Project

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Aspects	Description
About Phenome India-CSIR Health Cohort Knowledgebase	<p>1) Phenome India-CSIR Health Cohort Knowledgebase (PI-CheCK) is a project launched by the Council of Scientific and Industrial Research (CSIR) on December 7, 2023.</p> <p>2) This is the first pan-India longitudinal health monitoring study that focuses on cardio-metabolic diseases.</p> <p>3) Participants: Nearly 10,000 individuals including CSIR employees, pensioners, and their spouses from 17 states and 24 cities are involved.</p> <p>4) Data Collection: The study collects a wide range of data, including clinical questionnaires, lifestyle and dietary habits, anthropometric measurements, imaging/scanning data, and extensive biochemical and molecular data.</p>
Purpose	The initiative aims to create India-specific risk prediction models for cardio-metabolic diseases , including diabetes, liver diseases, and cardiac diseases.
Significance	<p>1) The study is critical for understanding the risk and prevalence of cardio-metabolic disorders in the Indian population, which may vary from Western populations due to ethnic diversity and different lifestyle patterns.</p> <p>2) CSIR is leveraging this project to promote Predictive, Personalized, Participatory, and Preventive (P4) healthcare, which is customized for the unique phenotypic and genetic profiles of the Indian population.</p>

About Council of Scientific and Industrial Research (CSIR)

Aspects	Description
About	<p>1. The Council of Scientific and Industrial Research (CSIR) is India's largest research and development (R&D) organization.</p> <p>2. It was established in September 1942.</p> <p>3. It operates as an autonomous body under the Societies Registration Act of 1860.</p> <p>4. CSIR receives its funding from the Ministry of Science and Technology.</p>
Headquarters	The headquarters is situated in New Delhi.
Focus Areas	CSIR is dedicated to scientific research and development across diverse fields including aerospace, biology, chemistry, earth sciences, engineering, and medical sciences.
Organizational Structure	<p>President: The Prime Minister of India serves as the President (Ex-officio).</p> <p>Vice President: The Union Minister of Science and Technology holds the position of Vice President (Ex-officio).</p>
Governing Body	<p>Leadership: The Director-General heads the governing body.</p> <p>Members: It includes other ex-officio members like the finance secretary responsible for expenditures.</p>

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	Term Length: Members typically serve terms of three years .
CSIR Advisory Board	Composition: It consists of a 15-member panel including distinguished experts from various scientific and technological fields. Role: The board advises the governing body on matters related to science and technology. Member Tenure: Each member's term also lasts for three years .

Women Representation in Lok Sabha

Why in News?

Over the years, the gender composition of the Lok Sabha has generally trended towards increasing women's representation.

About Women Representation in Lok Sabha

1. In 2024, India elected 74 women MPs to the Lok Sabha, which is four fewer than in 2019. These 74 women constitute 13.63% of the total strength of the Lower House, significantly below the proposed 33% quota for women.

2. The women MPs come from 14 different parties, with the BJP leading this list with 31 women MPs, followed by Congress with 13, and the TMC with 11.

3. Historical Progression:

i) In 1952, only 4.41% of the members in the Lok Sabha were women. By 1962, this number went up to a little over 6%. However, in 1971, it dropped to less than 4%.

ii) Since then, there has been a slow but steady rise in women's representation, crossing the 10% mark in 2009 and peaking at 14.36% in 2019. However, in 2024, this representation saw a slight decrease to 13.63%.

4. Comparative Analysis: India's 13.63% representation of women in the Lok Sabha lags behind several other countries. For instance, 46% of MPs in South Africa are women, 35% in the UK, and 29% in the US.

5. Party-wise Representation:

i) In 2024, women Lok Sabha MPs come from 14 parties. The BJP has the highest number of women MPs at 31, which is 12.92% of its total MPs.

ii) Congress follows with 13 women MPs, making up 13.13% of its MPs, and the TMC has 11 women MPs, representing 37.93% of its total.

iii) The SP has five women MPs, the DMK has three, and both the LJPRV and JD(U) have two each. Seven parties have one woman MP each.

6. New Faces and Experience:

i) Of the 74 women MPs elected in 2024, 43 are first-time MPs, and Misa Bharti of the RJD is a first-time Lok Sabha MP. Women MPs, on average, have 0.76 Lok Sabha terms of experience.

ii) The average age of women MPs is 50 years, compared to 56 years for the overall House. Additionally, 78% of the women MPs have completed their undergraduate education, which is comparable to their male counterparts.

7. Candidates' Composition:

- i) Out of the total 8,360 candidates who stood in the 2024 Lok Sabha elections, around 10% were women.
- ii) This number has increased over time, from 3% in 1957 to 10% in 2024. Among the major parties, 16% of BJP's candidates were women, while 13% of Congress's candidates were women, both higher than the overall average.

UPSC Syllabus: Science and technology

GNSS-based Electronic Toll Collection (ETC) System

Why in News?

The Indian Highways Management Company Limited (IHMCL), promoted by the National Highways Authority of India (NHAI), has issued a global call for Expressions of Interest (EOI) to develop and implement a GNSS-based Electronic Toll Collection (ETC) system on India's National Highways.

About GNSS-based Electronic Toll Collection (ETC) System

1. The GNSS-based ETC system utilizes Global Navigation Satellite System technology to facilitate electronic toll collection without physical toll barriers.
2. By using satellites or satellite constellations, the system accurately tracks vehicle movements and calculates tolls based on the distance traveled on tolled highways.

Key Features of the System

1. Vehicles must be equipped with GNSS-enabled On Board Units (OBUs) to be part of this toll collection system.
2. The NHAI plans to integrate this system within the existing FASTag ecosystem, starting with a hybrid model that supports both RFID-based and GNSS-based ETC simultaneously.

Significance of the GNSS-based ETC System

1. The system is designed to ensure smooth vehicle movement along National Highways by eliminating physical toll booths.
2. It offers a barrier-free tolling experience, significantly reducing congestion and wait times.
3. It implements distance-based tolling, where users are charged solely for the segments of the highway they use.
4. It aims to enhance toll collection efficiency by minimizing revenue leakages and preventing toll evasion.

