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## Current Affairs - 19 January 2025

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### WHAT IS DARK OXYGEN?



- It is the **oxygen** that is being **produced thousands of feet below the ocean, without any light or photosynthesis.**

#### Why is the discovery important?

- **Until now, it was thought that oxygen was created only through photosynthesis, a process that requires sunlight.**
  - Oceanic plankton, drifting plants, algae, and some bacteria are the primary elements attributed to the production of oxygen in the ocean. All these organisms are capable of photosynthesis.
  - However, in this case, oxygen is not being produced by plants. **It comes out of polymetallic nodules** that are similar in resemblance to lumps of coal.
  - These nodules, made up of metals like manganese, iron, cobalt, nickel, copper, and lithium, can **generate oxygen through electrochemical activity** even in the **absence of light.**
  - They **split water molecules into hydrogen and oxygen.**
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### WHAT IS SCOT MISSION?



- **SCOT (Space Camera for Object Tracking) is Digantara's (an Indian space startup) inaugural mission** dedicated to **space surveillance.**
- It is one of the **world's first commercial Space Situational Awareness (SSA) satellites.**
- It was **launched aboard SpaceX's Transporter-12 mission.**
- **SCOT is built to track Resident Space Objects (RSOs).**



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- SCOT will be **deployed in a sun-synchronous orbit**, allowing it to **track objects in Low Earth Orbit (LEO)** with more efficiency than existing sensors, which are restricted by fields of view (FoV), weather conditions, and geographic limitations.
- Unlike these traditional systems, SCOT will ensure surveillance of objects as small as 5 cm orbiting the Earth to ensure safer space operations.

### EXERCISE LA PEROUSE



It is a multilateral maritime exercise that takes place in the Indian Ocean Region.

- It is **conducted by French Navy** and held biennially.
- It is the **fourth edition** of the multinational exercise.
- **Participating countries:** This edition will witness participation of personnel/surface and sub-surface assets from various maritime partners including **Royal Australian Navy, French Navy, Royal Navy, United States Navy, Indonesian Navy, Royal Malaysian Navy, Republic of Singapore Navy** and Royal Canadian Navy.
- It aims to **develop common Maritime Situational Awareness** by enhancing the cooperation in the field of **maritime surveillance, maritime interdiction operations** and **air operations** along with the conduct of progressive training and information sharing.
- The exercise provides an opportunity for like-minded navies to develop closer links in planning, coordination and information sharing for enhanced tactical interoperability.
- The exercise will **witness complex and advanced multi-domain exercises** including surface warfare, anti-air warfare, air-defence, cross deck landings and tactical manoeuvres, as also the constabulary missions such as VBSS (Visit, Board, Search and Seizure) operations.
- Participation of Indian Navy in the exercise showcases the high levels of synergy, coordination and interoperability between the like-minded navies and their commitment to a rules-based international order in the maritime domain.



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### WHAT IS TRAJAN GUN?



The Trajan 155 mm towed artillery gun system, developed jointly by India and France, has bagged an export order from Armenia.

- It is a **155 mm towed artillery gun system**, jointly developed by India (Larsen & Toubro) and France (KNDS).
  - Several of this **52-calibre** towed gun system are indigenously developed like the auxiliary power unit, control panel, and rolling gear assembly.
  - It is designed to meet the demands of modern combat, with a **range of over 40 kilometers** depending on the type of ammunition used.
  - The Trajan's **modular design** makes it easy to transport and deploy, while its **automated loading system** ensures rapid firing rates.
  - It is also capable of **operating in diverse terrains**, from marshy lowlands to high-altitude cold deserts.
  - The system features **advanced targeting and fire-control systems**, which integrate seamlessly with modern military networks.
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### WHAT IS A 'PLANET PARADE'?



- It refers to a situation when **several planets** in our solar system are **visible in the night sky**, at the same time.
  - This planetary meet-up, also **known as a conjunction**, makes the two planets appear close together or even touch in the Earth's night sky.
  - This phenomenon is more an illusion of perspective rather than the planets being in a perfect line in space.
  - Planets have different motions in the sky. They move at different rates compared to the other stars.
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- Not all of them are visible in the sky everyday, but sometimes a position comes about so that many or all the planets are visible at the same time, or within a few hours of each other.
  - According to NASA, such events, especially those involving four or more planets, are noteworthy and **do not occur annually**.
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### WHY ARE FERTILITY LEVELS DECLINING IN INDIA?

- A global demographic analysis conducted by the **Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2021** highlights a significant decline in fertility levels worldwide, including in India.
- The report reveals a dramatic drop in India's **Total Fertility Rate (TFR)** from **6.18 in the 1950s** to **1.9 in 2021**, below the replacement level of 2.1. Projections suggest this rate could fall to **1.04 by 2100**, signalling major socio-economic implications.

#### Reasons for Declining Fertility in India:

- **Increased Female Literacy and Workforce Participation:**
  - Women's empowerment and higher educational attainment
- **Changing Societal Attitudes:**
  - Late marriages or choosing not to marry are becoming more common as women prioritize careers and financial independence over traditional roles.
- **Infertility and Abortions:**
  - Rising rates of infertility in men and women and increased abortion rates.
- **Migration:**
  - Many young individuals move abroad for higher education and employment.
- **Urbanization and Modern Aspirations:**
  - With urbanization, families are opting for fewer children.

#### Regional Implications:

- **Southern States**



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- **Kerala** and other southern states witnessed demographic transitions earlier than the rest of India, achieving replacement-level fertility in the late 20th century.

### Global Context:

- Countries like **South Korea** showcase the challenges of reversing fertility declines.
- Despite heavy investments in pro-natalist policies, South Korea's fertility rate fell from **0.78 in 2022** to **0.73 in 2023**, underscoring the difficulty of reversing demographic trends once they set in.

