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## Prelims Exam Topics

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### THE GREAT ATLANTIC SARGASSUM BELT (GASB)

#### Context

In 2025, the Great Atlantic Sargassum Belt reached a record length of 5,500 miles (twice the width of the US), signaling a massive ecological shift.

#### About Sargassum

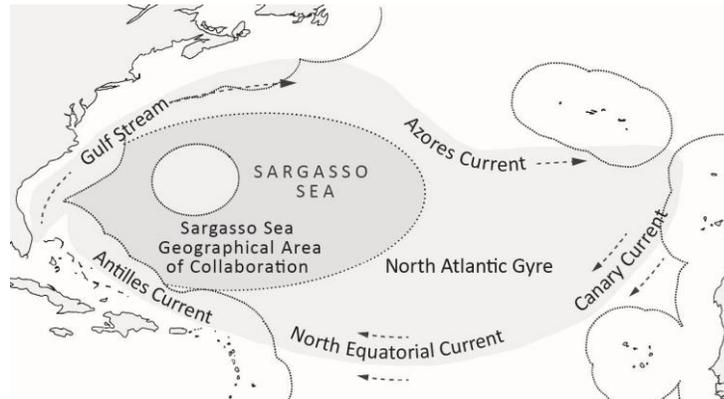
- **Definition:** A genus of large **brown seaweed** (algae) that floats in island-like masses.
- **Habitat:** Historically confined to the **Sargasso Sea** (a region in the North Atlantic surrounded by four currents). Unlike other seaweeds, it is "holopelagi," meaning it spends its entire life cycle floating on the ocean surface rather than being attached to the seafloor.
- **Significance:** In open water, it is a "Golden Floating Rainforest." It serves as a critical habitat for over 100 species, including sea turtles, tuna, and eels.

#### About The Great Atlantic Sargassum Belt (GASB)

- While the Sargasso Sea has existed for centuries, the **GASB** is a new phenomenon that first appeared in **2011**.
- **Scale:** By May 2025, it contained **37.5 million tons** of biomass.
- **Geographical Span:** Forms an unbroken band from **West Africa** to the **Gulf of Mexico**.
- **Growth Rate:** In nutrient-rich waters, its biomass can **double in just 11 days**.
- **Divers of the GASB:** Recent studies in the journal *Harmful Algae* show that the expansion is driven by **Eutrophication** (excessive nutrient enrichment) from land-based sources:
  - **Riverine Discharge:** The **Amazon River** (South America) and the **Mississippi/Atchafalaya Rivers** (USA) discharge massive amounts of nitrogen and phosphorus from agricultural runoff and wastewater.
  - **Human-induced pollution:** Between 1980 and 2020, the nitrogen content in sargassum tissue increased by **55%**, proving it is "feeding" on human-induced pollution.
  - **Ocean Currents:** The **Loop Current** and **Gulf Stream** act as conveyor belts, transporting these blooms across the Atlantic.
- **Concerns**
  - **Toxic Decomposition:** As it rots on beaches, it releases **hydrogen sulfide** gas (smells like rotten eggs), which is toxic to humans and wildlife.
  - **Dead Zones:** Thick mats block sunlight and use up oxygen as they decay, creating **hypoxic (low oxygen) dead zones** that kill coral reefs and seagrass.
  - **Climate Feedback:** Decomposing sargassum emits **methane** and other greenhouse gases, potentially accelerating global warming.
  - **Economic Impact:** Smothers tourism-dependent beaches and can even clog the cooling water intakes of **nuclear power plants**.

### The Sargasso Sea

- It is a vast patch of ocean, named for a genus of free-floating seaweed called Sargassum.
- The Sargasso Sea is **defined only by ocean currents**. It lies within the **Northern Atlantic Subtropical Gyre**.
- The Gulf Stream establishes the Sargasso Sea's western boundary, while the Sea is further defined to the north by the North Atlantic Current, to the east by the Canary Current, and to the south by the North Atlantic Equatorial Current.