About Global Navigation Satellite System (GNSS)

1. About: The Global Navigation Satellite System (GNSS) is a constellation of satellites orbiting Earth, continuously transmitting radio signals with precise time and orbital information.

2. Components of GNSS: It consists of satellite and a receiver.

i) Satellites: Orbit the Earth, transmitting time-stamped signals.

ii) Ground Control Stations: Monitor and manage the satellite constellation.

iii) Receivers: Devices that capture satellite signals to determine precise location.

3. Applications of GNSS

- i) **Navigation:** Used in aviation, maritime, and road transport.
- ii) **Mapping and Surveying:** Provides precise geospatial data for mapping and land surveys.
- iii) **Agriculture:** Enables precision farming techniques.
- iv) **Disaster Management:** Assists in emergency response and disaster relief operations.
- v) **Telecommunications:** Synchronizes networks and systems.

UPSC Syllabus: Science and technology, Governance

Donanemab Antibody to fight Alzheimer

Why in the News?

Donanemab which is currently in trials has shown significant potential in slowing cognitive decline in individuals with early Alzheimer's.

About Donanemab

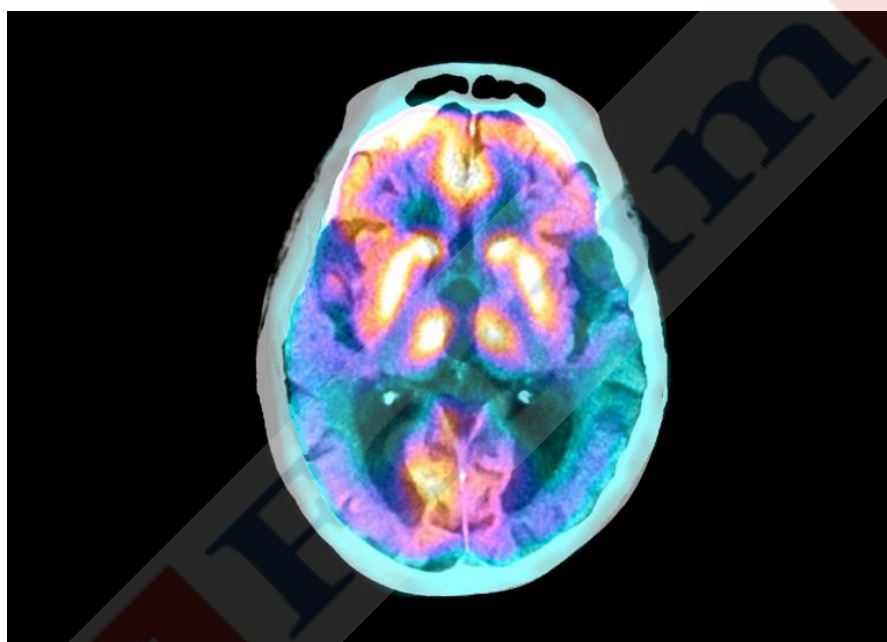


Figure 2. Source: IE

disease (AD)

Breakthrough in Slowing Cognitive Decline

- i) **Phase III Trial Results:** Donanemab slowed cognitive decline by 35% compared to a placebo in a phase III trial.
- ii) **Significance:** This represents a significant milestone in Alzheimer's research, being the second drug within a year to show effectiveness in slowing cognitive decline in early-stage patients.
- iii) **Limitations:** Donanemab and similar drugs do not stop or reverse Alzheimer's disease but can significantly improve the quality of life by slowing cognitive decline for affected individuals and their families.

1. Donanemab is a monoclonal antibody that attacks amyloid, which is a sticky protein that accumulates in the brains of people with Alzheimer's disease.

2. It proved more effective in individuals with low to moderate tau levels at the trial's onset, compared to those with high tau levels.

Note: Tau (t-tau) protein reflect the intensity of the neuronal damage in neurodegeneration, including Alzheimer's

iv) Urgent Need: With an estimated 14 million dementia cases, including Alzheimer's, expected in India by 2050, effective treatments are urgently needed.

About Alzheimer's Disease

- 1. Nature of the Disease:** Alzheimer's disease is a progressive and irreversible neurological disorder.
- 2. Protein Toxicity:** Beta-amyloid is a protein vital for brain function. It becomes toxic in Alzheimer's patients, forming clumps that disrupt brain cell connections, leading to cognitive issues such as memory loss.
- 3. Neuronal Damage:** These protein deposits interfere with neuron communication, causing deterioration and death of brain cells.
- 4. Early Symptoms:** Initial signs include forgetfulness, difficulty finding words, problem-solving challenges, confusion, and disorientation.
- 5. Causes:** The exact cause is not fully understood but involves genetic, environmental, and lifestyle factors.
- 6. Risk Factors:** Family history, genetic mutations, head injuries, cardiovascular disease, and certain lifestyle factors increase the risk.

UPSC Syllabus: Science and technology

Iskander-M missile system

Why in the News?

Recently, Russia claimed that it used the nuclear-capable Iskander-M missile system to target the Ukrainian military airbase in Mirgorod.

About Iskander-M

1. The Iskander (Western reporting name: SS-26 Stone) is a road-mobile short-range ballistic missile system developed by Russia.
2. It entered Russian service in 2006. It is designed for tactical strikes on small, high-value land targets.

3. Features

- i) The missile is 7.3 meters long, 0.92 meters in diameter, and has a launch weight of 3,750 kilograms.
- ii) It has a range of 400-500 km and uses both inertial and optical guidance systems.
- iii) It can carry conventional and nuclear warheads up to 700 kg.
- iv) Missiles can travel at up to seven times the speed of sound (Mach 7) and can reach an altitude of more than 30 miles.
- v) It employs a maneuverable re-entry vehicle (MaRV) and decoys to defeat theater missile defense systems.
- vi) It is equipped with various systems for in-flight correction and self-targeting, allowing the missile to overcome missile defense systems.
- vii) It has various variants such as Iskander-E and Iskander-K.

MATSYA 6000 Submarine

Why in News?

India is set to be the 6th country of the world to have its own Deep Sea Mission. The other 5 countries are France, the US, China, Russia and Japan. 1st Stage of harbor trial (40-50m) deep of deep sea mission planned by September 2024. MATSYA 6000 submarine is going to play a critical role in the Deep Sea Mission.

