UPSC Daily Current Affairs| Prelim Bits 02-04-2025

Effects of Monsoon Fluctuations on Marine Life in Bay of Bengal

Prelims (GS I) - *Indian and World Geography-Physical, Social, Economic Geography of India and the World.*

Mains (GS I) – *Geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes.*

Why in news?

A recent study published in the journal Nature Geoscience has revealed how monsoon patterns significantly impact marine productivity in the Bay of Bengal.

> *Despite covering less than 1% of the world's ocean area, the Bay of Bengal it provides nearly 8% of global fishery production.*

Key Findings of the study

- **Extreme Monsson conditions** – The study found that both abnormally strong and weak monsoons throughout history caused *major disruptions in ocean mixing*.
- This mixing play important role in climate, marine life, and cycles carbon and oxygen in the ocean.

Ocean mixing
• **Ocean mixing** - It is the process of warm, sun-filled surface water mixing with cold, nutrient-rich water near the bottom of the ocean. • Winds, ocean currents, and tides are responsible for most ocean mixing. **Types of Ocean Mixing** • **Vertical Mixing** – It occurs when water from different depths mixes, often driven by Wind, Turbulence, Convection. • **Horizontal/Lateral Mixing** – Driven by ocean currents. • **Diapycnal Mixing** – Mixing across density surfaces, often due to *turbulence or internal wave breaking*. • **Tidal Mixing** – Tides interacting with seafloor features (e.g., seamounts, continental shelves) generate internal waves and turbulence.

- **Reduced food availability** – Up to 50% reduction in food availability for marine life in surface waters.
- **Historical trend** – Significant declines happened in certain period when extreme monsoon weather was observed.
    - Heinrich Stadial 1 (a cold phase between 17,500 and 15,500 years ago).
    - Early Holocene (about 10,500 to 9,500 years ago).
- **Impact on plankton growth** – The ability of the ocean to support plankton growth is reduced which forms the base of the marine food chain.
- **Impact on food security** – The decline in ocean productivity reduces fish stocks and impacts food security for coastal communities.

Reasons for Disruption

- **During strong monsoons** – Increased rainfall leads to greater river runoff into the Bay and this excess freshwater creates a buoyant surface layer which prevents nutrient mixing from deeper waters.

  Buoyant surface layer formed as a result of difference in density of water where warm, less dense water floats on top of cooler, denser water.

- **During weak monsoons** – Due to reduced wind-driven mixing that limits the upwelling of nutrient-rich deep waters.
  - Surface waters become starved of essential nutrients.

Reference

The Hindu| Changes in monsoon affect marine productivity

Red-crowned roofed turtle (*Batagur kachuga*)

Prelims (GS I) – *Current events of national and international importance| General issues on Environmental ecology, Bio-diversity and Climate Change.*

Mains (GS I) – *Conservation*

Why in news?

After 30 years, 20 critically endangered red-crowned roofed turtles were reintroduced to the Ganga under Namami Gange Mission.

- The red-crowned roofed turtle is a ***freshwater turtle species***.



- **Distribution** – It is native to India, Bangladesh and Nepal.
- The species was widespread in the Ganga River, both in India and Bangladesh and it also occurs in the Brahmaputra basin.
- Substantial population of the species are found only in the *National Chambal River Gharial Sanctuary.*

- **Appearance** – The shells of these turtles can be as long as 56 cm and can weigh up to 25 kg.
- The *males are shorter and reach only half the length of females*.
- **Habitat** – Found in deep flowing rivers with terrestrial nesting sites.
- **Diet** – Exclusively of water plants.
- **Threats** – The turtles are at a high risk of extinction.
    - Habitat loss due to pollution and hydrological projects specific in the Gangal lowlands of northern India and Bangladesh.
    - Overharvesting the animal for illegal consumption and
    - Illegal international trade.
- **Conservation**
    - IUCN - Critically Endangered
    - IWPA – Schedule I
    - CITES – currently Appendix II (India proposed to move it to Appendix II)

Decline of Red-crowned Roofed turtle

- The species were last documented in Ganga River by Rao in 1993.
- No viable populations of the species turtle found in entire Ganga system in last three decades.

Reintroduction Program

- *20 turtles* were released into Haiderpur Wetland from Garhaita Turtle Conservation Center (National Chambal Sanctuary, UP).
- All turtles tagged with *sonic devices for monitoring*.
- The turtles were divided into two groups for Effective survival of the turtles,
    - One group was released above the barrage of Haiderpur Wetland.
    - While the other was released downstream in the main channel of the Ganga.

