

1. **United Nations Ocean Conference** : Recently, at the Third United Nations Ocean Conference (UNOC3) Brazil and France jointly launched the '**Blue NDC Challenge**'.
 - **About Blue NDC Challenge**: The initiative urges countries to integrate ocean-based solutions into their Nationally Determined Contributions (NDCs).
 - **Significance**: It reflects the growing global recognition of the oceans' vital role in: Climate regulation, Biodiversity preservation, Enhancing coastal resilience and Carbon sequestration
 - **Countries Joining the Challenge**: Six countries- Australia, Fiji, Kenya, Mexico, Palau and Republic of Seychelles
 - **About NDCs**: These are voluntary pledges made by countries to reduce their greenhouse gas emissions as part of global climate change mitigation efforts.
 - **Aim**: To achieve the targets set under the **Paris Agreement** and are submitted under the framework of the **United Nations Framework Convention on Climate Change (UNFCCC)**, particularly during the **United Nations Climate Change Conference of Parties (COP)**, such as the **UN Climate Action Summit**.
 - **About UNOC**: A global platform to drive action on ocean conservation, with a primary focus on implementing Sustainable Development Goal 14 (Life Below Water).
 - **Origin**: Established under the UN framework, in response to growing recognition of the ocean's crucial role in climate regulation, biodiversity, and human well-being.
 - **Previous Conferences**: **UNOC1 (2017, New York)**: Highlighted voluntary commitments for restoring ocean health.
 - ✓ **UNOC2 (2022, Lisbon)**: Focused on strengthening international cooperation for marine protection.
 - **UNOC3 Goals**: Aims to move from voluntary pledges to enforceable international agreements, addressing the global governance gap in ocean protection.
2. **Foreigners Tribunals (FTs)**: Recently, Assam Chief Minister announced the deportation of 330 declared "foreigners" to Bangladesh and stated that the Immigrants (Expulsion from Assam) Act, 1950 would be invoked to bypass Foreigners Tribunals in future cases.
 - **About Foreigners Tribunals** : Established under the **Foreigners (Tribunals) Order, 1964**, issued under Section 3 of the **Foreigners Act, 1946**.

- **Purpose:** Enable State authorities to refer cases of suspected foreigners for adjudication.
- **Geographical Scope:** Function exclusively in Assam; other states deal with such cases under the Foreigners Act without FTs.
- **Composition:** Headed by members drawn from retired judges, advocates, and civil servants with judicial experience.
- **Powers :** FTs have powers similar to a civil court (e.g., summoning witnesses, examining on oath, requiring documents).
- **About Immigrants (Expulsion from Assam) Act, 1950 :** Enacted to address the issue of illegal immigration into Assam, especially from East Pakistan (now Bangladesh) post-Partition.
 - **Applicability:** Specifically targeted at the state of **Assam**, but extends to parts of **Meghalaya** and **Nagaland** through administrative discretion.
 - **Definition of Illegal Immigrant:** Any person who entered India **after March 25, 1971** and is not an Indian citizen, or cannot prove Indian citizenship
 - The Act authorizes designated officers (e.g., District Collectors) to initiate expulsion without needing to refer the case to Foreigners Tribunals.
 - **Historical Background:** Passed in response to large-scale migration following the Partition and later the 1971 Bangladesh Liberation War.
- 3. **Tardigrade :** Recently, the International Space Station (ISS) initiated a study titled Voyager Tardigrades, focusing on the tardigrade — one of nature's most resilient microscopic organisms.
 - The experiment aims to investigate how these creatures survive, revive, and reproduce in the extreme environment of outer space.
- **About Tardigrades:** Commonly known as “water bears” or “moss piglets,” are microscopic aquatic animals.
 - They measure about 0.5 mm when fully grown and are known for their extraordinary resilience.
 - **Evolutionary History:** Existed for around 600 million years, predating dinosaurs by over 400 million years.



- **Features:** Have four pairs of stubby legs, each ending in claws, and use a specialized mouthpart to feed on algae, plant cells, and tiny invertebrates.
 - **Habitat:** They typically inhabit the thin layer of water found on mosses and lichens.
 - ✓ Found in some of the world's most extreme environments, including the Himalayas, deep-sea trenches, volcanic hot springs, and the icy regions of Antarctica.
4. **Nickel and Its Usage:** Recently, a study by the Max Planck Institute for Sustainable Materials introduced a **hydrogen plasma-based technique for nickel extraction**, presenting a more sustainable alternative to traditional, carbon-intensive methods.
- **About Hydrogen Plasma Method:** In this method, hydrogen gas is transformed into plasma using an electric arc furnace.
 - The resulting hydrogen plasma then reacts with nickel oxide to produce pure nickel and water—eliminating carbon dioxide emissions typically generated by conventional extraction processes.
 - **Key benefits :** Up to **84% reduction** in direct CO₂ emissions
 - ✓ **18%** more energy-efficient than traditional multistep methods
 - ✓ Yields **high-purity ferronickel** suitable for stainless steel without extensive refining
 - **About Nickel :** Silvery-white, hard, ductile, malleable, and corrosion-resistant with good thermal and electrical conductivity.
 - **Source and Occurrence:** Never found in pure form naturally; extracted from sulfide and laterite ores, often alongside copper and uranium.
 - **Applications :** Stainless steel production (65% of global demand) for added strength, corrosion resistance, and durability.
 - ✓ Construction, kitchenware, medical instruments, and infrastructure projects.
 - ✓ Aerospace and defence due to its heat resistance (jet engines, turbines, and superalloys)
 - ✓ Green technologies such as solar panels, wind turbines, and battery storage systems supporting net-zero targets.
5. **Special Economic Zones (SEZs):** Recently, in a major policy shift to boost India's semiconductor and electronics manufacturing ecosystem, the government amended key Special Economic Zone (SEZ) regulations.