About MATSYA 6000



Source- PIB

About	The Matsya 6000 is a three-person submersible that will be able to go 6,000 metres under the sea .
Developed By	The vessel is being developed by Chennai's National Institute of Ocean Technology (NIOT) .
Structure	<ol style="list-style-type: none">1. Matsya 6000 is a 2.1-diameter sphere.2. It is made up of 80mm-thick titanium alloy. It will be able to withstand a pressure 600 times greater than that at sea level.3. The Matsya 6000 will be able to operate from 12 to 16 hours straight and will have an oxygen supply of 96 hours.4. Matsya 6000 will also feature the ultra-short baseline acoustic positioning system (USBL). This will allow the mothership carrying the transponder to send information and the submersible to respond, which will then let the mothership know where the submersible is.
Function/Aim	<ol style="list-style-type: none">1. Matsya 6,000 will look at chemosynthetic biodiversity in hydrothermal vents and low-temperature methane seeps in the ocean.2. Matsya 6000 will also promote tourism and ocean literacy.

About the Samudrayan/Deep Ocean Mission Project

Samudrayan Project- The Samudrayaan project is slated to explore the ocean depths for resources. The mission will scout for precious metals such as cobalt, copper and manganese. The project will also examine the biodiversity of the ocean.

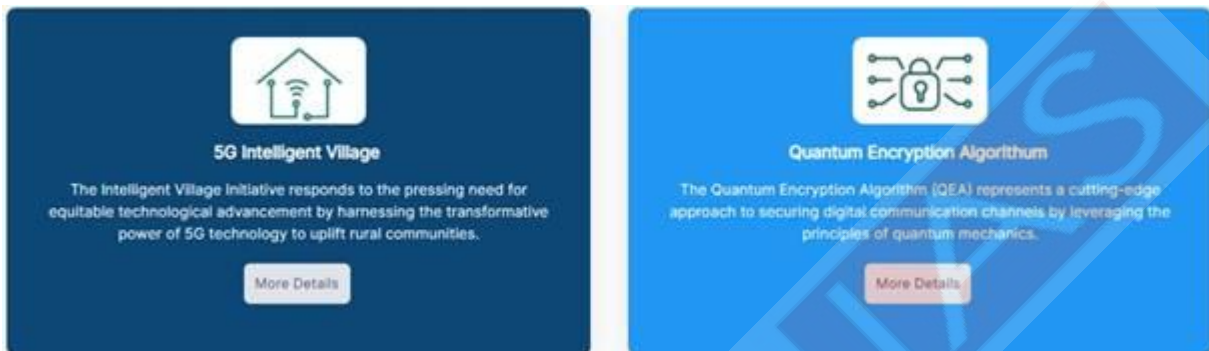
Read More- [Deep Ocean Mission](#)

5G Intelligent Village Initiative

Why in the news?

The Department of Telecommunications (DoT) has announced two innovative proposals-**5G Intelligent Village** and **Quantum Encryption Algorithm (QEA)**—to drive technological advancement in the telecom sector.

About 5G Intelligent Village Initiative



Source: PIB

Aspects	Description
Aim	The 5G Intelligent Village Initiative aims to uplift rural communities by harnessing the transformative power of 5G technology.
Focus	Addresses key sectors such as agriculture, education, healthcare, governance, and sustainability.
Features	i) It utilizes Ultra-Reliable Low-Latency Communication (URLLC) and massive Machine Type Communication (mMTC) features of 5G in selected villages. ii) It addresses key sectors such as agriculture, education, healthcare, governance, and sustainability.

About Quantum Encryption Algorithm (QEA)

- Quantum encryption algorithms use quantum computing techniques to encrypt messages (classical or quantum) into quantum states that are communicated to and decrypted by the recipient.
- Goal: To develop an India-specific Quantum Encryption Algorithm for securing digital communications using quantum mechanics.
- Features: The algorithm aims to provide unparalleled security, advanced encryption capabilities, and ultra-fast and efficient encryption. These proposals will be funded under the Telecom Technology Development Fund (TTDF) scheme of the DoT.

About Telecom Technology Development Fund (TTDF)

- It was established under the Universal Services Obligation Fund (USOF) of the DoT, Government of India.
- Purpose:** To promote the ecosystem for research, design, prototyping, proof of concept testing, IPR creation, field testing, security, certification, and manufacturing of telecom products.

Sleeping Sickness

Why in the news?

Chad became the first country to eliminate a neglected tropical disease (NTD) this year and the 51st globally. The disease eliminated is the gambiense form of human African trypanosomiasis (HAT), also known as sleeping sickness.

About World Health Organization (WHO) Validation

1. The World Health Organization (WHO) has previously validated the elimination of the gambiense form of HAT in seven countries: **Togo (2020), Benin (2021), Ivory Coast (2021), Uganda (2022), Equatorial Guinea (2022), Ghana (2023), and Chad (2024).**
2. The rhodesiense form of HAT has been eliminated as a public health problem in Rwanda.

About Sleeping Sickness

1. **Scientific Name:** Human African trypanosomiasis (HAT)
2. **Cause:** The disease is caused by protozoan parasites transmitted by infected tsetse flies.
3. **Impact:** HAT is typically fatal if untreated, causing symptoms like fatigue, headaches, and in severe cases, coma.
4. **Types of HAT:** There are two main types of HAT: *Trypanosoma brucei gambiense*, which accounts for 92% of cases, and *Trypanosoma brucei rhodesiense*, which accounts for 8% of cases.
5. **Diagnosis:** It involves 3 steps:
 - i) screening for potential infection using serological tests (only available for *T. b.gambiense*) and clinical examination;
 - ii) confirmation by observing microscopically the parasite in body fluids; and
 - iii) staging the disease progression via clinical examination and analysis of cerebrospinal fluid obtained by lumbar puncture, if needed.

About Chad

1. **Location:** Chad is an independent state located at the crossroads of North and Central Africa.
2. **Borders:** The landlocked country is bordered by Libya to the north, Sudan to the east, the Central African Republic to the south, Cameroon to the southwest, Nigeria to the southwest (at Lake Chad), and Niger to the west.

V-LEX-02 Mission

Why in the news?