> *Haiderpur Wetland, located in western Uttar Pradesh, India, was designated as a Ramsar site in April 2021.*

References

1. WII| Red Crowned Roofed Turtle
2. Hindustan Times| Red-crowned roofed turtles return to Ganga

South China Sea Dispute

Prelims – *Current events of International Importance*

Mains (GSI) & (GS II) | *Geography of the World* **|** *International relations*

Why in News?

China and the Philippines have displayed their national flags in competing photo opportunities on a disputed sandbank in the South China sea.

- **Recent Disputed area -** Sandy Cay, which is part of the disputed Spratly Islands.
- Beijing calls it as ***Tiexian Reef.***

- **Dispute happened after -** The US and the Philippines launched their annual joint military drills called “Balikatan”, or “shoulder to shoulder”.

South China Sea dispute

- **South China Sea** – It is a marginal sea of the Western Pacific Ocean.
- It is bounded in the
  - North by South China,
  - West by the Indochinese Peninsula,
  - East by the islands of Taiwan and northwestern Philippines (mainly Luzon, Mindoro and Palawan), and
  - South by Borneo, eastern Sumatra and the Bangka Belitung Islands
- It stretches from the ***Strait of Malacca*** in the southwest to the ***Strait of Taiwan*** in the northeast.
- The South China Sea dispute involves overlapping territorial and maritime claims by several countries.
- **Involved Countries -** China, Vietnam, the Philippines, Malaysia, Brunei, and Taiwan.
- The core of the dispute lies in China's broad claim to the region, using its ***"nine-dash line"*** to demarcate its sovereignty including the Paracel and Spratly Islands, which overlaps with the claims of other nations.
- **Strategic Importance of the area** – It holds rich natural resources, significant maritime trade routes, and the presence of islands and reefs, which are also sources of contention.
- **International Law** - The dispute has been subject to international legal proceedings, such as the Permanent Court of Arbitration's ruling in 2016, which largely rejected China's claims.



Reference

The Guardian | South China Sea Dispute

Brain-Computer Interface for Paralyzed people

Prelims – *Current events of National Importance*

Mains (GS III) | *Science and Technology | Developments and their applications and effects in everyday life.*

Why in News?

Researchers at the University of California, San Francisco (UCSF) have achieved a significant breakthrough in assistive technology for individuals with paralysis.

> *Research team consists of Nikhilesh Natraj, Indian Nikhilesh Natraj, a neuroscientist and neural engineer at the Weill Institute for Neurosciences, UCSF.*

- **The Methodology** - Researchers used ***brain-computer interface (BCI)*** that allows a paralyzed man to control a robotic arm simply by imagining the movements he wishes to execute.
- They used tiny sensors implanted on the participant's brain to read the intent to move, allowing them to track and analyze brain activity despite the participant being unable to physically move.
- To observe the changes of his brain patterns over time, the participant was asked to imagine moving different parts of his body.
- The participant's brain produce the signals for a movement when he imagined himself doing it, although he couldn't actually move.
- The BCI recorded the brain's representations of these movements through the sensors.
- The team looked at the patterns in the complex sensor data and noticed that even though the way movements were represented remained consistent, their positions in the high-dimensional space changed a bit each day.
- By keeping an eye on these changes and forecasting their progression, they managed to tackle the instability in BCI systems and created a complete signal processing and AI framework.
- The participant was then tasked with imagining himself making simple movements with his fingers, hands or thumbs while the sensors recorded his brain activity to train the AI.
- The read-out signals were then decoded to actuate a robotic arm.
- **Applications -** The participant can now perform tasks such as picking up and manipulating blocks, turning them, and relocating them, even managed to open a cabinet, retrieve a cup, and hold it under a water dispense.
- **Concerns -** Having established that it can be done is the first stage, a lot more work needs to be put into refining the technique and for it to be deployed among people who have paralysis.
- Especially, the system should be able to work fluidly in complex scenarios with many distractions, such as when going to a crowded grocery store.

Reference

The Hindu | Brain-Computer Interface

Naval Aviation in India

Prelims – *Current events of National Importance*

Mains (GS III) | *Various Security Forces & Agencies & Their Mandate*

Why in News?

India and France recently signed a government-to-government contract for 26 Rafale Marine (Rafale M) fighter aircraft for the Indian Navy.

Rafale Marine (Rafale M) fighter aircraft
• Rafale M is a ***4.5-generation twin-jet fighter jet*** that is proven in combat and can hold its own against any other, including the Chinese-made J15. • **Designed and produced by** – Dassault Aviation, French manufacturer of military aircraft and business jets. • It is able to operate from both an aircraft carrier and a shore base. • **Capabilities** - Air-defence & air-superiority, Reconnaissance, Nuclear deterrence, Air-to-ground precision strike, Close air support, Anti-ship attacks; and Buddy-buddy refuelling. • The Rafale-M has been operational with the French Navy, aboard its nuclear-powered Charles de Gaulle aircraft carrier, since 2004.

