

Climate Change induced Monsoon variability threatens Bay of Bengal's marine life: Study

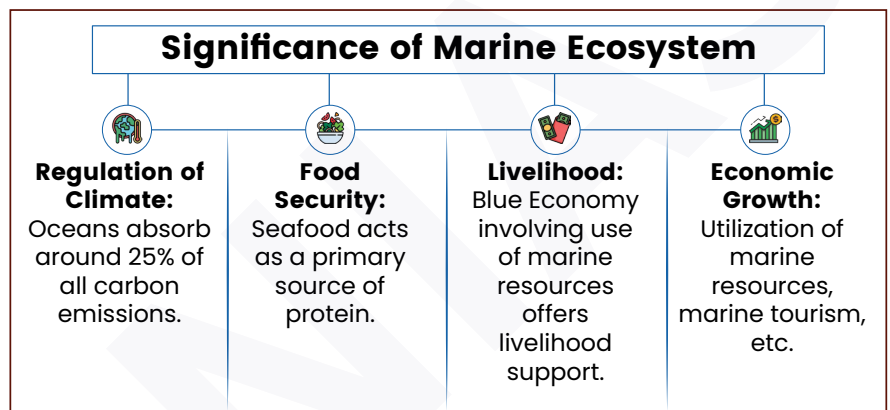
The Study conducted over **Bay of Bengal**, focusing on centuries to millennia timescales, reported a **50% drop** in food availability for marine life due to **extreme monsoon events**.

Impact of Climate Change on Marine Ecosystem

- **Reduced Plankton Growth:** Extreme monsoon conditions interfere with the vertical movement of nutrient-rich waters from the deep ocean to the surface, where plankton flourishes.
 - ⊕ **Planktons** include **phytoplankton (tiny plants)** and **zooplankton (weak-swimming animals)**, that form the base of the food chain.
 - ⊕ They produce their own food **releasing oxygen as a byproduct**.
- **Loss of Marine Biodiversity:** Climate Change **reduces diversity of marine species** including fisheries threatening **food security**.
- **Impact Nutrient Supply:** Climate Change may reduce **wind intensity** impacting the mixing of different layers of water.
- **Ocean Acidification:** Climate change causes **drop in ocean pH** reducing the availability of **calcium carbonate** required for organisms like **corals** for their structural integrity.

Some Initiatives to Safeguard Marine Ecosystems

- **Global**
 - ⊕ **United Nations Convention on the Law of the Sea (UNCLOS):** Legal framework for conservation and sustainable use of marine resources.
 - ⊕ **International Convention for the Prevention of Pollution from Ships (MARPOL):** Reducing shipping activities' impact on marine ecosystem.
- **Indian**
 - ⊕ **The Wildlife (Protection) Act, 1972:** Extends protection to Marine wildlife.
 - ⊕ **National Plan for Conservation of Aquatic Eco-systems:** Comprehensive plan for conservation and management of aquatic ecosystems.



Inclusive Digital access part of Article 21: Supreme Court

Recently, Supreme Court in **Amar Jain V Union of India and Ors.** judgment held that inclusive and meaningful digital access to e-governance and welfare delivery systems is a part of the fundamental right to life and liberty.

Key Highlights of Judgment

- **Directed to revise the digital Know-Your-Customer (KYC) norms:** To enable persons with facial disfiguration due to acid attacks or visual impairment to access banking and e-governance services.
 - ⊕ Under the **Rights of Persons with Disabilities Act, 2016**, the Court issued **twenty directions** to make the eKYC process accessible to them.
- **Invoking the 'principle of substantive equality':** Digital transformation must be both inclusive and equitable.
- **Part of Article 21:** Right to digital access emerges as an **instinctive component of the right to life and liberty**.
- **State's obligation:** Under **Articles 21** [Right to a dignified life], **14** [Right to Equality], **15** [Right against discrimination], and **38** [directs the State to promote Social Justice] of the Constitution, state is obliged to ensure digital infrastructure to all vulnerable marginalized populations.

Other Supreme Court Judgments concerning Right to Internet Access

- **Sabu Mathew George v. Union of India (2017):** Directed search engines to proactively block advertisements related to pre-natal sex determination but clarified that it does not create any kind of curtailment in right to access information and freedom of expression.
- **Anuradha Bhasin v. Union of India (2020):** Accessing the Internet for Freedom of Speech and Expression and the right to carry out trade is protected as a Fundamental Right under **Article 19(1)(a)** and **Article 19(1)(g)**, respectively.

