



ISRO's new NavIC Satellite NVS-01

For Prelims: NVS-01, GSLV, [NavIC](#), IRNSS, [GPS](#), IMO, [ISRO](#).

For Mains: ISRO's new NavIC satellite NVS-01, Significance of NavIC

Why in News?

The NVS-01 satellite was successfully launched by [the Indian Space Research Organisation \(ISRO\)](#) using the GSLV-F12, and after a 19-minute flight, it was accurately placed into a Geosynchronous Transfer Orbit.

- GSLV-F12 is the 15th flight of India's [GSLV \(Geosynchronous Satellite Launch Vehicle\)](#) and the 9th flight with indigenous cryo stage. This is the 6th operational flight of GSLV with indigenous cryogenic stage.

What is NVS-01?

▪ About:

- This satellite is the **first of the second-generation satellites of ISRO's NVS** (Navigational Satellite) series of payloads.
- It weighs 2,232 kg, making it the heaviest in the constellation.
- The NVS-01 carried **navigation payloads L1, L5 and S bands**.
- Its purpose is to provide continuity for the [NavIC \(Navigation in Indian Constellation\)](#) services, which is an Indian Regional Navigation Satellite System (similar to GPS) that offers accurate and real-time navigation within India and **up to a 1,500 km region around the country**.
 - In the First generation, there are seven satellites in the Indian Regional Navigation Satellite System (IRNSS) constellation, operationally named NavIC, weighing much less — around 1,425 kg — at liftoff.

▪ Atomic Clock:

- The satellite will have a **Rubidium atomic clock onboard**, a significant technology developed by India.
 - Some of the existing satellites in the navigation constellation **lost their ability to provide accurate location data** due to failed atomic clocks. Satellite-based positioning systems rely on precise time measurements from atomic clocks to determine object locations. When the clocks fail, the satellites cannot provide accurate location information anymore.

▪ L1 signals for better use in wearable devices:

- It will send signals in a **third frequency, L1**, besides the L5 and S frequency signals that the existing satellites provide, **increasing interoperability with other satellite-based navigation systems**.
- The L1 frequency is **among the most commonly used in the [Global Positioning System \(GPS\)](#)**, and will increase the use of the regional navigation system in wearable devices and personal trackers that use low-power, single-frequency chips.

▪ Longer Mission Life:

- It will have a **longer mission life of more than 12 years**. The existing satellites have a **mission life of 10 years**.

What is NavIC?

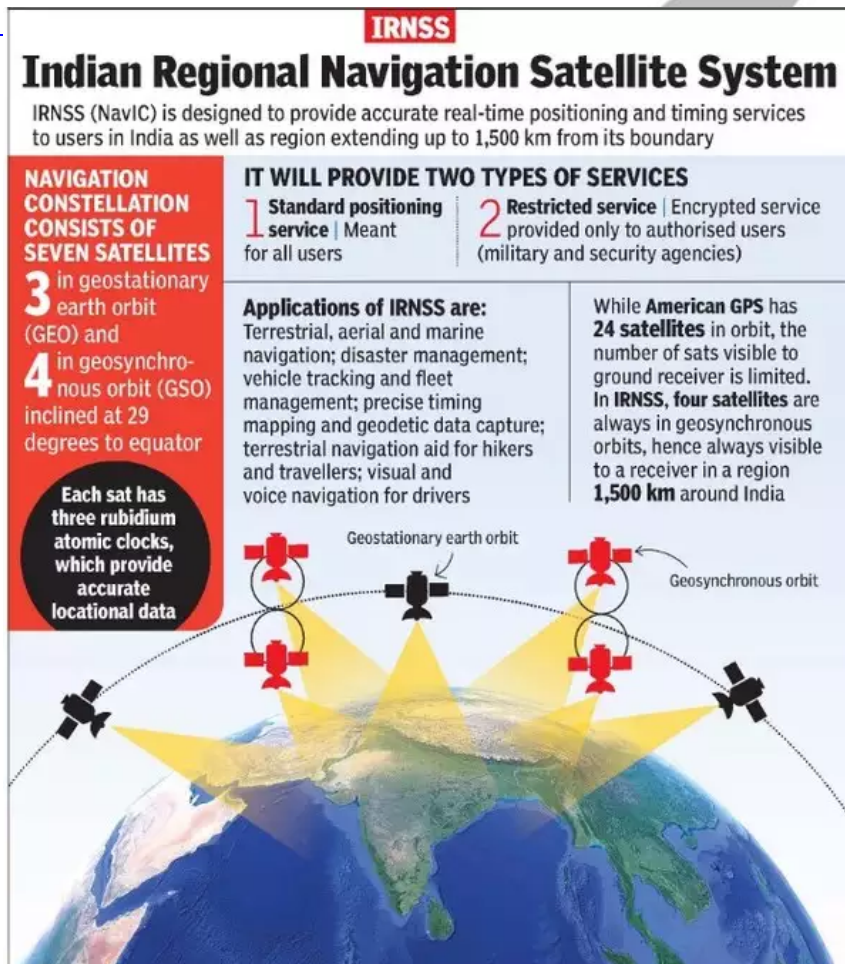
▪ About:

- NavIC or the IRNSS is designed with a constellation of 7 satellites and a network of ground stations operating 24×7.
 - There are a **total of eight satellites however only seven remain active**.
 - Three satellites in geostationary orbit and four satellites in geosynchronous orbit.
- The constellations' first satellite (IRNSS-1A) was launched on 1st July 2013 and the eighth satellite IRNSS-1I was launched in April 2018.
 - With the seventh launch of the constellation's satellite (IRNSS-1G), IRNSS was renamed NavIC by India's Prime Minister in 2016.
- It was recognised by the [International Maritime Organization \(IMO\)](#) as a part of the World-Wide Radio Navigation System (WWRNS) for operation in the Indian Ocean Region in 2020.

▪ Potential Uses:

- Terrestrial, aerial and marine navigation;
- Disaster management;
- Vehicle tracking and fleet management (especially for mining and transportation sector);
- Integration with mobile phones;
- Precise timing (as for ATMs and power grids);
- Mapping and geodetic data capture.

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What is the Advantage of Having a Regional Navigation System?

▪ Regional Navigation System:

- NavIC is India's own regional navigation system developed by ISRO. It covers the **Indian**

landmass and extends up to 1,500 km around it. The primary purpose of NavIC is to cater to the positioning and navigation needs of users in this specific region.

▪ **Ground Stations:**

- ISRO is working on setting up ground stations in countries like Japan, France, and Russia. These additional ground stations will enhance the accuracy and coverage of NavIC signals through better triangulation.

▪ **Signal Reception:**

- NavIC signals reach India at a **90-degree angle, making it easier for the signals to penetrate** congested areas, dense forests, and mountainous terrain. In contrast, GPS signals arrive at an angle, which can sometimes pose challenges for reception in certain locations.