- **Key Amendments : Reduced Land Requirement (Rule 5):** Minimum contiguous land for SEZs in semiconductor or electronic component manufacturing reduced from 50 ha to 10 ha.
 - **Permission for Domestic Supply (Rule 18):** SEZ units in these sectors can now sell in the domestic market on payment of applicable duties, apart from exports.
 - **Relaxed Encumbrance-Free Land Norms (Rule 7):** Board of Approval (BoA) may approve SEZs on mortgaged or government-leased land, easing acquisition hurdles.
 - **Special Economic Zones (SEZs) :** A designated area offering fiscal incentives and relaxed business laws to attract investment and generate employment.
 - Designed to overcome infrastructural and regulatory hurdles, improving the **ease of doing business**.
 - India's first **Export Processing Zone (EPZ)**, the precursor to SEZs, was established in **Kandla, Gujarat in 1965**.
 - The government initiated SEZs under the **Foreign Trade Policy in 2000** to address EPZ limitations.
 - The **Special Economic Zones Act, 2005**, and **SEZ Rules, 2006** formalised SEZ operations, inspired by China's model.
 - The **Board of Approval (BoA)**, chaired by the **Secretary of the Department of Commerce**, oversees SEZ approvals and policies.
- 6. Asafoetida (Heeng):** Recently, the CSIR-Institute of Himalayan Bioresource Technology (IHBT) in Palampur, Himachal Pradesh, announced the first successful flowering and seed formation of asafoetida (heeng) in India, marking a significant step in its adaptation and cultivation on Indian soil.
- **About Asafoetida (Heeng) :** A perennial herb whose strong-smelling oleo-gum resin is extracted from its taproot.
 - Used cooking and Ayurvedic medicine for its digestive and aromatic qualities.
 - **Native Habitat :** Cold, arid zones of Iran, Afghanistan, and Central Asia.
 - **Weather Conditions :** Thrives in sandy, well-drained soil, low rainfall (under 300 mm), and temperature from -4°C to 40°C .

- **In India:** High-altitude regions like Lahaul-Spiti, Kinnaur, and Uttarkashi offer suitable agro-climatic conditions.
 - Successful domestication in Palampur (1,300 m altitude) shows its adaptability beyond traditional cold deserts.
- 7. **BBX32 Gene :** A team of researchers from the **Indian Institute of Science Education and Research (IISER), Bhopal** has discovered how a single protein, **BBX32**, plays a vital role in helping plants transition from darkness beneath the soil to sunlight above it.
 - **About BBX32 Gene:** A **B-box zinc-finger protein** that acts as a **positive regulator** of seed germination.
 - **Gene Family:** Belongs to **subgroup V** of the **BBX (B-box) family** but shows distinct features compared to other members of the subgroup.
 - The gene gets temporarily activated in the embryo when the seed absorbs water.
 - This happens at both the level of gene activity (transcription) and how the protein is made from the gene (post-transcription).
 - **Regulatory Role:** Acts **upstream of PIF1 (PHYTOCHROME-INTERACTING FACTOR 1)**, a major repressor of seed germination.
 - **Mechanism of Action:** It directly attaches to PIF1 and blocks it from sticking to DNA or working with other proteins. This stops PIF1 from slowing things down and helps the seed start growing.
 - **Ecological Significance:** Acts as a **molecular bridge** that integrates **water availability (imbibition)** and **light cues**, coordinating the timing of **seed germination**.
- 8. **DRUM Web App :** Researchers from IIT Kharagpur have developed the **Dynamic Route Planning for Urban Green Mobility (DRUM)** web app, which enhances traditional navigation by integrating air quality and energy efficiency into route selection.
 - **Key Features:** Offers five types of routes and fetches **live pollution and traffic data** in real-time when a user enters a route.
 - Utilizes **GraphHopper** (Java-based routing engine) and **Mapbox** for real-time traffic data.
 - Sources pollution data from **Central Pollution Control Board (CPCB)** and **World Air Quality Index**.