Significance of inclusive digital access: Access essential governmental schemes, reducing rural-urban divide, access to online learning platforms, and financial technologies, inclusion of marginalised in development process, etc.

Fusion Reactor Project ITER reaches major milestone with India's help

Scientists have completed the **main magnet system** for the ITER nuclear fusion project, which will **power the core of ITER's Tokamak reactor**.

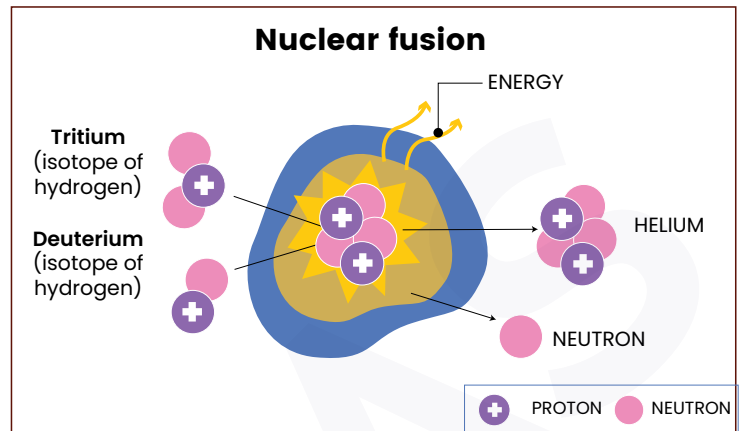
- India played a key role in building some of its most critical infrastructure, including the **massive cryostat cooling systems** and **heating technologies**.

About Tokamak Reactor

- It is an **experimental machine** designed to harness the energy of fusion.
 - ⊕ **Nuclear fusion** combines the **two light atomic nuclei** to form a single heavier one while **releasing massive amounts of energy**.
- It works on a **pulsed superconducting electromagnet system**.
- **First developed by Soviet** research in the late 1960s, adopted around the world as the most promising configuration of magnetic fusion devices.
- **ITER will be the world's largest tokamak** - twice the size of the largest machine currently in operation (JT-60SA in Japan), with six times the plasma chamber volume.

About International Thermonuclear Experimental Reactor (ITER)

- It is an **international collaboration** of more than 30 countries, located in **Southern France**.
 - ⊕ **ITER Members:** China, European Union (through Euratom), India, Japan, Korea, Russia and the United States.
- **Objective:** To demonstrate the viability of fusion - the power of the sun and stars - as an abundant, safe, carbon-free energy source for the planet.
- **European Union** being the host party contributes 45% while the rest of the parties contribute 9% each.



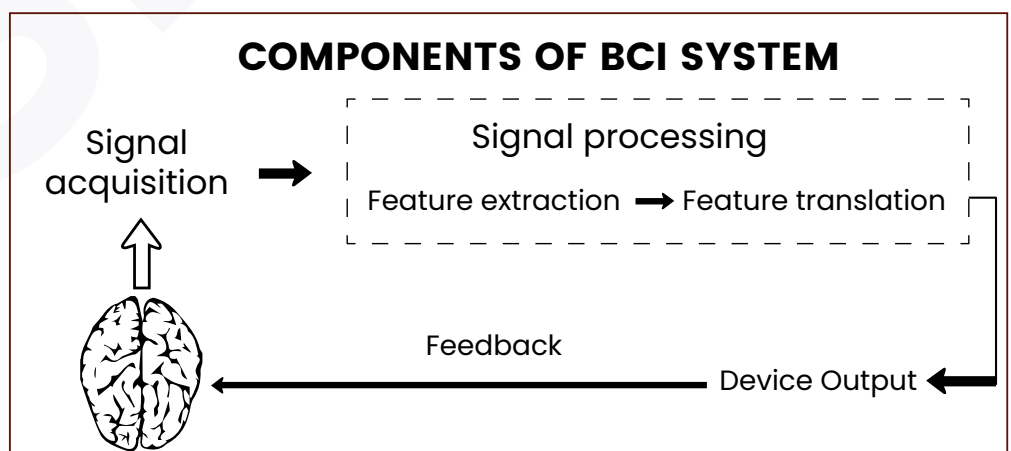
Scientists developed a Brain-Computer Interface (BCI) system for movement of paralysed persons

The system allows a paralysed person to simply **imagine the movement** he wishes to execute while the sensors record his **brain activity** to train an AI, which is used to **actuate a robotic arm**.