Recently, ISRO successfully completed the third reusable launch vehicle landing experiment (RLV LEX) at the Aeronautical Test Range in Chitradurga, Karnataka.

About V-LEX-02 Mission

1. The RLV-LEX-02 mission is the **third and final test of a series of landing experiments** conducted at the Aeronautical Test Range.

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2. Mission Objectives: The primary objective of the RLV-LEX-02 mission was to **demonstrate the autonomous landing capability of the reusable launch vehicle (RLV)** from challenging initial conditions after being released from a helicopter.

3. In this mission, the winged vehicle named **Pushpak was lifted by an Indian Air Force Chinook helicopter** and released from an altitude of 4.5 km.

4. Pushpak autonomously approached the runway, performing cross-range corrections. It then landed precisely on the runway, utilizing a brake parachute, landing gear brakes, and a nose wheel steering system to come to a halt.

5. Reusability and Systems: The winged body and all flight systems used in the **RLV-LEX-01 mission were reused in the RLV-LEX-02 mission** after receiving the necessary certifications and clearances.

6. The mission was accomplished through the collaboration of the Vikram Sarabhai Space Centre (VSSC), the Liquid Propulsion System Centre (LPSC), and the ISRO Inertial Systems Unit (IISU).

About Reusable Launch Vehicle (RLV)

1. The reusable launch vehicle is essentially a space plane with a **low lift-to-drag ratio**, requiring it to approach at high glide angles and necessitating a landing at high velocities of 350 km/h.

2. The RLV utilizes **several indigenous systems**, including localized navigation systems based on pseudolite systems, as well as instrumentation and sensor systems developed by ISRO.

Cryonics Practice for Freezing Human Body

Why in News?

Recently, a cryonics company in Australia has frozen its first client, with the hope of reviving him in the future.

About Cryonics

1. The **practice of freezing an individual who has died**, to revive them in the future, is known as cryonics.

2. The word cryonics is derived from the **Greek word "krýos," meaning "icy cold."**

3. Objective: Cryonics aims **to save lives by preserving individuals** at extremely low temperatures until future medical technologies can restore them to full health.

4. Individuals in this state are referred to as **"cryopreserved patients,"** as Cryonicists do not consider them truly dead.

5. Process: The process of Cryonic preservation involves the following process:

a) Cryonic preservation can only be performed after an individual has been legally declared dead. The process begins shortly after death, with the body being packed in ice and transported to a cryonics facility.

b) At the facility, blood is drained and replaced with antifreeze and organ-preserving compounds known as cryoprotective agents.

c) In this vitrified state, the body is placed in a chamber filled with liquid nitrogen and preserved at -196 °C.

6. Currently, a few hundred bodies have been frozen through cryonics.

Recombinant Proteins

Why in News?

Researchers at the Department of Biochemistry, Indian Institute of Science have devised an innovative method for producing recombinant proteins.

About Recombinant Proteins

- 1. Recombinant Proteins:** They are proteins that are artificially produced by introducing specific genes (Recombinant DNA) into host organisms, such as bacteria or yeast. These genes instruct the host organisms to manufacture the desired protein.
- 2. Types of Recombinant Proteins:** There are various types based on their applications and production methods. Some of the well known recombinant protein types are **interferons, recombinant hormones, tumor necrosis factors, tumor necrosis factors, etc.**
- 3. Examples:** Examples of recombinant proteins include **human insulin for diabetes, human growth factors for growth hormone deficiency, Factor VIII for hemophilia, and therapeutic monoclonal antibodies for treating cancer and viral infections like SARS-CoV-2.**
- 4. Process of Production: Recombinant protein production** involves inserting a modified gene into a suitable vector (like a plasmid) and transferring it into host cells (like bacteria or yeast). It involves:
 - a) Insert Gene:** A gene is modified and inserted into a vector.
 - b) Transfer to Cells:** The vector is introduced into host cells.
 - c) Cell Growth:** These cells are grown in a culture until they reach high concentration.
 - d) Harvesting:** After growing, the cells are harvested to obtain the recombinant protein.
- 5. Applications of Recombinant Proteins:**
 - a) Biomedical Research:** It is used to understand health and disease mechanisms.
 - b) Biotherapeutics:** It is employed in the development of biotherapeutic products.
 - c) Protein-Based Polymers:** They are also utilized in drug delivery systems.
 - d) Disease Treatment:** It is used to produce antibodies and enzymes.
 - e) Tissue Engineering:** It provides protein scaffolds for tissue engineering applications.

About Protein

1. A protein is a **large, complex molecule** that is a key **building block of life**.
- 2. Role in Biological Systems:**
 - a) Facilitator:** Proteins **facilitate most biological processes** in a cell, including gene expression, cell growth, proliferation, nutrient uptake, intercellular communication, and apoptosis.
 - b) Synthesis Blueprint:** The blueprint for **protein synthesis is stored in DNA**, which serves as a template for regulated transcriptional processes to produce messenger RNA (mRNA).

J&K Classifies Rabies as a Notifiable Disease

Why in News?

The government of Jammu and Kashmir has classified human rabies as a notifiable disease under the Epidemic Diseases Act of 1897.

About Rabies

1. Nature of Disease: Rabies is a **zoonotic**, viral disease preventable by vaccine, caused by the **RABV virus**.

2. Affected System: It primarily targets the **central nervous system**, causing severe brain disease and, ultimately, death if treatment is not administered before symptoms appear.

3. Transmission:

a) Main Carriers: **Domestic dogs are the primary transmitters** of the rabies virus to humans in up to 99% of cases. It can **affect both domestic and wild animals**.

b) Mode of Spread: The virus **spreads to humans and animals** through saliva, typically via bites, scratches, or direct contact with mucous membranes (e.g., eyes, mouth, or open wounds).

5. Symptoms:

i) Early Signs: Initial symptoms include **lethargy, fever, vomiting, and anorexia**.

ii) Advanced Symptoms: Rapid progression to **cerebral dysfunction, ataxia, paralysis, difficulties in breathing and swallowing, excessive salivation, unusual behavior, aggressiveness, and self-mutilation**.

iii) Outcome: Once clinical symptoms manifest, **rabies is almost always fatal**.