▪ **Availability:**

- NavIC signals are primarily designed to serve the Indian region. Therefore, users within the coverage area can expect reliable access to NavIC signals, even in remote or hard-to-reach areas.

Which are the other Navigation Systems operational in the world?

▪ **Four Global Systems:**

- GPS from the U.S.
- GLONASS from Russia.
- Galileo from European Union
- BeiDou from China.

▪ **Two Regional Systems:**

- NavIC from India
- QZSS from Japan.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q.1 Which one of the following countries has its own Satellite Navigation System? (2023)

- a. Australia
- b. Canada
- c. Israel
- d. Japan

Ans: d

Navigation Systems Operational in the World:

- GPS from the U.S.
- GLONASS from Russia.
- Galileo from European Union
- BeiDou from China.
- NavIC from India
- **QZSS from Japan. Hence, option D is correct.**

Q.2 With reference to the Indian Regional Navigation Satellite System (IRNSS), consider the following statements: (2018)

1. IRNSS has three satellites in geostationary and four satellites in geosynchronous orbits.
2. IRNSS covers entire India and about 5500 sq. Km beyond its borders.
3. India will have its own satellite navigation system with full global coverage by the middle of 2019.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) None

Ans: (a)

Mains

Q.1 Why is Indian Regional Navigational Satellite System (IRNSS) needed? How does it help in navigation? (2018)

Source: TH

Productivity of Lok Sabha and Implications

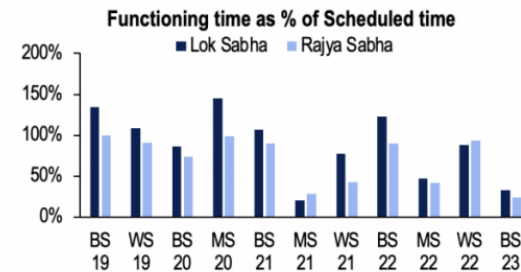
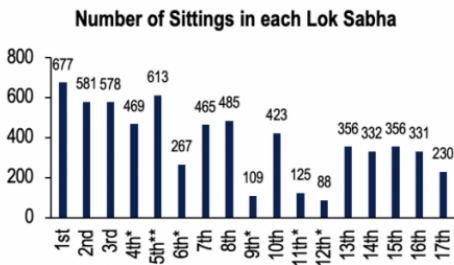
For Prelims: Productivity of Lok Sabha, [Parliament](#), [Lok Sabha](#), [Rajya Sabha](#), [Budget Session](#).

For Mains: Productivity of Lok Sabha and Implications.

Why in News?

The 17th [Lok Sabha](#), which is entering its final year, has functioned for **230 sitting days so far**.

- Of all the Lok Sabhas that completed the full five-year term, the 16th Lok Sabha had the lowest number of sitting days (331). With one more year remaining, and 58 average sitting days a year, the **17th Lok Sabha is unlikely to sit for more than 331 days**.
- This could make it the shortest full-term Lok Sabha since 1952.



Note: *Term less than 5 years; **6 year term. Figures for the 17th Lok Sabha are till the Budget Session 2023.

Note: BS – Budget Session; MS – Monsoon Session; WS – Winter Session.

How has the Lok Sabha Functioned So far?

- **Productivity of Budget Session 2023:**
 - The latest session (Budget session) held from January 2023 to April 2023, saw **limited legislative activity and minimal discussion** on the [Budget](#) amidst continuous

disruptions.

- In this session, the Lok Sabha functioned for 33% of its scheduled time (46 hours) and the Rajya Sabha functioned for 24% (32 hours).
- This has been the **sixth shortest budget session since 1952**. Lok Sabha spent 18 hours on financial business, of which 16 hours were spent on the general discussion of the budget.
- **Past Eleven Sessions:**
 - From the 2019 Budget Session to the 2023 Budget Session, 150 Bills have been introduced and 131 Bills have been passed.
 - In the first session, **38 Bills were introduced and 28 were passed**. Since then, the number of Bills introduced and passed has declined.
 - Fewer than 10 Bills have been introduced or passed in each of the last four consecutive sessions.
- **House Productivity:**
 - In 2022, the functioning of the Lok Sabha was **at 177 hours** and in the Rajya Sabha it was 127.6 hours.
 - In 2021, it was 131.8 hours in the Lok Sabha and 104 hours in the Rajya Sabha.
 - Similarly, in 2020, **productivity hours for the Lower House were 111.2** and 93.8 hours for the Upper House.
 - During the first half of this year's Budget Session, the Lok Sabha devoted a total of 14 hours and 45 minutes to discussing **it against the allotted time of 12 hours**.
- **Debates in Parliament Reducing:**
 - In the 17th Lok Sabha, only 11 short-duration discussions and **one half-an-hour discussion have been** held so far, and none were held during the latest session.
 - Question Hour functioned for only **19% of the scheduled time** in the Lok Sabha and 9% of the scheduled time in the Rajya Sabha.
 - No Private Member Bills were introduced or discussed. Each House discussed one Private Member Resolution.
- **Lower Examination under Parliamentary Committee:**
 - During the course of the 17th Lok Sabha, only 14 Bills have been referred for further examination under [Parliamentary Committee](#) so far.
 - As little as 25% of the Bills introduced **were referred to committees in the 16th Lok Sabha**, as compared to 71% and 60% in the 15th and 14th Lok Sabha respectively. This represents a declining trend of national legislation being subjected to expert scrutiny.
- **Delayed Election of Deputy Speaker:**
 - Article 93 of the Constitution states that **Lok Sabha will choose two Members of the House to be Speaker and Deputy Speaker**, as soon as possible. The 17th Lok Sabha has not elected a Deputy Speaker even **as it enters the final year of its five-year term**.

What are the Reasons for the Lower Productivity of Lok Sabha?

- **Frequent Disruptions:**
 - The 17th Lok Sabha experienced frequent **disruptions and protests by opposition parties**. These disruptions resulted in a **significant loss of time and decreased productivity**.
 - Several major issues led to these disruptions, including the [Citizenship Amendment Act \(CAA\)](#), [National Register of Citizens \(NRC\)](#), and farm laws.
- **Lack of Agreement:**
 - Despite the ruling party having a clear majority, there **was a lack of consensus on crucial matters**. This lack of agreement among the members of parliament caused delays in passing important bills and legislation.
- **Shorter Sessions:**
 - The 17th Lok Sabha had **shorter sessions compared** to previous ones. This limited time for thorough discussions and debates on essential bills and issues. Consequently, many important matters were left pending without sufficient attention.

What are the Implications of Lower Productivity of Lok Sabha?