About BCI

- **Meaning:** It is a **computer-based system** that acquires brain signals produced by the **Central Nervous System (CNS)**, analyses them, and **translates** them into commands that are **related to an output device** for a **desired action**.
- It is not a **voice-activated or muscle-activated** communication system or a device to read minds.
- **Components of a BCI System**

- ⊕ **Signal acquisition:** Involves **measurement of brain signals**, which are digitized and transmitted to a computer.
- ⊕ **Feature extraction:** Process of **analysing the signals to distinguish pertinent signal characteristics** (featuring person's intent) from extraneous content.
- ⊕ **Feature Translation Algorithm:** Converts the features into the **appropriate commands** for the output device.
- ⊕ **Device Output:** Through letter selection, cursor control, robotic arm operation, etc.



Key Applications of BCI

- **Communication and control:** Provide an alternative **communication channel** for disabled persons.
- **Medical:** Aids **prevention** (smoking, motion sickness, etc.), **detection and diagnosis** (brain or sleep disorders), and **rehabilitation and restoration** (Brain strokes, etc.)
- **Security and Authentication:** Uses **unique brainwave signatures** for **secure** identity verification, reducing vulnerabilities linked to passwords and biometrics.
- **Education and Training:** Determine the **degree of clearness** of studied information, personalized interaction, etc.

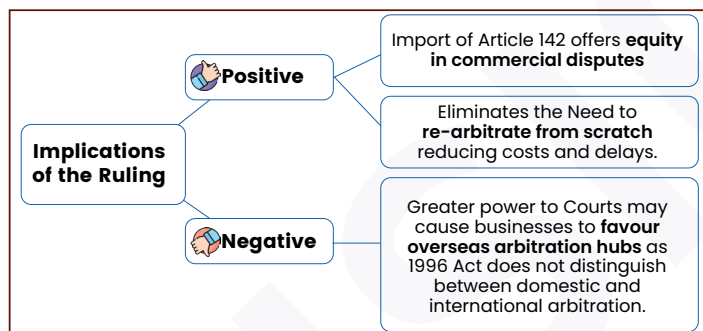
Courts have limited powers to modify Arbitral Awards: Supreme Court (SC)

SC in the **Gayatri Balasamy v. ISG Novasoft Technologies Limited**, held that the power to **modify awards** can be exercised under **Section 34 or 37** of the **Arbitration and Conciliation Act, 1996** under the following circumstances:

- When the award is **severable by separating the invalid portion from the valid portion**.
 - ⊕ SC cited the doctrine of **omne majus continet in se minus** (the greater power includes the lesser), i.e. the power to set aside an arbitral award necessarily includes the power to **set it aside in part**.
- Correct any **clerical, computation or typographical errors**.
- **Modify post-award interest** in some circumstances.
- Under **Article 142** (enabling Courts to do **complete justice**) of the Constitution, provided this power should be in consonance with the fundamental principles of the 1996 Act.

Arbitration in India

- **Meaning:** It is a form of **Alternative Dispute Resolution** mechanisms (others being conciliation and mediation) involving **consensual method** of resolving disputes **outside of a national judicial system** through a private system of adjudication.
- **Significance:** Less adversarial, Flexible, Quicker, etc.
- **Legal Framework:** The **Arbitration and Conciliation Act, 1996** modelled as per the **United Nations Commission on International Trade Law (UNCITRAL) Model Law on International Commercial Arbitration, 1985**.
 - ⊕ **Section 34(1)** of the Act stipulates '**recourse**' to a court only by an application **for setting aside the award**.
 - ⊕ **Section 37** states **instances** where an appeal may lie against orders.



Union Cabinet approves Caste enumeration in the upcoming Census

Recently, **Cabinet Committee on Political Affairs** has approved the inclusion of Caste enumeration in the upcoming Census.