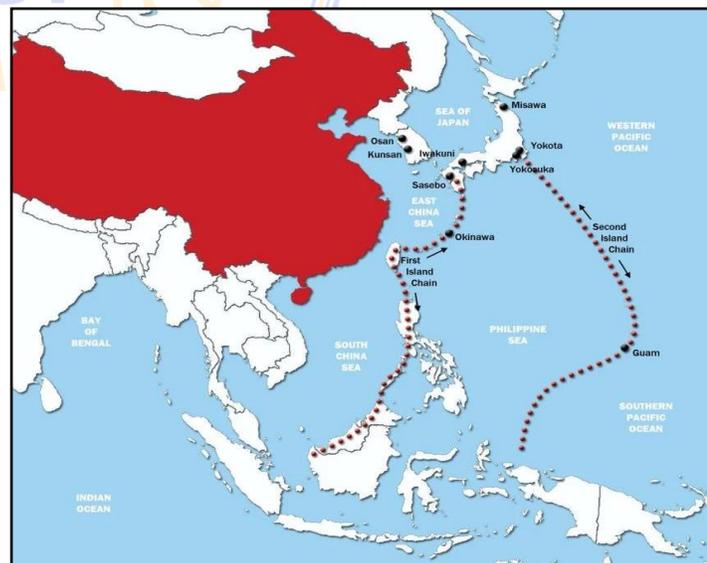
## CHINA'S GLOBAL OCEAN MAPPING INITIATIVE

### Context

A recent newspaper investigation reveals that China is conducting a massive undersea mapping and monitoring operation across the Pacific, Indian, and Arctic Oceans

### About "Transparent Ocean" Strategy

- **Objective:** To create a real-time network of sensors, buoys, and subsea arrays.
- **Data Points:** Capturing detailed information on **seabed topography, water temperature, salinity, and ocean currents**.
  - Because sound waves travel differently depending on temperature and salinity, this data allows Chinese sonars to detect enemy submarines more accurately while helping their own subs stay hidden in "acoustic shadows."



**Strategic geography and mapping significance**

Strategic Zone	Mapping Focus	Military Significance
<b>First Island Chain</b> (Kuril Islands, Japanese Archipelago, Ryukyu Islands, Taiwan, the northern Philippines, and Borneo)	Critical straits (Taiwan Strait, Luzon Strait) & deep-sea trenches	Enables breakout from perceived maritime “encirclement” by adversaries and facilitates access to the wider Pacific Ocean for blue-water naval operations.
<b>Second Island Chain</b> (anchored in the north by Japan’s Bonin and Volcano Islands, centers on the U.S. territory of Guam, and runs south toward Palau and the Federated States of Micronesia (FSM))	Port approaches, seabed topography & communication routes	Vital for surveillance of U.S. military bases (especially nuclear assets) and ensuring operational reach into the Central Pacific while countering U.S. power projection.
<b>Ninety East Ridge</b> (Indian Ocean; volcanic, aseismic ridge primarily formed by the Kerguelen hotspot)	Undersea canyons, ridges & seabed infrastructure routes	Crucial for safeguarding Sea Lines of Communication (SLOCs), particularly energy imports (“oil lifeline”), and enhancing submarine detection and deployment capabilities.
<b>Arctic/Alaska Region</b>	Continental shelf mapping, ice thickness & under-ice routes- Mapping north of Alaska and across the Chukchi Sea	Supports emerging “Polar Silk Road,” enables under-ice submarine stealth operations, and provides strategic advantage in future Arctic resource and military competition.

**ANCIENT MARINE SNAIL DISCOVERIES IN GUJARAT**

**Context**

A collaborative team from IIT Bombay, ISI, and IISER Kolkata has discovered four new species of 20-million-year-old marine snails in the Dwarka Basin.

**About the New Species**

- The fossils date back roughly 20 million years (Early Miocene, part of the Neogene Period).
- These fossils are "micro-fossils," often smaller than 5 mm

New Species	Features/Significance
<b>Jujubinus dwarkaensis</b>	Top-shaped; lacks an umbilicus (hole at the base); features a beaded pattern of ribs.
<b>Cerithium bardhani</b>	Slender, cone-like; distinguished by 15 vertical ribs forming tiny nodules (bumps).
<b>Nassarius anisi</b>	Part of a diverse "graveyard" of Miocene marine life.
<b>Clelandella saurashtraensis</b>	Contributes to the understanding of regional biodiversity.

**Significance of the Discovery**

Finding these specific filter-feeding snails allows geologists to reconstruct the ancient environment:

- **Ocean Upwelling:** Their presence proves the ancient Dwarka coastline experienced strong upwelling—a process where **deep, cold, nutrient-rich water** rises to the surface.
- **Productivity:** Such high density of life suggests a highly productive marine ecosystem, similar to modern-day regions with rich fisheries.
- **Global Warming Analog:** These fossils act as "microscopic time capsules," showing how marine life responded to natural periods of global warming in the deep past, long before human intervention.