- **Delayed Legislation:**
 - The primary implication is the **delay in passing important bills and legislation.**
 - When the Lok Sabha is unable to function effectively, bills related to crucial issues such as taxation, infrastructure, and social welfare **may get postponed.**
 - This delay hampers the progress of the country as it impedes the implementation of necessary policies and reforms.
- **Lack of Accountability and Oversight:**
 - When the Lok Sabha is not productive, **it hinders the process of holding members of parliament accountable** for their actions. Inadequate debate and scrutiny **result in a lack of thorough examination of proposed laws** and decisions.
 - This undermines the **democratic principle of checks and balances**, allowing the executive to push through decisions without sufficient oversight.
- **Diminished Public Trust:**
 - It can damage the **trust of citizens in democratic institutions.** When elected representatives are unable to fulfill their responsibilities effectively, it creates a sense of disillusionment and disengagement among the public.
 - This can **lead to a decline in citizen participation**, eroding the foundations of a healthy democracy.
- **Wasted Resources:**
 - The lower productivity of the Lok Sabha **translates into wasted resources, specifically taxpayers' money.**
 - The salaries and allowances of Members of Parliament are funded by the public exchequer. If these resources are not utilized effectively due to disruptions or lack of productivity, it results in a waste of public funds that could have been utilized for other developmental purposes.
- **Economic Impact:**
 - A less productive Lok Sabha can have a negative impact on the economy. Delayed or inadequate legislation on crucial economic issues **can hamper growth, investment, and development.**
 - The lack of certainty and efficient decision-making can undermine investor confidence, leading to a slowdown in economic progress.

Way Forward

- There is a need to reinvigorate the culture of parliamentary democracy in India. This involves **fostering a sense of respect, decorum, and professionalism** among parliamentarians. Members should be encouraged to **prioritize their role as representatives of the people** and actively participate in debates and discussions.
- It is crucial to promote a **culture of constructive dialogue and debate** within Parliament. Political leaders **should be encouraged to engage in substantive discussions** on policy matters, rather than resorting to disruptive tactics or personal attacks.
- Efforts should be made to strengthen the oversight function of Parliament through rigorous questioning, **scrutiny of government actions, and thorough debates on important policy decisions.** This requires ensuring that relevant information is provided to parliamentarians in a timely and transparent manner.

[Source: TH](#)

India's Coffee

For Prelims: Coffee Board of India, Chicory, Coffee production in India

For Mains: Government Policies and Interventions, the significance of coffee plantations in ecologically

sensitive regions, coffee consumption and its role in protecting against oxidative damage.

Why in News?

Recently, the Statista site stated that India is the **sixth largest producer of coffee in the world**, after **Brazil (largest producer of coffee)**, Vietnam, Colombia, Indonesia, Ethiopia and Honduras.

- In recent times, there has been increasing attention on the **health benefits of South Indian coffee blend**, particularly highlighting the **role of chicory and coffee with milk**.

What is South Indian Coffee Blend?

▪ About:

- It Includes an **admixture of coffee and chicory powders**.
- Gives the blend a **unique flavor and characteristics**.

▪ Chicory:

- Herb native to **Europe and Asia**.
- Contains **inulin**, a starchy substance beneficial for health which is found in **awide variety of fruits, vegetables, and herbs, including [wheat](#), onions, bananas, leeks, artichokes, and asparagus**.
- Possesses **mild laxative properties and it decreases swelling** and is rich in **beta-carotene, providing superior protection against oxidative damage**.
- **Absence of caffeine in chicory** makes it a suitable complement to coffee, which contains caffeine.

What are the Health Benefits of Coffee?

▪ Health Benefits of Coffee:

- Protection against **oxidative damage**.
- Reduced risk of **type 2 diabetes**.
- Reduced risk of **age-related diseases**.

▪ Coffee with Milk and Potential Health Effects:

- While plain coffee is popular in many parts of the world, **South Indian filter coffee is typically served with hot milk**.
- The addition of milk enhances the taste and flavor of coffee.
- Research from the University of Copenhagen suggests that coffee with milk may have an **anti-inflammatory effect, aided by the combination of proteins and antioxidants present in milk**.
- A large-scale human trial is underway to study the health effects of milk-added coffee, sparking interest among Indian coffee lovers.

What are the Key Points about Coffee?

▪ History and Commercialization:

- Coffee was introduced to India during the late seventeenth century.
- The **smuggling of seven coffee beans from Yemen to India** by an Indian pilgrim in 1670 marked its initial arrival.
- The **Dutch**, who occupied parts of India during the 17th century, **played a role in spreading coffee cultivation**.
- However, it was during the British Raj in the mid-nineteenth century that commercial coffee farming fully flourished, particularly from the Mysore region.

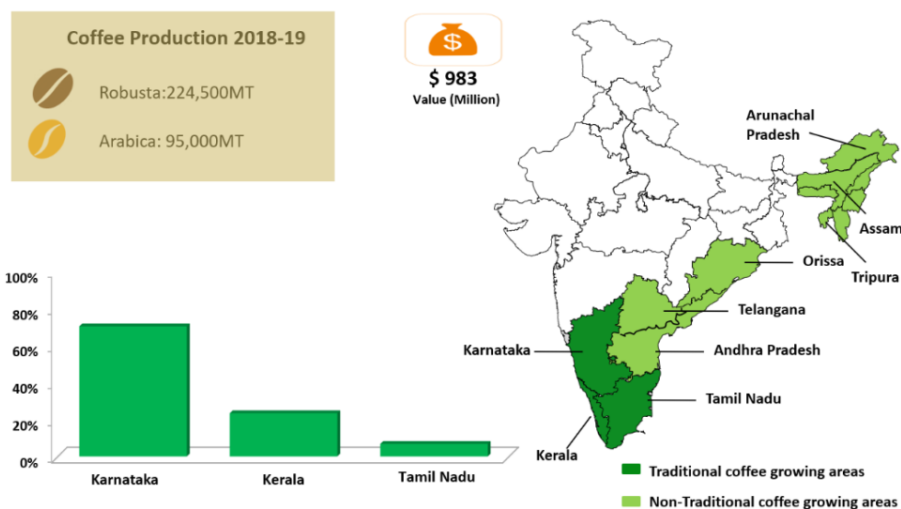
▪ Cultivation and Biodiversity:

◦ Coffee Plantation Practices in India:

- Predominantly grown under **thick natural shade**.
- Ecologically sensitive regions of the [Western](#) and [Eastern Ghats](#).

