Nobel Prize in chemistry 2024 awarded for work on 'protein research'

Nobel Prize has been awarded to **David Baker** "for computational protein design" along with **Demis Hassabis and John M. Jumper** "for protein structure prediction".

Prediction of Protein Structures

- **Demis Hassabis and John Jumper used Artificial Intelligence (AI)** to solve a 50-year-old problem: predicting proteins' complex structures i.e. how **proteins fold into the shapes that give them their functions.**
  - They created an **AI model called AlphaFold2,** with which they have been able to predict the structure of virtually all the 200 million proteins from their **amino acid sequence.**

Computational protein design

- **David Baker** took things further by **creating entirely new proteins with entirely novel shapes and functions.**
- His **computer program, Rosetta,** can provide suggestions for amino acid sequence to produce a desired protein structure, **allowing to create new proteins.**
- **Applications of new proteins:** Pharmaceuticals, vaccines, nanomaterials and tiny sensors or breaking down plastic.
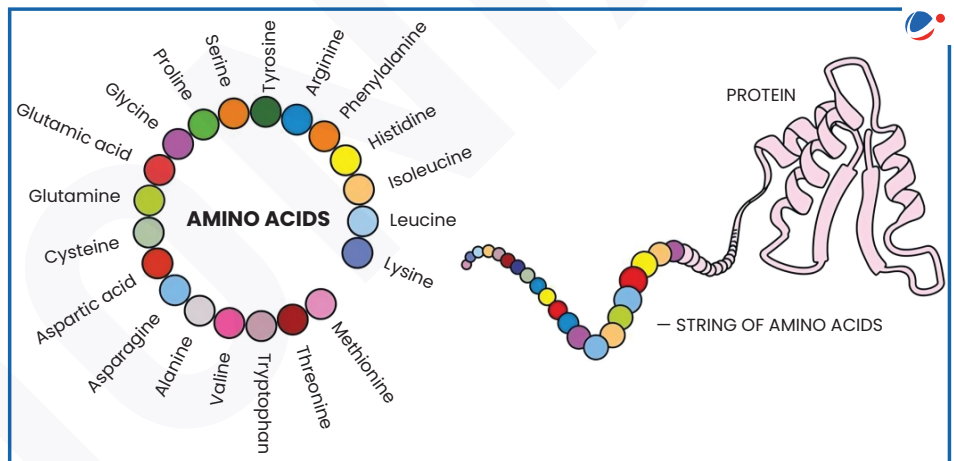
About Proteins

- Proteins are large, complex molecules that **control and drive all the chemical reactions** that together are the basis of life.
- A protein is made up of one or more long, **folded chains of amino acids** (each called a polypeptide), whose sequences are **determined by DNA sequence** of protein-encoding gene.
- They are required for **structure, function and regulation of body's tissues and organs.**
  - Proteins also function as **hormones, signal substances, antibodies and building blocks of different tissues.**

National Space Panel Clears India's 5th Lunar Mission 'Lunar Polar Exploration Mission (LUPEX)'

LUPEX will be a **precursor to the country's lunar sample return mission** and for sending **the first Indian to the moon by 2040.**

About LUPEX Mission

- **Purpose:** It will **investigate the quantity and quality of water on the Moon** and is envisaged to **explore the dark side of the moon.**
  - Dark side of the moon refers to the **'Far side' of the moon as it is never visible from the Earth** due to the **'Tidal Locking'** of the Moon with the Earth.
- **International collaboration project: ISRO** is in charge of the lunar **rover** and Japan's **JAXA** is responsible for the **lander.**
  - **Observation instruments from NASA and the ESA** will also be mounted on the rover.
- **Landing Location:** Landing point will be the **south pole of the moon** as this area is believed to **have a high-water potential.**
  - However, landing on the south pole is challenging as there are **very few flat, easy landing sites with good illumination and communication conditions.**
    - The successful landing of the Vikram Lander, onboard **Chandrayaan 3, made India the first country to land on its south-pole** and the 4th country to land on the Moon (after US, Russia and China).