#### Dwarka Basin

- **Location:** Okhamandal Peninsula, Devbhumi Dwarka District, Gujarat.
- **Geology:** the basin contains sedimentary rock layers (Gaj and Dwarka formations) dating back to the Miocene epoch.
- **River system:** Gomti River (seasonal river that historically served as a harbor).
- **Key resource:** Limestone (widely used in cement industry) and potential offshore gas.
- **Ancient Urban City:** Remains were discovered off the coast of modern-day Dwarka and Bet Dwarka in the Gulf of Kutch, typically at depths of 3 to 12 meters.

## IRAN'S ASSERTIVENESS AND INDIA'S DILEMMA IN THE WEST ASIA WAR

### Context

- The deepening U.S.-Israel-Iran conflict has fractured the Persian Gulf's delicate power balance, casting India's "strategic silence" into a global spotlight

### Iran's Assertiveness in West Asia

- **Historical Continuity:** Even under the Shah Mohammad Reza Pahlavi, Iran positioned itself as the "Gendarme of the Gulf," seizing islands from the UAE and intervening in Oman to project Persian power.
- **Ideological Expansion:** Post-1979, Tehran replaced secular nationalism with a Shia revolutionary framework, utilizing a "Forward Defense" strategy.
- **The Proxy Network:** Iran has cultivated a "Strategic Corridor" stretching to the Mediterranean by empowering non-state actors like Hezbollah (Lebanon), Hamas (Gaza), and the Houthis (Yemen).
- **Asymmetric Leverage:** Beyond its ballistic missile and nuclear programs, Iran's control over the Strait of Hormuz, a chokepoint for 20% of global oil, provides it with a "veto power" over global energy security.

### Why the Gulf Region is Difficult to Balance

- **Demographic Asymmetry:** Iran's **population of around 90 million** far exceeds the **combined citizen population of about 27 million in the Gulf Cooperation Council (GCC)** states, creating a long-term imbalance in regional power.
- **Fragmented Gulf Arab States:** While Iran is a **centralised nation-state**, the Arab Gulf is divided among **multiple monarchies**, making collective strategic coordination difficult.
- **Dependence on External Security Guarantees:** The Gulf states rely heavily on the **United States for military protection**, making regional security dependent on Washington's political decisions and strategic priorities.
  - **Failed Balancing Strategies:** Several attempts to balance Iran have failed:

- **Iraq under Saddam Hussein** was initially supported as a counterweight to Iran during the **Iran-Iraq War (1980-88)**.

However, Iraq later **invaded Kuwait in 1990**, creating a new security crisis.

- **Rise of Iran after the Iraq War:** The **U.S. invasion of Iraq in 2003** dismantled Saddam's regime and indirectly strengthened Iran's influence in Iraq and across the region.
- **Emerging Strategic Realignments:** Fear of Iran's growing influence has driven **quiet cooperation between Israel and Gulf states**, altering the geopolitical landscape of the Middle East.

#### India's Silence on the West Asia War:

**India's Policy of Strategic Neutrality:** India has avoided taking explicit sides in the conflict, emphasising **strategic autonomy and diplomatic caution** while maintaining relations with **Iran, Israel, and Gulf states**.

However it drawn criticism as:

- **Criticism of Moral Ambiguity:** Critics argue that India's silence amounts to **moral evasion**, especially given its historical commitment to **non-alignment, anti-colonial solidarity, and peaceful conflict resolution**.
- **Expectations from a Global South Leader:** As a country aspiring to play a larger role in global governance, India is expected to **articulate a principled position on major conflicts**, particularly those affecting developing countries.
- **Contrast with Past Indian Positions:** Historically, India took stronger moral stances, such as **condemning the 2003 Iraq invasion**, suggesting that strategic autonomy previously included ethical diplomacy.

#### Balancing National Interests:

India's cautious approach is shaped by multiple strategic considerations:

- **Energy Security:** Near-total dependence on the Gulf for oil and gas.
- **The Diaspora Factor:** Over 9 million Indians live and work in West Asia, contributing vital remittances.
- **The Israel Pivot:** Deepening defense, technology, and intelligence ties with Tel Aviv.
- **The Iran Link:** Civilizational ties and the strategic importance of the Chabahar Port as a gateway to Central Asia.