- **Biodiversity Hotspots:**
 - Coffee plantations located in these regions are recognized as [biodiversity hotspots](#).
 - Contribute significantly to **India's unique biodiversity**.
- **Export and Domestic Consumption:**
 - Approximately **65% to 70% of the coffee produced in India is exported** and remaining coffee is consumed domestically.
- **Role in Sustainability and Socio-economic Development:**
 - Coffee cultivation plays a vital role in sustaining biodiversity.
 - **Fosters socio-economic development in remote hilly areas.**
- **Climatic Conditions and Soil Types:**
 - **Climate Conditions:**
 - Hot and humid climate, Temperature 15°C to 28°C, and Rainfall 150 to 250 cm.
 - **Harmful Conditions:**
 - Frost, Snowfall, High temperatures above 30°C, and Strong sunlight.
 - **Ideal Soil Conditions:**
 - Well-drained loamy soils, Presence of humus and minerals (iron, calcium), Fertile volcanic red earth, and Deep sandy loam soils.
 - **Less Suitable Soil Conditions:**
 - Heavy clay soils, Sandy soils.
- **Geographical Distribution and Varieties:**
 - **Coffee Plantation Locations in India:**
 - Karnataka, Kerala, Tamil Nadu, Andhra Pradesh (Araku Valley), Odisha, Manipur, Mizoram, and Other northeastern states.
 - **Major Coffee Producer:**
 - Karnataka accounts for approximately 70% of India's total coffee production.
 - **Coffee Varieties in India:**
 - **Arabica and Robusta.**
 - **Characteristics of Arabica:**
 - Grown at higher altitudes and it has Higher market value due to its aroma.
 - **Characteristics of Robusta:**
 - Known for its strength and used in various blends.

INDIA COFFEE MARKET-KEY DATA



Source: Coffee Board of India, Wikipedia

The Coffee Board of India

- It is a **statutory organization that was constituted under Section (4) of the Coffee Act, 1942.**

- It **functions under the administrative control of the Ministry of Commerce and Industry, Government of India.**
- The Board comprises 33 Members including the Chairperson, who is the Chief Executive and it **functions from Bangalore.**
- The Board mainly focuses its activities in the areas of research, extension, development, market intelligence, external & internal promotion for coffee.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. 1 Match List-I with List-II and select the correct answer using the code given below the Lists: (2008)

List-I (Board)	List-II (Headquarters)
A. Coffee Board	1. Bengaluru
B. Rubber Board	2. Guntur
C. Tea Board	3. Kottayam
D. Tobacco Board	4. Kolkata

Code: A B C D

- (a) 2 4 3 1
 (b) 1 3 4 2
 (c) 2 3 4 1
 (d) 1 4 3 2

Ans: (b)

Q.2 Though coffee and tea both are cultivated on hill slopes, there is some difference between them regarding their cultivation. In this context, consider the following statements: (2010)

1. Coffee plant requires a hot and humid climate of tropical areas whereas tea can be cultivated in both tropical and subtropical areas.
2. Coffee is propagated by seeds but tea is propagated by stem cuttings only.

Which of the statements given above is/are correct?

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

Ans: (a)

Source: TH

National Rare Diseases Committee

For Prelims: [National Policy of Rare Diseases](#), Rare Diseases, National Rare Diseases Committee

For Mains: Impact of rare diseases on the healthcare system, Initiatives Related to Universal Health Coverage in India.

Why in News?

Recently, the Delhi High Court has taken a proactive step to **address the challenges faced by patients with rare diseases** by establishing a **five-member panel to implement the Centre's rare diseases policy effectively**.

- The panel, known as the **National Rare Diseases Committee**, aims to ensure that patients enrolled with the All-India Institute of Medical Sciences (AIIMS), Delhi, receive timely treatment and benefit from the policy.
- The mandate of the Committee would broadly be to take all steps needed for implementation of the [National Rare Disease Policy, 2021](#).

What are Rare Diseases?

- There are **6,000-8,000 classified rare diseases**, but less than 5% have therapies available to treat them.
- Example: [Lysosomal Storage Disorders \(LSD\)](#), **Pompe disease**, [cystic fibrosis](#), **muscular dystrophy**, **spina bifida**, [haemophilia](#) etc.
- About 95% rare diseases have no approved treatment and less than 1 in 10 patients receive disease-specific treatment.
- 80% of these diseases have **genetic origins**.
- These diseases have differing definitions in various countries and range from those that are **prevalent in 1 in 10,000 of the population to 6 per 10,000**.
- However broadly, a **'rare disease' is defined as a health condition of low prevalence that affects a small number of people** when compared with other prevalent diseases in the general population. Many cases of rare diseases may be **serious, chronic and life-threatening**.
- India has close to 50-100 million people affected by rare diseases or disorders, the policy report said almost **80% of these rare condition patients are children** and a leading cause for most of them not reaching adulthood is due to the high morbidity and mortality rates of these life-threatening diseases.

What is the National Rare Diseases Committee?

- **About:**
 - The National Rare Diseases Committee is a **five-member panel** who will work together to address the challenges faced by patients with rare diseases established by the Delhi High Court to implement the rare diseases policy and ensure efficient treatment for patients.
 - The committee consists of experts from relevant fields, including **medical professionals, policymakers, and representatives from healthcare institutions**.
- **Responsibilities and Objectives:**
 - Assessing Cases:
 - Focus on **patients enrolled with AIIMS in Delhi**.
 - Evaluate individual cases to understand medical needs and determine treatment.

- **Implementation of the Policy:**
 - Devise **strategies and guidelines for translating policy provisions into action.**
- **Coordination and Collaboration:**
 - Facilitate close coordination between **medical community, therapy providers, and governmental agencies.**
 - Create a collaborative environment for addressing challenges related to rare diseases.
- **Treatment Accessibility:**
 - Ensure **timely treatment for patients with rare diseases.**
 - Explore **avenues for procuring necessary therapies and drugs.**
 - Establish a **logistical framework for seamless administration of treatment.**

What is the National Rare Disease Policy 2021?

- **Aim:**
 - Increase **focus on indigenous research and local production of medicines.**
 - **Lower the cost of treatment** of rare diseases.
 - **Screen and detect rare diseases early** for prevention.
- **Major Provisions of the Policy:**
 - Categorization:
 - Group 1: Disorders amenable to **one-time curative treatment.**
 - Group 2: Diseases requiring **long-term or lifelong treatment.**
 - Group 3: Diseases with **available treatment but challenges in patient selection, high cost, and lifelong therapy.**
- **Financial Support:**
 - Provision for financial support of up to **Rs. 50 lakhs to the patients** suffering from any category of the Rare Diseases and for treatment in any of the Centre of Excellence (CoE) mentioned in NPRD-2021, outside the Umbrella Scheme of Rashtriya Arogya Nidhi.
 - Financial support of **up to Rs. 20 lakhs under Rashtriya Arogya Nidhi** for rare diseases listed under Group 1.
 - Rashtriya Arogya Nidhi provides assistance to patients with major life-threatening diseases, regardless of their poverty status.
 - Voluntary crowdfunding for treatment through a **digital platform for individual and corporate contributions.**
- **Centres of Excellence:**
 - Designation of **eight health facilities as 'Centres of Excellence'.**
 - One-time financial support of up to Rs. 5 crore for upgrading diagnostic facilities.
- **National Registry:**
 - Creation of a **national hospital-based registry of rare diseases.**
 - Ensuring comprehensive data and definitions for research and development purposes.
- **Concerns Raised:**
 - Lack of **sustainable funding for patients with Group 3 disorders.**
 - **Prohibitive costs of drugs for rare diseases.**
 - Limited global and domestic manufacturers of drugs for rare diseases.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Appropriate local community-level healthcare intervention is a prerequisite to achieve 'Health for All' in India. Explain. (2018)

[Source: TH](#)

Fortification of Rice

For Prelims: [Fortification of Rice](#), [Food Safety and Standards Authority of India \(FSSAI\)](#), [World Health Organization](#), [Public Distribution System](#), [Nanotechnology](#).