Naval Aviation in India

- Naval aviation is crucial for maintaining control of the seas, supporting naval and ground forces, and projecting military power along distant shores.
- It includes fixed-wing carrier borne squadrons, land-based Maritime Patrol Aircraft, Helicopters and Remotely Piloted Aircraft operated from warships and ashore.

Key roles of Naval Aviation	
Fleet air defence	Providing air cover for naval forces beyond the reach of land-based aircraft.
Strategic power projection	It allows deployment of air power without needing land bases.
Anti-surface warfare	Attacking enemy ships with air-launched missiles.
Supporting amphibious warfare	Aiding marine landings and operations inland.
Mine countermeasures	Using aircraft to detect and clear enemy mines.

- The Indian Navy currently operates 2 aircraft carriers - the *INS Vikramaditya* procured from Russia and the indigenously built *INS Vikrant* commissioned in September 2022.
- **Significance of Rafale-M for India -** A great advantage that accrues with the induction of the 26 Rafale MS for the Indian Navy is the commonality with the IAF Rafales.

- This provides the desirable scope for interoperability and joint training, as well as for maintenance and safe practices of these assets and their aircrew between the two services.

Reference

The Indian Express | Rafale-M fighter jets

One Liners 02-04-2025
History, Art and Culture

Dadasaheb Phalke

Born April 30, 1870, in Trimbak (now Maharashtra), Dadasaheb Phalke was a pioneering Indian producer-director-screenwriter.

• **A Visionary Filmmaker -** Widely recognized as the "Father of Indian cinema," Phalke laid the foundation for the country's film industry.
• **Trailblazing Contributions -** His groundbreaking work as a producer, director, and screenwriter shaped the early landscape of Indian movies.
• **Legacy and Recognition -** In honor of his immense contributions, the Government of India established the prestigious Dadasaheb Phalke Award.
• **Enduring Impact -** Phalke's legacy continues to inspire filmmakers and remains a cornerstone of Indian cinematic history.
• **First Indian Film was** – Harish Chandrachi Factory (Marathi Movie) directed by Dadasaheb Phalke.

Basava Jayanti

Recently, on Basava Jayanti, Prime Minister Narendra Modi honored Jagadguru Basaveshwara, the 12th-century philosopher and social reformer. He paid tribute to Basaveshwara's deep wisdom and lasting legacy.

• **Born in** - 1131 AD, Basaveshwara, a revered poet-philosopher from Karnataka, founded Lingayatism. His followers wear the linga, symbolizing Shiva.
• **Prime Minister and Visionary -** Serving as PM under King Bijjala, Basaveshwara advocated for a society without caste, emphasizing equal opportunity and hard work.
• **Spiritual Philosophy** - stressed Arivu (knowledge), Achara (conduct), and Anubhava (experience), promoting Lingangayoga – a union of devotion, knowledge, and action.
• **Socio-Economic Principles -** Basaveshwara introduced Kayaka (divine work), advocating sincere labor, and Dasoha (equal distribution), urging fair wages and selfless sharing of surplus wealth.
• **Lasting Impact -** His spiritual and social reforms, including the Anubhava Mantapa, a forum for discussion, continue to influence and inspire generations.
• **Important works** - Shat-sthala-vachana, Kala-jnana-vachana, Mantra-gopya, Ghatachakra-vachana, and Raja-yoga-vachana.

Polity & Governance

Hi-Tech Toilets for Women in Bidar

*Karnataka Rural Infrastructure Development Limited (KRIDL) **recently** announced its initiative to establish hi-tech community toilets exclusively for women in 60 villages across Bidar district to improve sanitation access.*

• **Modern Toilet Features -** Each Rs 25 lakh unit includes 11 washrooms (Indian and Western styles), a waste conversion system for fertilizer, water and electricity supply, and an inverter for nighttime use, wash basins, and laundry platforms.
• **Wide Coverage Across Taluks -** Sixty units are approved across Bidar's taluks, with the first model established in Chatnalli village, Bidar taluk, spanning 600 sq. ft in a safe, accessible location.
• **Safety and Health Benefits -** These toilets aim to reduce risks of snakebites and drowning associated with open defecation, while also improving overall hygiene and health in rural areas.
• **Ensuring Functionality -** Adequate water supply will be ensured through connections from the Jal Jeevan Mission, addressing a common issue with rural community toilets.