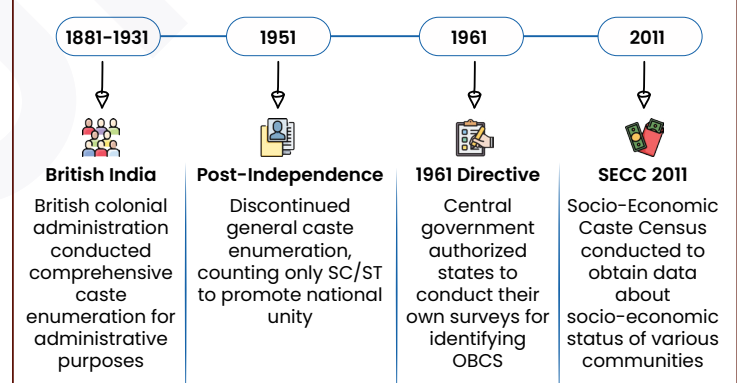
Census in India

- Census is a **Union subject (entry 69 of the union list under Schedule VII)** under **Article 246** of the constitution.
- **Census Act, 1948** provides a plan for conducting population census along with the duties and responsibilities of census officers.

Significance of Caste enumeration in Census

- **Judicial requirement:** States must conclude the "**backwardness**" of a particular class of people only after **proper assessment and objective evaluation**. (**Indra Sawhney & Others v. UoI, 1992**)
 - ⊕ Supreme Court also held that such a conclusion must be subject to **periodic review** by permanent body of experts.
- **Social justice:** Caste census along with other data might be helpful for **drawing up fresh list of socially and educationally backward classes**.
 - ⊕ Census caste data may also enable more equitable distribution of reservation benefits by making it possible to devise a '**quota-within-quota**' (sub-categorization) system.
- **Policy making:** Caste census data will help in formulation of more informed and evidence-based policy making to cater to the needs and demands of the underprivileged and downtrodden.

History of Caste Enumeration in India



Also in News



Stockholm Convention on Persistent Organic Pollutants (POPs)

India has opposed the inclusion of a **hazardous insecticide Chlorpyrifos**, listed as POP for global phase out in 2021, under the **Stockholm Convention**.

About the Convention

- **Genesis:** Adopted in **2001** and enforced in **2004**.
- **Objective:** Protect human health and environment from POPs.
 - ⊕ **POPs are carbon-based organic chemical** substances which remain persistent for a long time, accumulate and magnify in living organisms and are toxic to both humans and wildlife.
- **Features:** Lists chemicals in **three annexes**.
 - ⊕ Annex A (for Elimination), Annex B and C (Restriction)
- **India** has signed and ratified it.



Encephalitis

UK-based Encephalitis International launched a global campaign to promote the importance of vaccination against the rising threat of **encephalitis** and other vaccine-preventable diseases.

About Encephalitis

- It is **inflammation of the active tissues of the brain** caused by an **infection (viral, bacterial, etc.)** or an **autoimmune response** causing the brain to swell leading to headache, stiff neck, sensitivity to light, mental confusion and seizures.
- **Some pathogens that cause encephalitis:** Japanese encephalitis Virus (JEV), Influenza, West Nile Virus, etc.
- **India's Universal Immunisation Programme (UIP)**, provides free vaccination against 12 diseases, including **Japanese Encephalitis**.



Mendelian Inheritance

Researchers pinpoint the genes responsible for the final three pea traits studied by the biologist Gregor Johann Mendel.

- Gregor Mendel, **cross-bred around 28,000 garden pea plants and studied features such as shape and color of the pods and seeds** to make discoveries about genetic inheritance.
- **Aim:** To understand and identify how the traits were inherited by **future generations of the pea plants**.

About Mendelian Inheritance

- It is an approach that **explains the traits or characters inherited from one generation to another by the discrete units or genes**.
- To explain the theory of inheritance, he introduced three approaches, **namely the law of dominance, law of segregation, and law of independent assortment**.



Vikramaditya I of Badami Chalukya

A rare inscription dating back to the time of Vikramaditya I of the **Badami Chalukya dynasty has been unearthed at Madapura Lake in Davangere district**.

About Vikramaditya I

- **Timeline:** 644 CE - 681 CE
- Ascended the throne after **the defeat of his father Pulakeshin II at the hands of the Pallava king Narasimhavarman I**.
- **Military Conquest:** Vikramaditya I's most significant **achievement was the recapture of Vatapi, the Chalukya capital, from the Pallavas**.
- **Architectural patronage:** He contributed to the development of freestanding temples, **which became a hallmark of Chalukya architecture**.