For Mains: Benefits of Iron Fortification of Rice, Risks Associated with Iron Fortification of Rice.

Why in News?

In a response to the **recent wave of criticism surrounding the distribution of iron fortified rice**, the Union Food Ministry has released an official statement dismissing the allegations levelled against the iron fortified rice.

What is Fortification of Rice?

▪ About:

- **Fortification is the process of adding nutrients to food products** that are not naturally present or are present in insufficient amounts.
- Fortification of rice can be **done by coating the rice grains with a premix of micronutrients, or by producing extruded rice kernels that are enriched with micronutrients and then blended with regular rice.**
 - According to [Food Safety and Standards Authority of India \(FSSAI\)](#) norms, 1 kg fortified rice shall contain **iron (28 mg-42.5 mg), folic acid (75-125 microgram) and Vitamin B-12 (0.75-1.25 microgram).**

▪ Purpose:

- India has **very high levels of malnutrition among women and children.** According to the Food Ministry, every second woman in the country is anemic and every third child is stunted.
- Rice is a **source of protein and contains various vitamins.** Some nutrients, including **vitamin E, magnesium, potassium, and manganese, are lost during milling and polishing** (the process by which brown rice becomes white or polished rice).
 - **Rice** is one of the most **widely consumed staple foods in the world**, especially in Asia and Africa.
 - Per capita rice consumption in India is 6.8 kg per month. Therefore, **fortifying rice with micronutrients is an option to supplement the diet** of the poor.
- **Iron deficiency** also is a major public health problem that **affects more than two billion people globally**, causing anaemia, weakness, fatigue, impaired learning and increased risk of infections and maternal mortality.
 - To address this problem, **some countries have adopted the strategy of fortifying rice with iron and other micronutrients, such as folic acid and vitamin B12.**
 - Most of the iron we need comes from meat, which gets absorbed 50% by our body. Through vegetables, there is limited intake and only 3% absorption. **This is the reason why iron deficiency is a major problem in India.**

Vitamin B12

- **Vitamin B12**, also known as **cyanocobalamin is synthesized by most bacteria and algae with the help of enzymes.**
 - It is synthesized in microorganisms that enter the human food chain through incorporation into food of animal origin.
 - It is also crucial to the **normal function of the brain and the nervous system.**

- **Deficiency of Vitamin B12 causes pernicious anaemia.** It is rarely caused due to lack of Vitamin B12 in the diet but because of the **absence of the intrinsic factor in the stomach leading to failure of absorption of Vitamin B12.**

Folic Acid

- **Folate is the natural form of vitamin B9,** water-soluble and naturally found in many foods. It is also added to foods and **sold as a supplement in the form of folic acid.**
- Folic acid needs to be taken by pregnant women before conception.
 - Deficiency of folic acid in pregnant women leads to **Neural Tube Defects in the baby such as Spina Bifida.**
 - Spina bifida is a condition that **affects the spine and is usually apparent at birth.**
- **India & Southeast Asia & some parts of Africa** have the highest cases of neural Tube defects (4.7-9 per 1000 in Punjab & Haryana).
 - In the developed world, **it is less than 1 per 1000.**

What are the Benefits of Iron Fortification of Rice?

- According to the [World Health Organization \(WHO\)](#), fortification of rice with micronutrients can be an **effective, simple and inexpensive strategy to improve the nutritional status and health outcomes** of populations that consume rice regularly. Some of the benefits of iron fortification of rice are:
 - **Improved Cognitive Development:** Iron plays a crucial role in **brain development and function.**
 - Adequate iron intake during early childhood is essential for optimal cognitive development and learning abilities.
 - By **fortifying rice with iron, particularly in regions where rice is a primary dietary staple, the potential for cognitive impairment due to iron deficiency can be reduced,** leading to improved cognitive performance and better educational outcomes.
 - **Enhanced Maternal and Infant Health:** Anemia is prevalent among pregnant women and can increase the risk of complications during [pregnancy and childbirth](#).
 - Iron fortification of rice can help **improve the iron status of pregnant women,** reducing the occurrence of maternal anemia and the associated risks. Additionally, adequate iron intake during pregnancy is essential for fetal development and can contribute to healthy birth outcomes.

What are the Risks Associated with Iron Fortification of Rice?

- **Chances of Ineffectiveness:**
 - It **may not be sufficient to meet the iron requirements of all individuals,** especially those with **high needs or low bioavailability of iron.**
 - Bioavailability of iron refers to the **proportion of iron that is absorbed and utilised by the body,** which depends on several factors such as the **type and amount of iron compound used for fortification,** the **presence of enhancers or inhibitors of iron absorption in the diet,** and the physiological status and genetic variation of the individual.
- **Adverse Effects on Sensitive Individuals:**
 - It may cause **adverse effects in some individuals who have excess iron intake or accumulation.** Excess iron can be toxic to the body and cause **oxidative stress, inflammation, organ damage** and increased risk of infections and chronic diseases.
 - Some groups that may be at risk of excess iron intake or accumulation are those with [genetic disorders](#) such as **hemochromatosis or thalassemia,** those with liver diseases or infections such as hepatitis or **malaria,** and those who consume other sources of fortified foods or supplements.

- **Barriers Abound:**
 - It may face **technical, regulatory or social barriers to implementation.**
 - Technical barriers include ensuring the **quality, stability and safety of the fortified rice products;**
 - Regulatory barriers include **establishing and enforcing standards, guidelines and monitoring systems for fortification;**
 - Social barriers include ensuring the **acceptability, affordability and accessibility of the fortified rice products** among consumers and stakeholders.

Way Forward

- **Deploying Nanotechnology:** There is a need to **explore the use of [nanotechnology](#) to encapsulate iron particles and enhance their bioavailability.**
 - Nanoparticles can be engineered to **increase iron absorption by improving solubility and preventing interactions with inhibitors present in rice.**
- **Blending Iron Fortification with Biofortification:** There is a need to combine iron fortification with **[biofortification strategies](#).**
 - Biofortification involves **breeding crops with higher nutrient content**, including iron, through **conventional breeding techniques.**
 - By integrating iron fortification and biofortification, we can **develop rice varieties that are naturally enriched with iron.**
- **Public-Private Partnerships:** There is a need to foster collaborations between **governments, research institutions, private sector entities, and NGOs to promote and scale up iron fortification efforts.**
 - These partnerships can facilitate the development of innovative technologies, funding mechanisms, and distribution networks for iron-fortified rice.
- **Continuous Research and Development:** There is a need to encourage ongoing research and development to explore **new technologies, formulation methods, and fortification techniques.**
 - Regularly assessing the efficacy and impact of iron fortification programs is required to identify areas for improvement and innovation.