## SC STATUS AFTER RELIGIOUS CONVERSION

### Context

In a recent judgment, the Supreme Court affirmed that individuals who convert to Christianity are no longer entitled to claim Scheduled Caste (SC) status. This decision upheld an earlier ruling by the Andhra Pradesh High Court.

### Andhra Pradesh High Court Decision (April 2025)

The High Court ruled in favour of the accused, stating that:

- The caste system is not inherent to Christianity.
- The SC/ST Act is meant exclusively for members of SC/ST communities.
- A person who has converted to Christianity does not fall within the SC category and cannot seek protection under the Act.

### Background of the Case

- The ruling arose from a complaint filed in 2021 by Pastor Chintada Anand Paul from Andhra Pradesh. He alleged caste-based abuse and violence, leading to charges under the SC/ST (Prevention of Atrocities) Act along with relevant IPC provisions.
- The accused challenged the case, arguing that the complainant had converted to Christianity long ago and therefore could not claim SC status or invoke protections under the Act. The key legal issue was whether such protections continue after voluntary religious conversion.

### Key Observations by the Supreme Court

- **Tension between two realities:**
  - **Legal framework:** SC status is a legally defined identity linked to specific religions under the Constitution (Scheduled Castes) Order, 1950.
  - **Social reality:** Evidence suggests that caste-based discrimination often continues even after conversion, particularly among Dalit Christians.
- **A person cannot simultaneously:** Court clarified that a person cannot simultaneously follow a religion outside Hinduism, Sikhism, or Buddhism, and claim recognition as a Scheduled Caste
  - It emphasized that this restriction is absolute, leaving no room for exceptions.
  - According to the Court, these two positions are fundamentally incompatible within the constitutional structure.
- **Meaning of “Profess”:** Interpreting the term “profess,” the Court noted that it involves more than personal belief. It requires an outward and public expression of faith. In this case, the individual’s role as a pastor, leading prayers and organising religious gatherings was seen as clear evidence of professing Christianity.
- **Distinction Between SCs and STs:** The Court drew a clear distinction between Scheduled Castes and Scheduled Tribes:
  - For SCs, religion is a determining factor.
  - For STs, identity is based on continued association with tribal customs and community recognition, irrespective of religion.
- Further, the Court stated that SC status does not fade gradually after conversion but it ends immediately. Once a person adopts another religion, their earlier caste identity loses legal validity.

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## Mains Exam Topics

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### RACISM AGAINST THE NORTHEASTERN COMMUNITY

#### Context

The Union Ministry of Home Affairs (MHA) has recently directed cities in the National Capital Region (NCR), including Noida and Ghaziabad, to appoint nodal officers to address discrimination and racial issues faced by people from the Northeastern states. Delhi and Gurgaon already have such officers in place.

#### About casual racism

- **Definition:** Casual racism is the everyday, often subtle or unintended expression of prejudice, stereotypes, or bias directed at a particular racial or ethnic group.
- **Forms of Expression:** It can manifest through jokes, offhand comments, humour, social media posts, “harmless” remarks, or routine behaviours that normalise inequality or demean certain groups.
- **Socio-cultural fault lines:** Despite the constitutional guarantee of equality, data from the **National Crime Records Bureau (NCRB)** and high-profile incidents such as the killings of **Nido Tania (2014)** and **Anjel Chakma (2025)** reveal persistent casual racism against people from the Northeastern states.
- **Impact:** Although seemingly minor, casual racism is a form of psychological violence.
  - It reinforces social hierarchies, legitimises discrimination, and normalises biased attitudes.
  - For the affected communities, it can be internalised, harming self-esteem, creating feelings of alienation, and making individuals feel like “outsiders” rather than equal members of Indian society.

#### Socio-cultural roots of discrimination against Northeastern community

- **Historical invisibility:** School curricula have traditionally focused on the Gangetic plains, leaving histories of the Northeast, such as the Ahom dynasty or regional freedom movements, largely unacknowledged.
  - **Impact:** Lack of awareness fosters ignorance and reinforces stereotypes rather than promoting familiarity.
- **Phenotypic stereotyping:** Mongoloid features are often wrongly associated with being “foreign,” giving rise to slurs like “chinky” or “Chinese.”
  - **Impact:** Such perceptions create a racial hierarchy, contradicting India’s pluralistic ethos.
- **Stereotype formation:** Distinct food, attire, and gender norms of the Northeast are often exoticised or moralised.
  - **Impact:** This leads to hyper-sexualisation of women and dehumanisation of men, reinforcing social prejudice.
- **Casual racism and micro-aggression:** Everyday jokes, chants, and slurs normalize disrespect, lowering social and moral thresholds for discriminatory behaviour.