Government Extends Supply of Fortified Rice Across Welfare Schemes Until 2028

Free Fortified Rice will be supplied under **Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY) and other welfare schemes.**

- **Rice fortification** involves **adding Fortified Rice Kernels** (containing micronutrients like Iron, Folic Acid, and Vitamin B12) **to normal Rice** (Custom Milled Rice) **as per standards prescribed by FSSAI.**
  - **Fortification** is the addition of **key vitamins and minerals** to staple foods such as rice, wheat, oil, milk and salt **to improve their nutritional content and combat malnutrition.**

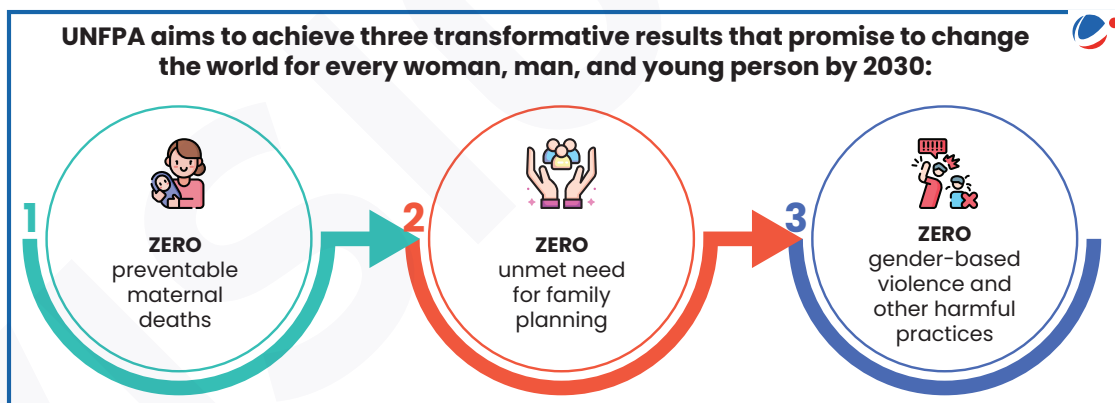**About Fortified Rice Initiative**

- **Background:** The initiative was launched in **2022,** and the **three-phase rollout** of this scheme was **completed successfully** by March 2024.
- **Rationale:**
  - **Combating malnutrition:** Fortification is a cost-effective method for **combating Anaemia and micronutrient malnutrition.**
  - **Higher reach:** Rice is an ideal vehicle for supplying micronutrients as it is a **staple food for 65% of India's population.**
- **Schemes covered:**
  - Targeted Public Distribution System (TPDS),
  - Integrated Child Development Services (ICDS),
  - PM POSHAN (formerly the Mid-Day Meal scheme), and
  - other welfare programs across all states and Union Territories.
- **Funding:** Central Sector Initiative with **100% funding by the Centre** as part of the **food subsidy component of PMGKAY.**
  - Under PMGKAY, free foodgrain is being provided (for 5 years) to **81.35 crore beneficiaries of the National Food Security Act 2013.**

> **About Anaemia**
>
> - **Anaemia** is a condition in which the **number of red blood cells or the haemoglobin** concentration within them is **lower than normal**
> - **Prevalence:** As per the National Family Health Survey 5 (2019-21) around **57% women** (age 15-49 years), **59% adolescent girls** (age 15-19 years) **and 67% Children** (6-59 months) are anaemic.
> - **Anaemia Mukt Bharat strategy** is implemented to reduce Anaemia **in the vulnerable age groups.**

United Nations Population Fund (UNFPA) recognizes India's Progress in advancing Maternal Health and Family Planning.