[Source: TH](#)

The Slowdown in Overturning Circulation

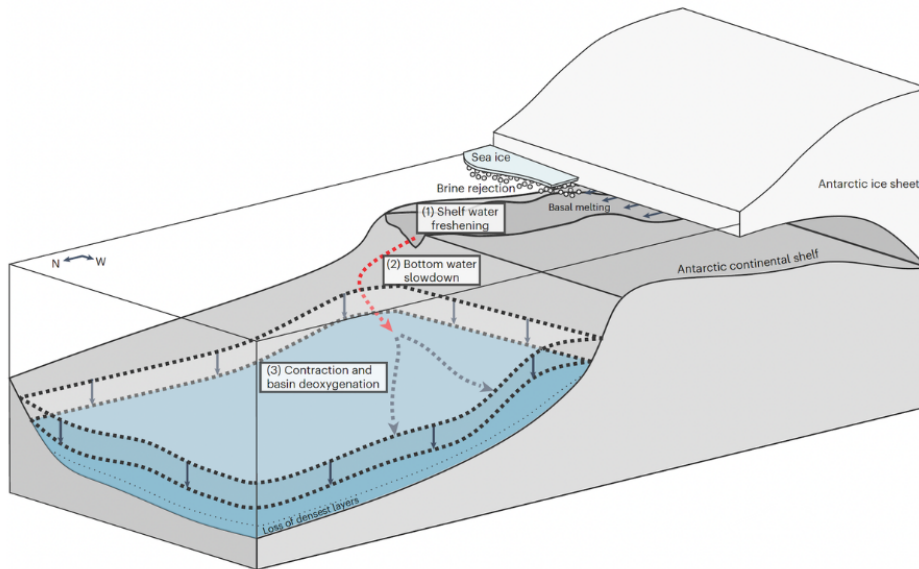
For Prelims: [Overturning circulation](#), Bottom Water, [Antarctica](#), Greenhouse effect, [ocean currents](#).

For Mains: Overturning circulation and its significance in maintaining climate stability, Slowdown in deep ocean currents in Antarctica and its consequences.

Why in News?

Recently, **Deep Ocean currents in [Antarctica](#) are slowing down** earlier than predicted, potentially **disrupting the crucial [overturning circulation](#).**

- The slowdown in circulation and declining oxygen levels in the deep ocean have been observed, indicating significant changes in the **Antarctic deep ocean over the past three decades.**
- The consequences of this phenomenon are further underscored by the **impacts of melting Antarctic ice** on the overturning circulation.



Freshening of shelf waters reduces the flow of dense water and slows the deepest parts of the overturning circulation while also reducing deep oxygenation.

What is Overturning Circulation?

▪ About:

- Overturning circulation refers to the **global network of ocean currents that redistribute heat, carbon, and nutrients across the world's oceans.**
- In Antarctica, it involves the **sinking of dense, oxygen-rich water from the surface, its spread along the sea floor, and slow rise in distant regions.**

▪ Process:

- In polar regions, the surface water cools due to **low temperatures and exposure to frigid air masses.**
- The cooling leads to the formation of **sea ice, which extracts freshwater from the surrounding seawater.** This process increases the **salinity and density of the remaining water.**
- The high salinity and density cause the **surface water to become denser, making it more likely to sink.**
 - The dense water sinks to deeper layers, forming what is known as **bottom water.**
- The sinking of dense water drives the deeper limb of the **overturning circulation.** It flows towards the equator, while at the same time, warmer surface water from lower latitudes moves towards the poles.
- As the deep-water travels, it gradually mixes with surrounding water masses, **exchanging heat, carbon, and nutrients.** Eventually, the upwelling of this modified water occurs in other regions, completing the overturning circulation.

▪ Importance:

- Overturning circulation plays a crucial role in maintaining **climate stability on Earth.**
- It facilitates the **transport of heat, carbon, and nutrients, influencing the planet's climate system.**
- Additionally, it **ensures the supply of oxygen to the deep ocean, supporting marine life and its ecosystems.**

▪ Impact of Slowdown in Overturning Circulation:

- The observed slowdown of deep ocean currents in Antarctica, occurring earlier than anticipated, raises concerns about climate stability.
- A reduced flow of bottom water results in a **decline in oxygen supply** to the deep ocean, impacting **oxygen-dependent organisms.**
- Lower oxygen levels may lead to **behavioral changes, migrations, and disruptions in the marine food chain.**
 - Moreover, the slowdown amplifies **global warming** as the ocean's **capacity to**

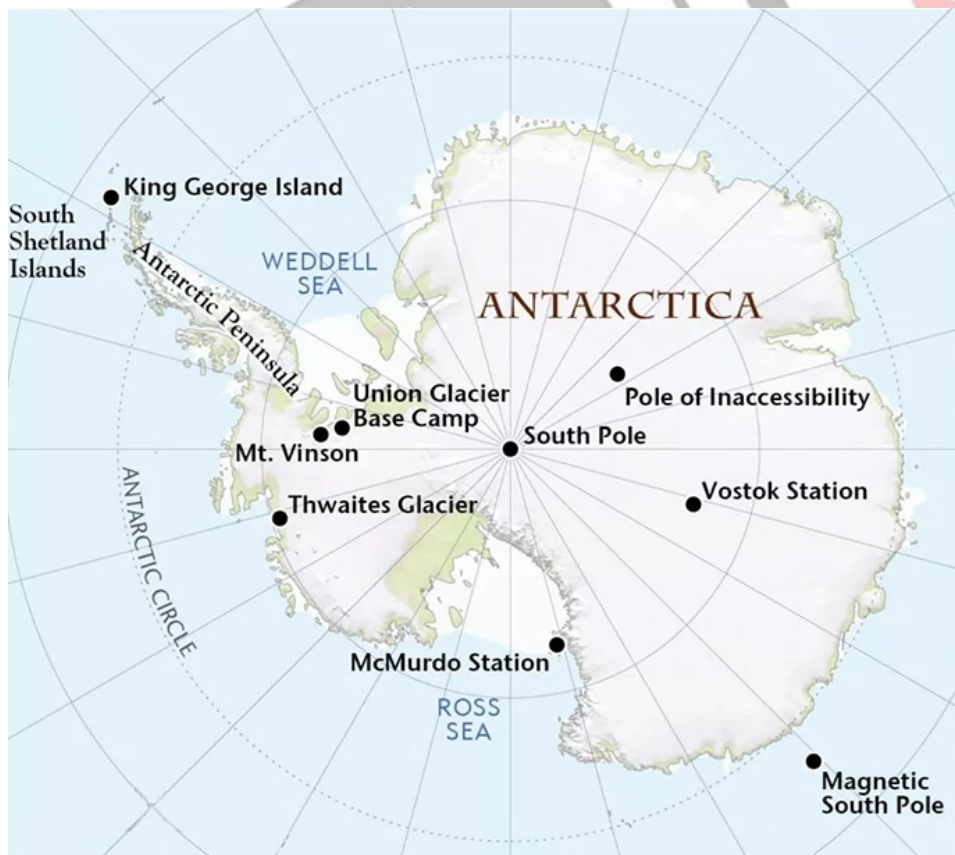
store carbon dioxide and heat diminishes, intensifying the **greenhouse effect**.