6. Prevention:

i) Rabies can be prevented through vaccination.

ii) The most cost-effective method to prevent rabies in humans is by vaccinating dogs, including puppies, to cut off the transmission at its source.

7. Treatment:

i) Post-Exposure Prophylaxis (PEP): Treatment after exposure to rabies includes wound care, administration of **human rabies immune globulin (HRIG)**, and a series of four or five rabies vaccines.

ii) This treatment is nearly 100% effective in preventing the disease if given promptly after exposure.

About notifiable disease

1. About: A notifiable disease is one that law mandates must be reported to government authorities. This reporting helps in monitoring the disease and providing early warnings of potential outbreaks. Here's who notifies these diseases and how the notification process works:

2. Who Notifies:

i) Healthcare Providers: Doctors, nurses, and other healthcare professionals are typically required to report cases of notifiable diseases.

ii) Laboratories: Medical laboratories must report findings that indicate the presence of notifiable diseases.

iii) Hospitals and Clinics: Both government and private hospitals and clinics are responsible for reporting cases of notifiable diseases.

3. How They Notify:

i) Written Notification: For most diseases, healthcare providers must fill out a specific form detailing the case and submit it to local or state health authorities within three days.

ii) Verbal Notification: In urgent situations, healthcare providers are required to report cases verbally via phone within 24 hours.

iii) Electronic Reporting Systems: Some regions may use electronic health records and reporting systems to streamline the notification process

Diadromous fish

Why in News?

Recently, a study was published in the British Ecological Society's Journal of Applied Ecology. The researchers discovered that **marine protected areas (MPAs) designated to safeguard diadromous fish species did not align with their core habitats.**

This finding highlights the need for better coordination and planning to ensure effective conservation efforts for these migratory fish.

About Diadromous fish

Aspects	Description
About	<p>1. Diadromous fish are those species that migrate between saltwater and freshwater environments.</p> <p>2. They move back and forth between the ocean and rivers or streams during different stages of their lives.</p>
Types of Diadromous Fish	<p>1) Anadromous Fish: These fish are born in freshwater. As juveniles, they migrate to the ocean, where they grow into adults. Later, they return to freshwater to spawn (lay eggs).</p> <p>2) Catadromous Fish: These fish are born in saltwater. As juveniles, they move into freshwater, where they mature into adults. Eventually, they migrate back to the ocean to spawn.</p> <p>3) Amphidromous Fish: These fish are born in freshwater or estuaries (where freshwater meets the sea). Initially, they drift into the ocean as larvae. Later, they return to freshwater to grow into adults and spawn.</p> <p>4) Potamodromous Fish: These fish are born in upstream freshwater habitats (upstream areas of rivers). As juveniles, they migrate downstream within freshwater to grow into adults. Finally, they migrate back upstream to spawn.</p>
Threats to Diadromous Fish	<p>Diadromous fish face various human-induced pressures:</p> <p>i) Agricultural and pollutant runoffs: Contaminants from agriculture and other sources can harm their habitats.</p> <p>ii) Habitat destruction: Dam construction and land development impact their migration routes.</p> <p>iii) Barriers to migration: Dams, weirs, and other structures hinder their movement.</p> <p>iv) Fishing and bycatch: Overfishing and accidental capture affect their populations.</p> <p>v) Climate change: Altered water temperatures and habitats impact their survival.</p>

Stromatolites- Geological Structures

Why in News?

Recently, scientists discovered **living stromatolites** which are ancient geological structures formed by algae on Sheybarah Island, located on the northeastern shelf of the Red Sea in Saudi Arabia.

About Stromatolites

1. About Stromatolites: These are **layered structures** formed by the activity of microorganisms, primarily **cyanobacteria (blue-green algae)**. They are also **known as stromatoliths**.

2. Formation Process: These **organisms trap and bind sedimentary grains in shallow waters**, creating layers upon layers until they form mound-like structures.

3. Appearance: Stromatolites typically display thin, **alternating light and dark layers**. Their shapes can vary, being flat, rounded (hummocky), or dome-shaped.

4. Historical Significance

i) They are **ancient structures**, most common during the Precambrian era, over 542 million years ago.

ii) While **primarily marine, some ancient stromatolites** from **more than 2.5 billion years ago** are found in **environments** ranging from intertidal zones to freshwater lakes.

iii) **Current Locations:** Today, **living stromatolites** are **rare** which are found in a few salty lagoons or bays, notably in Western Australia. **Shark Bay** is a **key location for these living marine stromatolites**.

5. Importance of Stromatolites

i) **Fossil Records:** It provide **critical evidence of early life on Earth**, with fossils dating back over 3.5 billion years.

ii) **Oxygen Production:** The cyanobacteria in stromatolites are photosynthetic. They produce **oxygen as a byproduct** of their metabolism.

iii) **Role in Understanding the Great Oxygenation Event and evolution of complex life forms:** About 2.5 billion years ago, as stromatolites became more prevalent, they **significantly increased the oxygen levels in the atmosphere**. This transformation was crucial as it changed the atmosphere from being rich in carbon dioxide to one rich in oxygen. The rise in atmospheric oxygen set the **stage for the evolution of more complex life forms**, including the development of eukaryotic cells, which are cells with a nucleus.

PraVaHa software

Why in News?

The Indian Space Research Organisation (ISRO) recently developed PraVaHa, a Computational Fluid Dynamics (CFD) software.

About PraVaHa software

Aspects	Description
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About	<ol style="list-style-type: none">1. PraVaHa is a software developed by ISRO's Vikram Sarabhai Space Centre (VSSC) for analyzing the aerodynamics and thermodynamics of aerospace vehicles.2. This software, known as a Computational Fluid Dynamics (CFD) tool helps simulate the flow of air around various vehicles like rockets and re-entry vehicles (both with and without wings).
Aim	<ol style="list-style-type: none">1. PraVaHa aims to take over most of the CFD simulations for aerospace vehicle design, currently done using commercial software.2. This means it could become a primary tool for designing missiles, aircraft, and rockets, providing solutions to complex aerodynamic problems.
Applications of PraVaHa	<ol style="list-style-type: none">1. Gaganyaan Program: PraVaHa is crucial in analyzing the aerodynamics of human-rated launch vehicles, including HLVM3, Crew Escape System (CES), and Crew Module (CM).2. Collaborative Development: It's designed to be secure and flexible, allowing academic institutions and government labs to work together on developments.3. Simulation Capabilities: Currently, PraVaHa can simulate airflow in both perfect gas and real gas conditions. Work is ongoing to extend its capabilities to simulate chemical reactions, such as those occurring during re-entry into Earth's atmosphere and in scramjet engines.