This recognition came at an event celebrating a landmark **50-year partnership between UNFPA and the Government of India.**

UNFPA aims to achieve three transformative results that promise to change the world for every woman, man, and young person by 2030:

1. **ZERO** preventable maternal deaths
2. **ZERO** unmet need for family planning
3. **ZERO** gender-based violence and other harmful practices

- UNFPA is the United Nations **sexual and reproductive health agency** and is a subsidiary organ of UN General Assembly.

India's Initiatives for advancing Maternal Health and Family Planning

- **Surakshit Matritva Aashwasan Yojana (SUMAN): Assured, dignified and respectful delivery** of quality healthcare services at **no cost** and zero tolerance for denial of services to any woman and newborn visiting a public health facility.
- **Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA):** Provide assured, comprehensive, and quality **antenatal care, free of cost, universally to all pregnant women.**
- **Midwifery Services Initiative:** Training about **90,000 midwives** as they can provide about 90% of all sexual, reproductive, maternal, new-born and adolescent health (SRMNAH) care.

India's Advancements in Maternal health and Family Planning

- India has **reduced Maternal Mortality Rate (MMR) by 70% (between 2000 and 2020)** to **97** (per 1,00,000 live births), positioning India to achieve SDG target of MMR below 70 by 2030.
- **Total Fertility Rate** (2.0 in 2020) reduced **below Replacement level Fertility** (2.1).
- In 2019−2021, **89% of women delivered in a health facility,** up from 79% in 2015−2016.
- **Infant Mortality Rate (IMR)** has declined from 39 in 2014 to 28 in 2020.

'2024 Forest Declaration Assessment: Forests under fire' Report Released

Report focuses on tracking the overarching forest goals: **eliminating deforestation and forest degradation, and restoring 30% of degraded forest area by 2030.**

➤ These goals have been established by **international commitments** such as New York Declaration on Forests (2014), Glasgow Leaders' Declaration (2021), and Kunming-Montreal Global Biodiversity Framework (2022).

Global Forest Goals and Progress

➤ **Eliminate deforestation by 2030:** Around 6.37 million hectares deforested in 2023, much greater than the targeted 4.38 million hectares.
  ⊙ **3.8 billion metric tons of CO2 equivalent in 2023** making deforestation fourth-highest emitter after China, US and India.

➤ **Eliminate tree cover loss in forested Key Biodiversity Areas (KBAs):** Over 1.4 million hectares of forests were lost within **forested KBAs in 2023.**

➤ **Controlling Forest Fire:** Nearly **one-third of area lost to fires** since 2001 was burned from 2019-23.

➤ **Restore 30% of degraded and deforested landscapes by 2030:** Only around **18% of the Bonn Challenge's 2020 target of 150 million hectares** was restored from 2000-19.

Drivers of Deforestation

➤ **Commodity Production:** Agricultural commodities responsible for **57% of global deforestation** over past two decades.

➤ **Shifting agriculture in primary forests:** Responsible for loss of 15.9 million hectares of primary forests from 2015-23.

➤ **Mining:** From 2000-19, mining volumes from tropical moist forest ecosystems doubled.

Recommendations

➤ All forests need protection, but **primary and intact ecosystems** should be the top conservation priority.

➤ **Large scale efforts** are necessary to restore 30% of degraded ecosystems, and to monitor and transparently report progress.

➤ **Governments should acknowledge altered fire patterns** as a human-induced phenomenon and implement adaptive strategies accordingly.

➤ **KBAs** and **other areas identified as high integrity and high conservation value** forests should be prioritized within global and national forest conservation efforts.

Cabinet Approves Development of National Maritime Heritage Complex (NMHC) At Lothal, Gujarat

NMHC is **being developed under the Sagarmala Programme** by the Ministry of Ports, Shipping & Waterway.