- **Escalation to physical violence:** Verbal abuse can evolve into physical assault, as in Nido Tania’s murder, consistent with sociological frameworks like Allport’s scale of prejudice.
- **Power asymmetry and urban vulnerability:** Many migrants from the Northeast work in hospitality and retail, making them susceptible to landlord harassment, workplace exploitation, and policing apathy.
  - **Impact:** Structural impunity enables perpetrators to act without fear of consequences.
- **Policing deficit:** Instances where racial slurs are dismissed as “jokes,” such as in Anjel Chakma’s case, indicate lack of recognition for hate crimes, weakening deterrence.
- **Partial legal response:** Measures like SPUNER, nodal officers, and IPC amendments suggested by the **Bezbaruah Committee (2014)** exist, but implementation is uneven and politically under-prioritized.

#### Impact on National Unity and Integration

- **Psychological alienation and citizenship anxiety:** Repeated questioning of one’s nationality violates Articles 14 and 21, leading to emotional alienation from the constitutional mainstream.
- **Social fragmentation and ghettoisation:** Fear-driven clustering of Northeastern communities reduces multicultural interactions, undermining composite nationalism as envisioned by B.R. Ambedkar.
- **Threat to national cohesion:** Persistent racism fosters distrust in state institutions, weakening social capital and indirectly affecting national security, as highlighted in 2nd ARC Reports.

#### M.P. Bezbaruah Committee

**About:** The M.P. Bezbaruah Committee, constituted by the Ministry of Home Affairs, examined issues faced by citizens from the North Eastern states living elsewhere in India. It proposed a range of remedial measures, including legal, administrative, and social interventions, to protect their rights and ensure safety.

#### Key Recommendations

- **Strengthening policing:** The Committee suggested amending the Indian Penal Code (IPC) by introducing new sections, 153C and 509A, to criminalize gestures, comments, or actions meant to insult or intimidate a person from a specific racial group.
- **Modified law:** Recommended either enacting a separate law or making these offences cognizable and non-bailable, with imprisonment of 3–5 years and the possibility of fines.
- **Social Media:** Suggested the creation of dedicated channels on Facebook, WhatsApp, email, and helplines for North Eastern citizens residing in other parts of India.
- **Dedicated public prosecutors:** Proposed a panel of specialized lawyers to handle cases for North Eastern victims, with 50% of lawyers being women.
- **Nodal police stations:** Recommended setting up specific police stations or nodal points for North Easterners, enabling immediate registration of FIRs without transferring victims to multiple stations.
- **Fast-track courts:** Suggested establishing fast-track courts dedicated to cases involving North Eastern citizens.

## BIOLOGICS AND THE SHIFT TOWARDS NON-ANIMAL METHODOLOGIES (NAMS)

### Context

- The shift toward human-relevant Non-Animal Methodologies (NAMs) is accelerating in India via Biopharma SHAKTI, addressing the critical failure of animal models to predict human responses to complex biologics.

### What are Biologics

**Biologics are large, complex medicines produced from living cells or organisms**, unlike conventional chemical drugs which are synthetically manufactured.

- **Examples of Biologics:** Common biologics include **monoclonal antibodies (mAbs), vaccines, insulin, gene therapies and cell-based therapies**, widely used for treating **cancer, autoimmune diseases, diabetes and rare genetic disorders**.
- **Rising Global Importance:** Biologics are becoming a **major segment of the pharmaceutical industry**, with increasing use in the treatment of **chronic and complex diseases**.

**Biosimilars:** When the patent of a biologic drug expires, **biosimilars (generic versions of biologics)** can be developed, though they require extensive testing because biologics are **structurally complex molecules**.

### Issues in of Biologics:

- **Limitations of Animal Models:** Animal experiments often **fail to accurately predict how biologics behave in humans** because biologics interact with **human-specific receptors and immune pathways** that may not exist or function differently in animals.
- **Differences in Immune Response:** Human immune systems react differently to biologics compared with animals, making **toxicity and immune reactions difficult to predict during pre-clinical trials**.
- **Examples of Failure of Animal Testing:**
  - **Theralizumab trial (2006)** caused severe immune reactions in human volunteers despite appearing safe in monkey studies.
  - **Semorinemab (Alzheimer's drug)** worked in mouse models but failed during human clinical trials.