SeaCURE

A ground-breaking project to **suck carbon out of the sea** has started operating **on England's south coast**.

About Project SeaCURE

- It is funded by the **UK government**.
- It is a small-scale **pilot project exploring whether extracting carbon directly from seawater could offer a cost-effective and scalable solution to reducing atmospheric CO₂ levels**.
- Unlike traditional carbon capture methods that target emissions **at their source or draw CO₂ directly from the air, SeaCURE targets the ocean, where carbon is present in concentrations up to 150 times higher than in the atmosphere**.



Sigma 8 (S8)

Latest research suggests that the **fundamental nature of the universe** could be determined by finding out how clumpy it is using **S8**.

About S8

- It is a measure of **inhomogeneity** of the Universe.
- It is calculated by **counting** the number of galaxies, and other cosmic structures to assess the distribution of matter, in various regions of the universe.
- **Higher value** for S8 indicates **more clustering** (clumping of matter), while a **lower value** indicates its **uniform distribution**.
- **S8 Tension** occurs when **different ways** to measure the value of S8 yields different estimates.



Pthalates

A recent study found that a daily exposure to **phthalates**, which is commonly used in making household plastic items, is **linked to 3.5 lakh, or 13 per cent, deaths in the world due to heart disease**.

About Phthalates

- **Ortho-phthalates**, often referred to as "phthalates," are **chemicals used in plastic products** (most commonly in the specific type of plastic named polyvinyl chloride) **to make the material soft and less brittle**.
- **These colorless, odorless, oily liquids** are also referred to as "**plasticizers**".
- They **do not permanently bind to plastic surfaces** to which they are applied.
- **Applications:** Pharmaceuticals, and medical devices (e.g., medical tubing), Food packaging, etc.



Fair and Remunerative Price (FRP)

Cabinet Committee on Economic Affairs chaired by PM approved the FRP of sugarcane for Sugar Season 2024-25

About FRP

- Price declared by the **central government**, at which mills are bound to procure sugarcane from farmers.
- **The Sugarcane (Control) Order 1966** gives powers to the central government to fix FRP of sugarcane.
- Decided on the basis of the recommendations of the **Commission for Agricultural Costs and Prices (CACP)**.
- Some States (Uttar Pradesh, Punjab, Haryana & Uttarakhand) determine their own **State Advised Price (SAP)** which is generally higher than FRP.

Personality in News

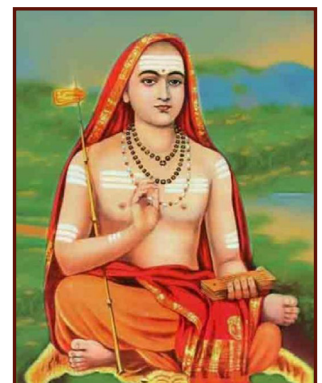


Adi Shankaracharya

Four panchaloha idols of Adi Shankaracharya are set to be installed at Kedarnath, Badrinath, and Uttaramanya Jyotirmath in Uttarakhand.

About Adi Shankaracharya (8th Century CE)

- **Born: In Kalady, Kerala.**
- Gave the **concept of Advaita** (non-dualism).
 - ⊕ It emphasizes the non-dual nature of Brahman - the ultimate, formless reality - and teaches that the individual soul (Atman) is not separate from Brahman.
 - ⊕ According to Shankaracharya, the perceived duality in the world is an illusion (**Maya**), and **liberation (Moksha)** comes from realizing the oneness of the individual.
- He acknowledged the role of **Bhakti (devotion)** in spiritual practice.
- He established **four mathas in the four cardinal directions** of India - Sringeri (South), Dwarka (West), Puri (East), and Badrinath (North).
- **Literary works:** Bhaja Govindam, Atma Shatakam, Saundarya Lahari, Brahma Sutra Bhashya, etc.



AHMEDABAD



BENGALURU



BHOPAL



CHANDIGARH



DELHI



GUWAHATI



HYDERABAD



JAIPUR



JODHPUR



LUCKNOW



PRAYAGRAJ



PUNE



RANCHI