▪ **Melting Antarctic Ice and its Contribution:**

- Melting Antarctic ice disrupts the formation of **Antarctic bottom water**, making **surface waters fresher and less dense, impeding their sinking**.
 - This disruption weakens the overturning circulation, further diminishing the oxygen supply to the deep ocean.
- The replacement of bottom water with warmer, oxygen-depleted waters exacerbates the **decline in oxygen levels**.
- Additionally, melting ice contributes to rising sea levels through thermal expansion as warmer water occupies more space.

What are the Key Highlights about Antarctica?

- Antarctica is **uninhabited except for those manning the nearly 40 permanent stations** established by several countries, including India, for carrying out scientific research.
 - India maintains **two research stations on the continent**: 'Maitri' (commissioned in 1989) at Schirmacher Hills and 'Bharati' (2012) at Larsemann Hills.
 - It has also **launched 41 scientific expeditions every year** thus far. Together with **'Himadri' station in Svalbard**, above the Arctic circle, India is among an **elite group of countries with multiple research** in the polar regions.
- Antarctica is **Earth's southernmost continent**. It contains the **geographic South Pole** and is situated in the **Antarctic region of the Southern Hemisphere**.
- At 14,000,000 square kilometres, it is the **fifth-largest continent**.
- The **Indian Antarctic Programme** is a multi-disciplinary, multi-institutional programme under the control of the National Centre for Antarctic and Ocean Research, Ministry of Earth Sciences.
- India officially **acceded to the Antarctic Treaty System in August 1983**.



UPSC Civil Services Examination Previous Year Question (PYQ)

Q. How do ocean currents and water masses differ in their impacts on marine life and coastal environment? Give suitable examples. **(2019)**

Q. What are the forces that influence ocean currents? Describe their role in fishing industry of the world. **(2022)**

[Source: TH](#)

India's New Parliament House

For Prelims: India's New Parliament House, [Central Vista project](#), [Lok Sabha](#), [Rajya Sabha](#), [Earthquake](#), [Foucault Pendulum](#), [Sengol](#).

For Mains: Need for India's New Parliament House.

Why in News?

Recently, the Indian Prime Minister has inaugurated India's new **Parliament building**, part of the revamped [Central Vista project](#).

- The construction of the new building, designed by Architect Bimal Patel, began in 2019.



What is the Need for New Parliament Building?

- **Narrow Seating Space for MPs:**
 - The old building was never **designed to accommodate a bicameral legislature** for a full-fledged democracy. The number of Lok Sabha seats is likely to increase significantly **from the current 545 after 2026**, when the freeze on the total number of seats lifts.

- **Distressed Infrastructure:**
 - The addition of services like water supply and sewer lines, air-conditioning, firefighting equipment, CCTV cameras, etc., **have led to seepage of water at several places** and impacted the aesthetics of the building.
 - Fire safety is a major concern at the building, the official site says.
- **Obsolete Communication Structures:**
 - Communications infrastructure and **technology was antiquated in the old Parliament**, and the acoustics of all the halls need improvement.
- **Safety Concerns:**
 - The old Parliament building was **built when Delhi was in Seismic Zone-II**; currently it is in Seismic Zone-V. This raises structural safety concerns.
- **Inadequate Workspace for Employees:**
 - Over the years, inner **service corridors were converted into offices** which resulted in poor-quality workspaces. In many cases, these workspaces were made even smaller by creating sub-partitions to accommodate more workers.

What are the Key Points Related to the New Parliament?

- **Triangular Shape:**
 - The new building is triangular in shape, mostly **because the plot of land that it is built on is a triangle**.
 - The new building's design is **influenced by sacred geometry found in various religions**. Its design and materials are meant to complement the old Parliament, with the **two buildings expected to function as one complex**.
- **Environment Friendly:**
 - Built using **green construction techniques**, the new building is supposed to reduce **electricity consumption by 30%**, compared to the old one.
 - Rainwater-harvesting and **water-recycling systems have been included**. It has been designed to be more space efficient and meant to function for the next 150 years.
- **Earthquake-Safe:**
 - Since Delhi is in seismic zone-V, the **building is primed to be Earthquake-safe**.
- **Lok Sabha:**
 - The new [Lok Sabha](#) chamber **has a peacock theme**, with designs **drawn from the national bird's feathers** carved on the walls and ceiling, complemented by teal carpets.
 - The Lok Sabha chamber will have 888 seats, up from the existing 543, with the option of **expanded seating up to 1,272**. The Lok Sabha will be used for joint sittings of both Houses **in the absence of a Central Hall**, which was the fulcrum of the old building.
- **Rajya Sabha:**
 - The Rajya Sabha chamber has been **decorated with the lotus as its theme**, with red carpets.
 - In both the Lok Sabha and the Rajya Sabha, **two MPs will be able to sit on one bench** and each MP will have a **touch screen on the desk**.
 - The Rajya Sabha chamber can **accommodate 384 Members of Parliament (MPs)**, as opposed to the existing capacity of 250. The increased capacity of both chambers is meant to cater to any future increase in the number of MPs following Delimitation.
- **Constitution Hall:**
 - The new building has a Constitution Hall, where the **journey of Indian democracy has been documented**.
- **Material from across India:**
 - For the interior and exterior of the building, construction **materials have been brought in from across** the country, including *sandstone from Sarmathura* in Dholpur and **granite from Lakha village in Jaisalmer**, Rajasthan.
 - Similarly, the **wood used in the decor is from Nagpur** and **craftsmen from Mumbai** have led the wooden architecture design.
 - **Bhadohi weavers from Uttar Pradesh** have made the **traditional hand-knotted carpets for the building**.
- **Gandhi Statue:**