### About Non-Animal Methodologies (NAMs)

**Non-Animal Methodologies (NAMs) refer to human-relevant experimental systems used to study drug safety and efficacy without using animals. Key Technologies Used in NAMs**

- **Organoids:** Miniature **lab-grown human organ models** derived from stem cells that replicate the structure and function of real organs.
- **Organ-on-a-Chip Systems:** Microfluidic devices that simulate **human organ functions such as lungs, heart or tumours**, enabling scientists to test drug responses.
- **3D Bioprinting:** Advanced techniques that **print human tissues using living cells**, helping create realistic models for drug testing.
- **Human Cell-Based Assays:** Experiments using **human tissue cultures or engineered cell systems** to study drug interactions.

These systems mimic **human physiology more accurately than animal models**.

### Advantage of using Non-Animal Methodologies

- **Better Human Relevance:** NAMs use **human cells and tissues**, making them more predictive of **human biological responses**.
- **Improved Drug Testing:** They allow researchers to test **drug safety, immune responses, and treatment effectiveness** in controlled human-like environments.
  - E.g. A **breast cancer-on-chip model** has been used to study **CAR-T cell therapy**, enabling researchers to observe how immune cells attack tumours without using animals.
- **Cost Reduction:** Organ-on-chip technology is estimated to lower drug development costs by 10–26%.
- **Shorter Development Time:** NAMs may **reduce drug development timelines by around 19%**, speeding up identification of promising drug candidates.

### Challenges in Development of NAMs

- **Limited Accessibility:** NAM technologies are **not yet as widely available as traditional animal testing systems**.
- **Lack of Standardisation:** Many NAM models require **validated protocols, standardisation and reproducibility** before they can be widely adopted by industry.
- **High Infrastructure Costs:** Development of organ-on-chip systems and advanced cell models requires **specialised laboratories and advanced equipment**.
- **Slow Industry Adoption:** Although **over 90 academic labs in India are working on NAM technologies**, their transition to **industrial drug testing remains limited**.
- **Regulatory Uncertainty:** Regulatory agencies are still **developing frameworks to validate and approve NAM-based testing methods**.

### Government Support to NAMs:

- **Biopharma SHAKTI (BioPharma Strategy for Health Advancement through Knowledge, Technology, and Innovation):** The **Union Budget 2026 announced the Biopharma SHAKTI programme**, with an outlay of **₹10,000 crore**, to strengthen India's biologics and biosimilars ecosystem. It supports through:
  - **Boosting Domestic Biologics Production:** The initiative aims to support **research, manufacturing, and commercialisation of biologics and biosimilars**.
  - **Funding Infrastructure for NAMs:** Biopharma SHAKTI can provide **financial support for advanced laboratories, predictive human model systems and NAM research platforms**.
- **Regulatory Reforms:** India's **New Drugs and Clinical Trials (Amendment) Rules 2023** promote the use of **non-animal testing methods in drug development**.
- **Support for Start-ups and MSMEs:** Government agencies such as **DBT (Department of Biotechnology) and ICMR** are supporting **biotech start-ups working on biologics and NAM technologies**.

## CSR AND ENVIRONMENTAL RESTORATION IN INDIA

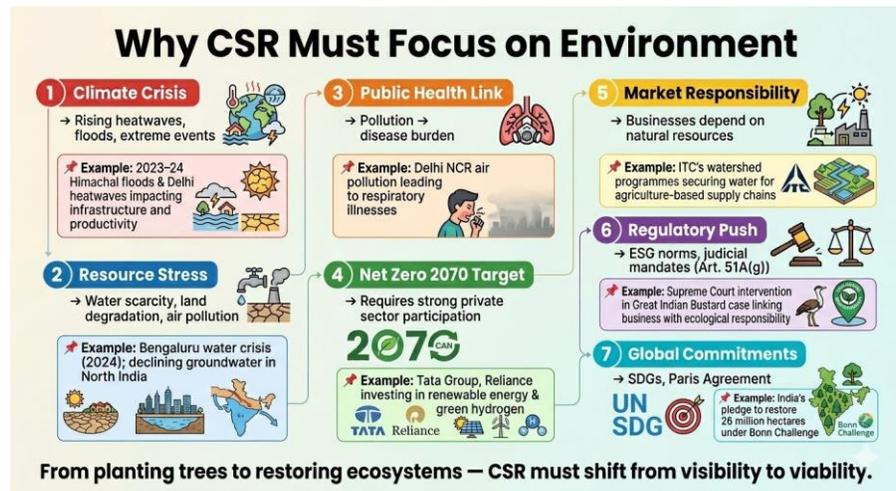
### Context

While India was a global pioneer in mandating Corporate Social Responsibility (CSR) through the Companies Act, 2013, environmental funding remains a neglected ledger.