About NMHC

➤ **Aim:** To **showcase** India's rich and diverse **maritime heritage** and create the **largest maritime heritage complex in the world.**

➤ **Significance of Lothal:** It is located between **Bhogavo and Sabarmati rivers** near Gulf of Khambat.
  ⊙ It is a prominent city of **Indus-Valley Civilization (IVC)** and had the **oldest man-made dry-dock** (2400 BC ago).
    ◆ Discovery of a dry-dock at Lothal gives an insight into the **knowledge of tides, winds and other nautical factors** that existed during that period.

➤ **Key projects:** NMHC involves a **world-class Lighthouse Museum, coastal state pavilions, a maritime-themed eco-resort, etc.**

India's Maritime Heritage

➤ **Early Days (3000 – 2000 BC): IVC** had maritime trade link with **Mesopotamia.**

➤ **Vedic Age (2000 – 500 BC): Earliest reference to maritime activities** is contained in the **Rig Veda.**

➤ **Age of the Nandas and Mauryas (500 – 200 BC):** Navy of the **Magadh kingdom** is considered to be **world's first ever recorded instance of a navy.**

➤ **Satavahana Dynasty (200 BC-220 AD): First native Indian rulers** to issue their **coins with inscriptions of ships.**

➤ **Gupta Dynasty (320-500 AD):** Several ports in the east and west were opened which greatly **revived maritime trade with European and African countries.**

➤ **Marathas:** Under Shivaji the **Maratha navy** developed into a ferocious force with more than 500 ships.

➤ **Southern Dynasties:** Cholas, Cheras and Pandyas, also Vijaynagar empire, are known to have maritime resources.

Also in News

Anaconda strategy

Taiwan's navy recently claimed that China's military is employing an 'anaconda strategy' to constrict the island.

About Anaconda strategy

➤ It refers to a **military strategy** proposed by Union General Winfield Scott **during early stages of the American Civil War.**
  ⊙ Its key objective was to **suffocate the Confederacy economically and militarily,** similar to how an anaconda snake coils around and asphyxiates its prey.

➤ China's 'anaconda strategy' against Taiwan involves a **mix of military manoeuvres, psychological tactics, and cyber warfare.**
  ⊙ Its goal is to **force Taiwan into submission without** engaging in a **full-scale invasion.**

Comprehensive Annual Modular Survey (CAMS)

Ministry of Statistics & Programme Implementation released **annual CAMS (July 2022-June 2023) Report,** conducted as part of 79th round of National Sample Survey.

Key Findings

➤ **Drinking water & Sanitation:** 97.8% of households have toilet facilities and 95.7% have access to improved sources of drinking water.

➤ **Clean Fuels:** Only **63.4%** of households use **clean fuel** for cooking.

➤ **Education:** Among persons aged 15-24 years, around 96.9% are able to read and write simple statements and perform simple arithmetic calculations.

➤ **Health:** Average **out-of-pocket medical expenditure** per household on hospitalization during last 365 days are Rs 4,129/- in rural areas and Rs 5,290/- in urban areas.

National Commission for Backward Classes (NCBC)

NCBC tendered advice to Union Government for inclusion of certain Castes from Maharashtra, in the Central List of OBCs.

- **Article 342 A** empowers the President to **specify socially and educationally backward classes** for States and UTs.

About NCBC

- **Constitutional Body:** Established under **Article 338B** of Constitution (inserted through 102nd Constitutional Amendment Act, 2018).
- **Composition:** A Chairperson, a Vice-Chairperson and three other Members
- **Functions:**
  - to **investigate and monitor all matters** relating to constitutional safeguards for the socially and educationally backward classes,
  - to **inquire into specific complaints** concerning the deprivation of their rights and safeguards, etc.

Universal Postal Union (UPU)

Department of Posts, India has released commemorative postage stamps to mark the 150th anniversary of the Universal Postal Union.