Importance of Computational Fluid Dynamics (CFD):

- i) Design Studies:** Initial design studies for launch vehicles **require evaluating many different configurations** to find the best one.
- ii) Aerodynamic Loads:** Aerospace vehicles face **extreme aerodynamic and thermal loads** (pressure and heat) during launch and re-entry into Earth's atmosphere.
- iii) Flow Understanding:** Understanding how air flows around vehicles like rockets or crew modules during re-entry is **crucial for designing their shape, structure, and thermal protection systems (TPS)**.
- iv) Unsteady Aerodynamics:** The unsteady (changing) **part of aerodynamics can cause serious flow issues and significant noise** during a mission.

UPSC Syllabus: Economy

Preston Curve

Why in News?

It has been observed that with the increasing per capita income in India, there has been a shift in attention towards Preston curve which was first proposed by "**Samuel H. Preston**" in the year "**1975**".

About the Preston Curve

- 1. About:** The Preston Curve is a graph that shows **the relationship between the average income per person in a country (usually measured as GDP per capita) and the average life expectancy of its people**.
- 2. Origin:** The concept was introduced by American sociologist **Samuel H. Preston** in his 1975 paper titled "**The changing relation between mortality and level of economic development**".

3. Key Observations of the Preston Curve:

- i) Generally, **people in wealthier countries live longer compared to those in poorer countries.**
- ii) This trend is likely because individuals in richer nations typically have better access to healthcare, education, clean environments, and nutritious food.
- iii) **Economic Growth and Life Expectancy:** When a country's economy grows and incomes rise, life expectancy also tends to increase significantly. This improvement is initially due to better access to basic necessities like food and healthcare.

Example: In India, the average income rose from approximately ₹9,000 per year in 1947 to about ₹55,000 in 2011. Correspondingly, the average life expectancy increased from 32 years to over 66 years during the same period.

5. Limitations of Income Growth on Life Expectancy: The relationship between per capita income and life expectancy starts to plateau beyond a certain point. Further increases in income do not lead to significant gains in life expectancy, possibly because there is a natural limit to human lifespan.

UPSC Syllabus: International Relations

India Opportunity at IPEF Clean Economy Investor Forum

Why in the News?

Recently, an event was organised by Department of Commerce and Invest India to showcase various investment opportunities in India

About India Opportunity at IPEF Clean Economy Investor Forum

1. Organised by: The Department of Commerce and Invest India organised a meeting to showcase various investment opportunities in India. It was held at Marina Bay Sands, Singapore on June 7, 2024.

2. Participants: Over 60 global investors and financial institutions, and more than 15 Indian firms.

3. Highlights of the event: At the event, it has been highlighted that :

- i) India's growth rate is nearly double that of other emerging market economies.
- ii) Indian startups are returning home for capital access and tax benefits.
- iii) AI and data centers are key to future growth.
- iv) reforms aimed at streamlining regulations, enhancing transparency, and improving Ease of Doing Business.
- vi) focus of government on sustainable infrastructure, climate technology, and renewable energy projects to meet Net Zero targets.

About Indo-Pacific Economic Framework for Prosperity (IPEF)

1. About: The Indo-Pacific Economic Framework for Prosperity (IPEF) is an economic initiative launched by U.S.A President Joe Biden in 2022.

2. Objective: It provides a platform for countries in the region to collaborate on advancing resilient, sustainable, and inclusive economic growth, and aims to contribute to cooperation, stability and prosperity in the region.

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3. Members: It has 14 partners – Australia, Brunei Darussalam, Fiji, India, Indonesia, Japan, the Republic of Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand, USA and Vietnam.

4. Nodal agency: Department of Commerce for the IPEF engagements

5. Pillars of cooperation: The IPEF comprises four pillars of cooperation namely: Trade, Supply Chain, Clean Economy and Fair Economy.

Read more: [IPEF agreement IPEF's Clean Economy Investor Forum](#)

International Organization for Migration (IOM)

Why in the News?

Recently, International Organization for Migration reported that at least 49 migrants died and 140 others were missing after their boat capsized off the coast of Yemen.

About the International Organization for Migration

Aspects	Description
About	The International Organization for Migration (IOM) is part of the United Nations System. It was founded in 1951.
Headquarters	Its headquarters is in Geneva, Switzerland.
Guiding Principles	IOM is guided by the principles in the Charter of the United Nations, with a focus on upholding human rights for all, respect for the rights, dignity, and well-being of migrants is paramount.
Member States	175 member states and 8 observer states.
Objective	IOM's work focuses on three main objectives: i) Saving lives and protecting migrants. ii) Finding solutions for displaced people. iii) Creating safe and regular migration pathways.
Mandate	To provide services and advice to governments and migrants, including internally displaced persons, refugees, and migrant workers.
Key Areas of Work	1. Migration and Development: It works to maximize the benefits of migration for home and host countries, as well as migrants. 2. Migration Health Services: It provides health services and support to migrants and displaced populations. 3. Emergency Operations: It offers emergency relief and post-crisis recovery programs. It includes transportation assistance, temporary shelter, and rebuilding infrastructure. 4. Counter-Trafficking: It actively combats human trafficking through prevention, protection, and prosecution. It also provides assistance to victims of trafficking.
Key Publications	It publishes reports such as World Migration Report and Migration Health Annual Report.

UPSC Syllabus: International organization

Ukraine Peace Summit

Why in the News?

The two-day Ukraine Peace Summit ended recently.