## Issues and Challenges with CSR in Environmental Sector

### 1. Structural Gaps in CSR Allocation

- **Human-Centric Bias in CSR Allocation:** A significant majority of CSR funds in India are directed toward social sectors, with education receiving approximately 38% and healthcare around 22% of total spend. In contrast, the environment receives only 7–9% of the funding.



- **Visibility vs. Ecological Impact:** Corporate entities often prioritize "optics-driven CSR," such as high-profile awareness campaigns or renewable energy projects that offer immediate branding value.
- **Low Private Sector Contribution:** Under the global Bonn Challenge, India has committed to restoring 26 million hectares of degraded land by 2030; however, of the approximately 9.8 million hectares restored so far, the private sector's contribution stands at a negligible 2%.

### 2. Technical and Execution Constraints

- **Technical and Institutional Capacity:** Most CSR implementing agencies currently lack the scientific and technical capacity to execute specialized environmental interventions effectively.
- **Miyawaki pitfall:** The Miyawaki method's emphasis on rapid growth and corporate visibility often overlooks native biodiversity, resulting in superficial greening that disrupts local ecosystems rather than achieving functional forest restoration.
- **Urban Bias in Project Selection:** There is a pronounced geographical imbalance in CSR activity, with initiatives heavily concentrated near **corporate offices and urban or peri-urban areas.**

### Judicial Oversight: From Charity to Constitutional Obligation

- Judicial intervention has transformed environmental protection from a voluntary act of "charity" into a **binding constitutional obligation.**
- This shift strengthens the principles of **sustainable development and intergenerational equity**, ensuring that the needs of future generations are not compromised by present-day corporate activities.
- **Examples:**
  - **The GIB Case:** In a landmark move, the Supreme Court of India highlighted the severe ecological damage caused by infrastructure and energy projects in the habitats of the Great Indian Bustard (GIB).

- **Invocation of Article 51A(g):** The judiciary reinforced the **Fundamental Duty** to protect the environment by invoking Article 51A(g) of the Constitution.
  - The Court established that the **right to do business is inherently linked with ecological responsibility**, making the restoration of nature a core part of the corporate mandate.

#### Way Forward: Towards Ecosystem-Centric CSR

- **Redefining Success Metrics:** Success must shift from the quantity of saplings planted to measurable ecological outcomes like soil carbon sequestration, groundwater recharge, and biodiversity recovery to ensure genuine ecosystem resilience.
- **Strengthening Institutional Collaboration:** A multi-stakeholder alliance involving Forest Departments, universities, NGOs, and local committees is essential to ensure that restoration projects are both scientifically rigorous and community-supported.
- **Long-Term Financial Mechanisms:** Establishing Restoration Trusts or Escrow Funds can provide the sustained, multi-year financing necessary for landscape-scale ecological recovery that exceeds standard annual CSR cycles.
- **Shift to Ecosystem-Centric Governance:** Corporate strategy must transition from a shareholder-centric model to an ecosystem-centric approach by integrating Natural Capital accounting and Nature-Based Solutions into core business values.

#### Corporate Social Responsibility (CSR)

- It refers to a company's responsibility to contribute to **social, environmental, and sustainable development** beyond profit-making.
- **Legal basis in India:** CSR is mandated under **Section 135 of the Companies Act, 2013**, making India one of the first countries to have **statutory CSR**.
- **Eligibility:** CSR provisions apply to companies having:
  - **Net worth  $\geq$  ₹500 crore**, or
  - **Turnover  $\geq$  ₹1,000 crore**, or
  - **Net profit  $\geq$  ₹5 crore** in the preceding financial year.
- **CSR spending norm:** Eligible companies must spend **at least 2% of the average net profits of the previous three financial years** on CSR activities.
- **Permissible activities:** CSR spending can be made on areas such as **education, health, poverty alleviation, environment protection, rural development, gender equality, and disaster relief**.