- The 16-foot-tall bronze statue of **Mahatma Gandhi**, originally placed at the main entrance of Parliament in 1993, has been relocated between the old and new buildings.
- It now faces the old building, near the entrance used by the **Lok Sabha Speaker**. The statue has been a significant site for protests, gatherings, and photo-ops for students and Members of Parliament.
 - It was created by renowned sculptor Ram V Sutar, a recipient of the **Padma Bhushan award**.
- **National Symbols:**
 - The building is replete with national symbols, including the **national emblem — the Lion Capital of Ashoka** — that weighs 9,500 kg and is 6.5 metres in height, and is visible from a distance.
 - To support this massive bronze sculpture, a **structure of 6,500 kg was constructed on top of the central foyer**. At the entrance, the Ashoka chakra and the words 'Satyameva Jayate' have been carved in stone.
- **Golden Sceptre:**
 - A **golden sceptre (Sengol)**, given to **Jawaharlal Nehru** on the eve of Independence to mark the transfer of power from the British, **will sit in the new Lok Sabha chamber**, near the Speaker's podium. This sceptre was given to **him by priests from Tamil Nadu**.
- **Going Digital:**
 - In line with the environment-friendly focus of the new Parliament, **all records — House proceedings**, questions and other business — are being digitised. Besides, tablets and iPads will become a norm.
- **Galleries in the Building:**
 - A gallery called 'Shilp' will exhibit textile installations from across India, along with pottery items made from the mitti of all Indian states. The **gallery 'Sthapatya' will exhibit the iconic monuments of India**, including those from the different states and UTs. Besides monuments, it also amalgamates yoga asanas.
- **Vaastu Shastra:**
 - At all the entrances of the building, **auspicious animals as guardian statues will be exhibited**, based on their importance in Indian culture and vaastu shastra. These include the elephant, the horse, the eagle, the swan, and mythical creatures shardula and makara.
- **Foucault Pendulum:**
 - A Foucault pendulum installed inside the new Parliament building. At the latitude of Parliament, it takes **49 hours, 59 minutes and 18 seconds** to complete one rotation.
 - The Foucault pendulum, named after **French physicist Léon Foucault**, is used to demonstrate the earth's rotation.
 - The pendulum consists of **a heavy bob suspended at the end of a long, strong wire** from a fixed point in the ceiling. As the pendulum swings, the **imaginary surface across which** the wire and the bob swipe is called the plane of the swing.

Central Vista

- The Central Vista of New Delhi houses **Rashtrapati Bhawan, Parliament House, North and South Block**, India Gate, National Archives among others.
- In December 1911, **King George V made an announcement in Delhi Durbar** (a grand assembly) to shift the capital of India from Calcutta to Delhi.
 - Delhi Durbar was hosted to mark the coronation of King George V.
- The task of constructing a new city was given to **Edwin Lutyens, known for his strong adherence to European Classicism** and Herbert Baker, a prominent architect in South Africa.
 - Herbert Baker is also the architect of the Union buildings at Pretoria, South Africa.
- The Parliament House building was **designed by both Lutyens and Baker**.
- Rashtrapati Bhavan was designed by Edwin Lutyens.
- The Secretariat, which includes both north and south blocks was designed by Herbert Baker.

Rapid Fire Current Affairs

CAG Chief Re-elected as WHO External Auditor

Girish Chandra Murmu, the [Comptroller and Auditor General of India \(CAG\)](#), has been re-elected as the **External Auditor of the [World Health Organization \(WHO\)](#)** for a **four-year term from 2024 to 2027**. The re-election took place during the **76th [World Health Assembly](#) in Geneva**. This marks his second major international audit assignment this year, following his selection as the **External Auditor for the [International Labour Organisation \(ILO\)](#) in March 2023**. Additionally, the CAG of India holds the position of External Auditor for several other international organizations, including the [Food and Agriculture Organization](#), the [International Atomic Energy Agency](#), and the [Inter-Parliamentary Union](#). The CAG's re-election as the WHO External Auditor highlights **India's strong presence and influence in international audit and governance bodies**.

The function of the External Auditor of the WHO is to conduct **independent audits** and provide assurance on the financial statements, **compliance with regulations, effectiveness of operations, and risk management** within the organization.

Read more: [Comptroller and Auditor General of India \(CAG\), World Health Organization \(WHO\)](#)

China Sends First Civilian into Space

China's space program achieved a significant milestone by successfully launching the **Shenzhou 16 spacecraft, carrying 3 astronauts using a Long March 2F rocket**. This marks the **country's first-ever mission involving a civilian astronaut**. With ambitions to catch up with the United States and Russia, China has invested billions of dollars into its military-run space program. This milestone **marks a departure from the previous practice of only sending astronauts from the People's Liberation Army**. The civilian astronaut, Gui Haichao, a payload expert from Beijing University of Aeronautics and Astronautics, will be responsible for space science experimental payloads. China's space dream includes plans for a **lunar base and a crewed lunar mission by 2029**, while the [Tiangong space station](#) will facilitate scientific experiments and the testing of new technologies.

Read more: [China's Tiangong Space Station](#)

Boosting Unani Medicine

The **Union Ministry of Minority Affairs has allocated Rs 45.34 crore to bolster the research and development of [Unani medicine](#)**, a traditional healing system. The **Central Council of Research in Unani Medicine (CCRUM)** and the **National Institute of Unani Medicine (NIUM) Bengaluru** have received Rs 35.52 crore and Rs 9.81 crore respectively to enhance Unani facilities in Hyderabad, Chennai, Lucknow, Silchar, and Bengaluru.

The grants have been disbursed under the centrally sponsored scheme [Pradhan Mantri Jan Vikas Karyakram](#), aiming to promote the advancement of Unani medicine and its accessibility to the public.

Unani medicine, **based on the principle of boosting the body's inherent self-healing power, is one of India's popular alternative treatments, alongside [Ayurveda](#) and homoeopathy**.

Read more: [Pradhan Mantri Jan Vikas Karyakram](#)

Increased Bird Migration to Chilika Lake Despite High Temperatures

Chilika Lake in Odisha, Asia's largest brackish water lagoon, saw a higher influx of migratory birds this summer compared to previous years, defying the scorching temperatures ranging from 39 to 41 degrees Celsius.

The **Tangi range** recorded the highest number of bird sightings, followed by Balugaon, Satapada, Chilika and Rambha. Notably, the **grey-headed swamphen or purple swamphen** was the most commonly sighted species, followed by the **Asian Openbilled-stork, whiskered tern, little cormorant, and little egret**.

Factors such as **habitat improvement, food availability, and the removal of prawn enclosures** in the lake contribute to the increased bird migration. The birds, mostly from beyond the **Himalayas in northern Eurasia, the Caspian region, Siberia, Kazakhstan, Baikal Lake and the remote areas of Russia** and neighbouring countries, visit the Chilika every winter and start their homeward journey before the onset of summer.

Some of the migratory birds preferred to remain in the lake instead of going to their native places despite the heat. The **flamingos and pelicans** generally come to Chilika in delay. While pelicans start their journey with the onset of monsoon, some **flamingos choose to stay in the lake over the years**.

Read more: [Chilika Lake](#)

PDF Reference URL: <https://www.drishtiiias.com/current-affairs-news-analysis-editorials/news-analysis/30-05-2023/print>