- **India Post,** world's largest postal network is also observing **170 years of its formation.**

Universal Postal Union (UPU)

- **Established** as General Postal Union on October 9, **1874,** through **Treaty of Bern.**
  - **Second oldest international organization** after International Telecommunication Union (ITU), formed in 1865.
  - **World Post Day** is celebrated on anniversary of establishment of UPU.
- **HQ: Bern, Switzerland.**
- **Members: 192 countries. India** is one its oldest and most active members.
- UPU is a **United Nations specialized agency.**

UPI 123 and UPI Lite

To encourage wider adoption of Unified Payments Interface (UPI), RBI enhances transaction limits for UPI123Pay, UPI Lite.

UPI123Pay

- Started in March 2022 to **enable feature-phone users** to use UPI.
- It is available in 12 languages.
- **Technology alternatives** include IVR number, app functionality, missed-call and proximity sound-based payments.
- RBI enhanced the per-transaction limit from ₹5000 to ₹10,000.

UPI Lite

- It allows users to **make low-value transactions without entering a UPI PIN.**
- RBI enhanced per-transaction **limit to ₹1,000 from ₹500** and overall **wallet limit to ₹5,000 from ₹2000.**

Climate Risk Information System

Reserve Bank of India has proposed to create **the Reserve Bank – Climate Risk Information System (RB-CRIS).**

- It will be a **data repository** comprising of **two parts –**
  - **First part** will be a **web-based directory,** listing various data sources (meteorological, geospatial, etc.).
  - **Second part** will be a **data portal** accessible only to regulated entities, comprising of standardized datasets.
- It aims to **address the gaps in available climate related data** such as fragmented and varied sources, differing formats, frequencies and units etc.
- It will help **regulated entities to undertake climate risk assessments** for ensuring stability of their balance sheets and that of the financial system.

Living Planet Report

World Wildlife Fund (WWF) released the latest edition of its biennial 'Living Planet' report.

Key finding:

- **Biodiversity loss: Wildlife population declined by 73% over the past 50 years** (1970–2020).
  - **Freshwater populations** have suffered **heaviest declines** followed by terrestrial and marine populations.
- **Reasons for decline:** Habitat loss, degradation, climate change, invasive species.
- **Findings on India**
  - Adopting **India's consumption patterns worldwide** would need **less than one Earth by 2050.**
  - **Andhra Pradesh Community-Managed Natural Farming (APCNF)** is a good example of the positive socio-economic impacts of nature-positive food production.
  - Praised **India's millet mission.**

Slag

Researchers documented a new kind of **sedimentary rock made from coastal slag deposits in the U.K.**

About Slag

- It is a composite material containing **metal oxides and silicon dioxide,** and is a **by-product of the steelmaking process** in the iron and steel industries.
- It is **chemically stable** and has the ability to **neutralise acidity.**
- It is a major **component of artificial ground.**
  - The **lithification process hardens slag** (and other industrial wastes), **into sedimentary rocks,** creating artificial ground.
  - Sedimentary rocks with slag are **relatively more abundant in the U.K.** due to historical industrial activities.

Place in News
South Africa (Capital: Pretoria (executive), Cape Town (legislative), and Bloemfontein (judicial).

Recently, INS Talwar reached South Africa to participate in IBSAMAR VIII (joint multinational maritime exercise among Indian, Brazilian, and South African Navy).

Political Features

- **Southernmost country in Africa.**
- **Bordering Countries:** Namibia, Botswana and Zimbabwe (North); Mozambique (Northeast) and Eswatini (East) and Lesotho (an enclave in East).
- **Maritime Boundaries:** Indian Ocean and Atlantic Ocean.

Geographical Features

- **Mountain Ranges:** Drakensberg
- **Major Rivers:** Limpopo, Orange
- **Plateaus** covered with rolling grasslands, called **highveld,** and tree-dotted plains called **bushveld.**
- Plateau lands surrounded by mountainous region called **Great Escarpment.**

AHMEDABAD   BENGALURU   BHOPAL   CHANDIGARH   DELHI   GUWAHATI   HYDERABAD   JAIPUR   JODHPUR   LUCKNOW   PRAYAGRAJ   PUNE   RANCHI