About Ukraine Peace Summit



Source: The hindu

Aspects	Description
About	This summit underscores the international community's efforts to find a resolution to the ongoing conflict between Russia and Ukraine, with a focus on humanitarian issues and global security.
Held at	It was held at the Bürgenstock resort, Switzerland.
Participants	It was attended by 100 delegations, including 80 countries and four organizations.
Focus	It focuses on nuclear safety, global food security, and humanitarian issues.
Non-Signatories	India did not sign the document; Brazil attended as an observer.
Highlights of the declaration	<ol style="list-style-type: none"> The declaration condemned the Russian Federation's war against Ukraine for causing large-scale human suffering and global crises. Humanitarian Demands include release of all prisoners of war and return of deported and unlawfully displaced Ukrainian children and civilians.
Challenges and Criticisms	<ol style="list-style-type: none"> Russia's Absence: Russia was not invited, raising questions about the summit's effectiveness. The host, Switzerland, adheres to the Rome Statute, which could have led to Putin's arrest if he attended. China's Position: China's absence was noted as problematic, with calls for

	China to leverage its influence over Russia to help end the conflict.
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UPSC Syllabus: International relations

UN Global Supply Chain Forum

Why in News?

The Government of Barbados and the UN Trade and Development (UNCTAD) recently concluded the inaugural United Nations Global Supply Chain Forum successfully.

About the UN Global Supply Chain Forum

1. Organised by: The first-ever UN Global Supply Chain Forum, organized by the UN Trade and Development (UNCTAD) and the Government of Barbados, was successfully held from May 21 to 24, 2024, in Barbados.

2. Purpose: The event brought together over 1,000 participants from around the globe to address global disruptions, geopolitical tensions, climate change, and the impacts of the COVID-19 pandemic on international trade.

3. Participants and Key Focus Areas: The forum included trade and transport Ministers from various small island developing states (SIDS), representatives from UN agencies, major global ports such as the Port of Seattle, and leaders in the shipping and logistics sectors.

4. Initiatives and Outcomes:

a. A “Manifesto for Intermodal, Low-Carbon, Efficient and Resilient Freight Transport and Logistics,” was introduced which aims to transform freight transport to meet global climate goals and bolster socio-economic resilience.

b. The launch of the UN Trade and Development Trade-and-Transport Dataset, developed with the World Bank. This dataset provides extensive global data on over 100 commodities and various transport modes, helping to analyze trade and transport costs comprehensively.

UPSC Syllabus: Defence Exercise

Tarang Shakti Exercise 2024

Why in the News?

India will host its first multinational air exercise Tarang Shakti 2024 in August.

About Tarang Shakti Exercise 2024



Source: The Hindu

Aspects	Description
About	It is the Indian Air Force's first multinational air exercise which will be held in August.
Participating Nations	<ol style="list-style-type: none"> Ten countries will be participating in the exercise. In addition to this, few others would be acting as observers. Australia, France, Germany, Japan, Spain, the United Arab Emirates, the United Kingdom, and the United States will be sending contingents. Germany will deploy fighter jets and also an A-400M transport aircraft.
Objectives	The plan is to invite friendly foreign countries with whom the IAF interacts regularly and has a certain degree of interoperability.
What will happen during the exercise	<ol style="list-style-type: none"> The exercise is now planned to take place in two phases. The first phase will occur in southern India during the first two weeks of August, and the second phase will be in the western sector from late August to mid-September. Some countries will participate in both phases, while others will join only one of the two phases.

About Red Flag exercise

Aspects	Description
About	<ol style="list-style-type: none"> Red Flag is an air combat exercise conducted with multiple scenarios designed to provide realistic combat settings. It is the Second edition of Red Flag this year. Red Flag is conducted four times annually by the USAF.
Hosted by	U.S. Air Force (USAF)
Held at	Eielson Air Force Base, Alaska

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Participating Force	Indian Air Force (IAF), Singapore Air Force, U.K.'s Royal Air Force, Royal Netherlands Air Force and German Luftwaffe
What will happen during the exercise	<ol style="list-style-type: none">1. Air combat exercise with multiple realistic combat scenariosForces divided into two groups:2. Red Force: It will simulate air defence elements3. Blue Force: It will simulate offensive composite elements4. In this edition, the Red Force comprised mainly of the USAF Aggressor Squadron, flying F-16 and F-15 aircraft.

Joint Doctrine for Cyberspace Operations



Why in the news?

Recently, CDS released the Joint Doctrine for Cyberspace Operations during the Chiefs of Staff Committee (COSC) meeting.

About the Joint Doctrine for Cyberspace Operations

- i) The doctrine emphasizes **understanding military aspects of cyberspace operations and provides conceptual guidance** to commanders, staff, and practitioners for planning and conducting these operations.
- ii) It aims to **raise awareness among warfighters** at all levels about the importance and execution of cyberspace operations.

Significance of the Joint Doctrine

- i) **Guidance for Commanders:** The Joint Doctrine is a **keystone publication** designed to guide commanders in conducting cyberspace operations within today's complex military environment.

ii) **Enhancing Jointness and Integration:** Development of joint doctrines is crucial for promoting jointness and integration which is an actively pursued goal by the Indian Armed Forces.

iii) **Impetus to Ongoing Processes:** The release of this doctrine is a significant step forward in advancing the ongoing processes related to cyberspace operations.

UPSC Syllabus: Art and culture

Satnamis Community

Why in the News?

Recently, a huge mob from the Satnami community in Chhattisgarh's Baloda Bazar district torched dozens of vehicles, pelted stones at police personnel, and set fire to the Superintendent of Police office building. The protesters, dissatisfied with the police's handling of a case involving the desecration of a sacred 'Jaithkamb', demanded a CBI probe.

About Satnamis Community

1. The term "Satnamis" means those who believe in a God whose name is 'truth'.
2. The Satnamis are a predominant group within the 11% Scheduled Caste (SC) population in Chhattisgarh, believed to be an offshoot of the Ravidassia community.
3. The community was founded on April 21, 1657, by Bir Bhan in Narnaul, Haryana. Udhodas who was a disciple of Saint Ravidas was the first priest or spiritual guru of the community.
4. The Satnamis inhabit the plains of central Chhattisgarh, mainly in the old districts of Bilaspur, Durg, Rajnandgaon, and Raipur.

5. Principles and Influence: The Satnamis emphasize three main principles:

- i) Adorning the attire of a Satnami devotee
- ii) Earning money through proper means
- iii) Not tolerating any injustice or oppression in any form

6. The community is believed to exert political influence by voting collectively, and representatives occupy most of the 10 assembly segments allotted for SCs.