### Future Implications for India:

- **Economic Impacts:**
  - A shrinking workforce may hinder economic growth.
  - Increased healthcare costs due to the ageing population.
- **Social Challenges:**
  - Rising dependency ratios could strain families and welfare systems.
  - Reduced innovation and productivity due to fewer young workers.

### Way Forward:

- **Socio-Economic Policies:**
    - Policies focusing on economic growth, job creation, and support for the youth can help mitigate the effects of declining fertility rates.
  - **Leveraging the Elderly Population:**
    - Tap into the potential of senior citizens through skill development and involvement in economic activities.
  - **Support for Families:**
    - Provide incentives for young couples to have children, such as tax benefits, childcare support, and housing subsidies.
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### SVAMITVA SCHEME

- SVAMITVA stand for - Survey of Villages Abadi and Mapping with Improvised Technology in Village Areas
  - It is a Central Sector Scheme of Ministry of Panchayati Raj.
  - It a collaborative effort of the Ministry of Panchayati Raj, State Panchayati Raj Departments, State Revenue Departments & Survey of India.
- It was nation-wide launched on National Panchayati Raj Day, 24th April 2021.

### **Aim**

- This Scheme is a reformative step towards establishment of clear ownership of property in rural inhabited areas.
- It does so by:
  - mapping of land parcels using drone technology and
  - providing 'Record of Rights' to village household owners with issuance of legal ownership cards (Property cards/Title deeds) to the property owners.

### **Objectives**

- Creation of accurate land records for rural planning and reduce property related disputes.
  - To bring financial stability to the citizens in rural India by enabling them to use their property as a financial asset for taking loans and other financial benefits.
  - Determination of property tax, which would accrue to the GPs directly in States where it is devolved or else, add to the State exchequer.
  - Creation of survey infrastructure and GIS maps that can be leveraged by any department for their use.
  - To support in preparation of better-quality Gram Panchayat Development Plan (GPDP) by making use of GIS maps.
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### THE TROUBLE WITH DISPOSING BHOPAL'S UNION CARBON WASTE

#### Bhopal gas disaster

- It is one of the world's worst industrial accidents, occurred on the night of **December 2-3, 1984**, in Bhopal, Madhya Pradesh.
- **What Happened?**
  - A highly toxic gas, **methyl isocyanate (MIC)**, leaked from a pesticide plant owned by Union Carbide India Limited (UCIL).
  - The leak exposed over 500,000 residents to the gas, leading to immediate fatalities and long-term health complications.

#### Union Carbide waste disposal

- Hazardous waste from the defunct Union Carbide factory was transported in sealed container trucks from Bhopal to the Pithampur industrial area in Dhar district, 250 km away, for disposal.
  - **Planned Disposal**
    - Madhya Pradesh government planned to incinerate 377 tons of hazardous waste at a **treatment, storage, and disposal facility (TSDF)** in Pithampur.
    - The waste was packaged and labelled per Hazardous Waste Management Rules and transported in secure containers.
  - **Challenges**
    - Protests by locals in Pithampur over fears of harmful emissions from incineration have delayed the disposal process.
  - **High Court Intervention**
    - On January 6, 2025, the Madhya Pradesh High Court gave the State government six weeks to **safely dispose** of the waste.

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### Why Pithampur Was Chosen for Waste Disposal

- **Previous Attempts**
  - In 2007, the MP government tried disposing of the waste at an incinerator-equipped TSDF in Ankleshwar, Gujarat, but the facility declined.
- **Supreme Court Selection**
  - In 2012, the Supreme Court identified the **Pithampur TSDF** in MP as the most suitable site for disposing of the hazardous waste.
  - The facility, equipped with both a landfill and an incinerator, is the only TSDF in the state, according to the Central Pollution Control Board (CPCB).

### Is the Waste Harmful?

- **Composition of the Waste**
  - The trial waste included: 4.8 tonnes of **excavated waste**; 1.6 tonnes of **semi-processed residue**; 1.3 tonnes of **naphthol waste**; 1.3 tonnes of **carbaryl residue**; 0.8 tonnes of **reactor residue**.
  - **Naphthol** is a precursor for carbaryl, the insecticide produced by the Union Carbide plant.
- **Water Quality Concerns**
  - A December 2024 CPCB report found that water samples near the Pithampur TSDF showed **higher-than-permissible levels** of:
    - Its Colour, chloride, sulphate, and fluoride concentrations
    - Hardness and total dissolved solids (TDS)
  - These issues were found in two open wells near the landfill but were attributed to **general groundwater quality**, not the TSDF operations.





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### UPPER KARNALI HYDRO-ELECTRIC PROJECT



- It is a **900 MW run-of-the-river** hydropower project being developed on the **Karnali River in Nepal**.
- The project will **supply power to Nepal, India, and Bangladesh** for a **contracted period of 25 years**.

The project is being **developed by GMR Upper Karnali Hydro Power Limited (GUKHL)**, a **subsidiary of GMR Group India**, **Nepal Electricity Authority (NEA)**, and **SJVN Green Energy**.

- The project is being developed on a **build-own-operate-transfer (BOOT) basis**.
- **GUKHL and NEA** are currently owning the project, having **ownership stakes of 73% and 27%, respectively**.
- It is estimated to generate **3,466 million units of electricity** while offsetting approximately two million tons of greenhouse gas emissions a year.
- It will feature a **concrete gravity dam**, headrace tunnels, a fish pass, feeder tunnels, surge and pressure shafts, and silt flushing tunnels.
- The project consists of **8 turbines**, each with **112.5 MW nameplate capacity**.

**Development status:** The project **construction** is expected to **commence from 2027**. Subsequent to that it will enter into commercial operation by 2031.

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