7. The community reveres Mini Mata, the first female Member of Parliament from Chhattisgarh, who entered the Lok Sabha by winning the 1955 by-election. Political parties often invoke her legacy to appeal to the Satnamis for votes.

About Satnami Revolt of 1672

1. The Satnami revolt occurred during the reign of Mughal Emperor Aurangzeb, in today's Mahendragarh district of Haryana.
2. Cause: The revolt began when a Mughal soldier killed a Satnami, leading about 5,000 Satnamis to take up arms.
3. The Satnamis routed the Mughal troops, drove away the administrators, and set up their own administration.
4. The revolt gained support from Hindus in Agra and Ajmer, who were discontent with Aurangzeb's strict Islamic policies, including the revival of the Jizya tax, banning of music and art, and destruction of Hindu temples.

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5. Aurangzeb took personal command and sent troops with artillery to suppress the revolt, resulting in an attempt to annihilate the Satnamis. The remnants fled and remained disorganized and leaderless for a long time.

About New Movement

1. The most significant Satnami group was founded in 1820 in the Chhattisgarh region by Saint Ghasidas, a farm servant and member of the lower (Chamar) caste.
2. Saint Ghasidas established the Satnam Panth ("Sect of the True Name"), providing a religious and social identity for many Satnamis.
3. He preached a code of ethical and dietary self-restraint and social equality, and authored Nirvan Gyan to propagate his teachings.
4. Throughout history, Satnamis have navigated their position within a larger Hindu hierarchy, influenced by connections with the Kabir Panth at different points.

124th Death Anniversary of Birsa Munda

Why in News?

Recently tribute was paid to revolutionary tribal leader Birsa Munda marking the 124th anniversary of his death.

About Birsa Munda



Source: IE

- i) Birsa Munda was born on November 15, 1875.
- ii) He belonged to the Munda tribe in the Chotanagpur region (present-day Jharkhand). His community, originally nomadic hunters, had turned to farming.
- iii) He completed his primary education under the guidance of teacher Jaipal Nag.
- iv) Birsa converted to Christianity to join the German Mission school but left after a few years.

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Impact of British Rule

i) Land Ownership Changes: The traditional land ownership system, known as “khuntkatti,” was disrupted by the Permanent Settlement Act (1793), introducing the zamindari system.

ii) Exploitation: The new system created land-owning zamindars (dikus) and tenant farmers (ryots), leading to the displacement and exploitation of tribal communities.

iii) Forced Labour: The “begar” system imposed forced labor on the tribal people.

iv) Moneylenders and Courts: Tribals were forced to depend on moneylenders and had their traditional clan councils replaced with British courts.

v) Famines: Famines in 1896-97 and 1899-1900 caused mass starvation among the tribal population.

Significant contribution of Birsa Munda

1. He was influenced by the Sardari agitation against British rule, Birsa became actively involved in the anti-missionary and anti-colonial movement.

2. Birsa founded the **Birsait faith**, which advocated against superstition and encouraged the worship of one God. He was revered as ‘Bhagwan’ (God) and ‘Dharti ka Abba’ (Father of the Earth).

3. Birsa Munda launched the **Ulgulan movement**, a rebellion against British rule using guerrilla warfare. The movement aimed to establish the Birsa Raj and resist colonial laws and rent payments.

4. The Ulgulan movement led to significant reforms, including the **repeal of the begar system** and the enactment of the Tenancy Act (1903) and the Chotanagpur Tenancy Act (1908), which protected tribal land rights.

5. Birsa was arrested on March 3, 1900, and died in Ranchi Jail on June 9, 1900, at the age of 25.

Nalanda University

Why in the news?

Prime Minister Narendra Modi is **set to inaugurate the new Nalanda University campus** near the ancient university ruins in Rajgir. **About Nalanda University**



Source: mondesetmerveilles.centerblog.net

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1. Nalanda is recognized as the **most ancient university on the Indian subcontinent**.
2. It was established by **Kumar Gupta of the Gupta dynasty** in Bihar during the early 5th century. The university thrived for 600 years until the 12th century.
3. It **reached its zenith during the reign of Harshavardhan and the Pala monarchs**. It served as a hub for learning, culture, and intellectual exchange, significantly influencing Indian civilization and beyond.
4. It was primarily a **place where monks and nuns lived and studied**. It focused on teaching major philosophies of Buddhism.
5. It attracted students from regions including China, Korea, Japan, Tibet, Mongolia, Sri Lanka, and Southeast Asia. Students followed a strict code of conduct and participated in daily meditation and study sessions.
6. It offered courses in medicine, Ayurveda, religion, Buddhism, mathematics, grammar, astronomy, and Indian philosophy.
7. The university was **destroyed in 1193 by Bakhtiyar Khilji**, a general of the Turkish ruler Qutbuddin Aibak.
8. It rediscovered in **1812 by Scottish surveyor Francis Buchanan-Hamilton** and later identified as the ancient university by **Sir Alexander Cunningham in 1861**.
9. The Chinese monk **Xuan Zang** provided invaluable insights into Nalanda's academic and architectural grandeur. Nalanda is recognized as a UNESCO World Heritage Site.

Prerna Sthal

Why in the News?

Vice President Jagdeep Dhankhar recently inaugurated the Prerna Sthal at the Parliament House Complex.

About Prerna Sthal



Figure 3. Source: PIB

1. Prerna Sthal is located at the Parliament House Complex.

2. The Sthal contains statues of India's prominent leaders and freedom fighters, which were formerly dispersed throughout different areas of the Parliament House complex.

3. The initiative aims to enhance visitor experience by providing easier access and utilizing modern technology, such as QR codes, to narrate the life stories of these inspiring figures in Indian history.

About Committee on the Installation of Portraits and Statues of National Leaders and Parliamentarians

1. The Committee on the Installation of Portraits and Statues of National Leaders and Parliamentarians is responsible for decisions regarding the placement of statues and portraits of national leaders and parliamentarians within the

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Parliament House Complex.

2. It also handles the acceptance of such items from outside organizations and individuals, and determines their placement within the complex.
3. However, it has not been reconstituted since 2019.