Deputy Speaker of Lok Sabha: Constitutional Mandate

The continued absence of a Deputy Speaker in the 18th Lok Sabha, mirroring the 17th, has sparked concerns regarding adherence to constitutional mandates and established parliamentary conventions

• **Article 93** - The Indian Constitution mandates the Lok Sabha to elect a Deputy Speaker "as soon as may be," alongside the Speaker.

• **Election and Convention** - Lok Sabha members elect the Deputy Speaker from among themselves. The Speaker sets the election date post his own election. Conventionally, the Deputy Speaker is chosen from the Opposition, though not legally required.

• **Powers and Functions** - The Deputy Speaker presides over the Lok Sabha in the Speaker's absence, exercises a casting vote in ties, and automatically chairs any appointed parliamentary committee. They are independent and directly responsible to the Lok Sabha.

• **Relevance: Continuity and Neutrality** - The Deputy Speaker ensures uninterrupted House proceedings and maintains institutional neutrality, balancing legislative debates.

• **Symbol of Bipartisanship** - Historically, appointing the Deputy Speaker from the Opposition fosters cross-party cooperation and trust, symbolizing bipartisanship.

• **Crisis Management** - The Deputy Speaker plays a crucial role in crisis management, especially during unforeseen Speaker vacancies, ensuring smooth functioning of the House.

International Relations and Issues

India and Egypt Discuss Skill Development Cooperation

Recently, a high-level Egyptian delegation engaged in crucial discussions with the Ministry of Skill Development and Entrepreneurship (MSDE) in New Delhi.

• **Strengthening Bilateral Ties -** Meeting, facilitated by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), builds upon the Strategic Partnership established in 2023, further solidifying the strong India-Egypt relationship.

• **India's Skilling Vision -** MSDE, emphasized India’s ambition to become the “Skill Capital of the World” through the Skill India Mission (SIM), highlighting significant achievements in advanced skilling and entrepreneurship.

About SIM

• Launched in 2015 under the Ministry of Skill Development and Entrepreneurship, the Skill India Programme is a national initiative focused on skill development.

• The programme has positively impacted over 2.27 crore individuals, including rural youth, women, and marginalized communities.

• Courses and certifications offered through the Skill India Programme adhere to the National Skills Qualification Framework (NSQF).

• The programme is integrated with DigiLocker and the National Credit Framework (NCrF), ensuring formal recognition of skills and facilitating transitions to employment and further education.

• The Skill India Programme aims to empower a large segment of the population with relevant skills for improved livelihoods.

Military Spenders of 2024-25

Recent Escalating geopolitical tensions, notably the Russia-Ukraine conflict and Middle East instability, have spurred a surge in national defense budgets report from the Stockholm International Peace Research Institute (SIPRI).

• **Rise in Global Military Expenditure (2024-25) -** As nations allocated substantial portions of their Gross Domestic Product (GDP) towards defense. This notable increase reflects the escalating geopolitical tensions worldwide.

• **India's Ascendancy as a Major Military Power -** Among the world's largest military spenders, India firmly established its position as the fifth-highest globally.

· **Fifth Largest Military Spender - In 2024, India ranked fifth globally in military expenditure, allocating $86.1 billion, a 1.6% rise from 2023. This accounts for 3.2% of total global military spending.**

• **Top 4 countries are –** USA, China, Russia and Germany.

Environment

Sariska Tiger Reserve (STR)

The Critical Tiger Habitat (CTH) of STR in Rajasthan is expected to expand by approximately 4,500 hectares.

The development and refinement were driven by the breeding trends and movement behaviors of tigers at STR.

About STR

• **Location & History -** Nestled in the ancient Aravalli range, Sariska spans 800 sq. km. Formerly the Alwar Maharaja's hunting grounds, it became a reserve in 1955 and a national park in 1979.

• **Tiger Relocation -** Sariska holds the distinction of being the world's first successful tiger relocation site.

• **Historical Significance -** The reserve is dotted with old temples, palaces, and picturesque lakes like Siliserh and Jai Samand.

• **Landscape & Vegetation -** Characterized by rocky terrain, scrub thorn and semi-deciduous forests, Sariska features Northern Tropical Dry Deciduous and Thorn Forest vegetation, dominated by dhok trees.

• **Wildlife -** Besides tigers, Sariska is home to diverse fauna including leopards, sambhar, chital, nilgai, and wild boar.

Critical Tiger Habitat (CTH)

CTH denotes core zones within tiger reserves, vital for tiger survival.

• **Purpose -** These inviolate areas, often National Parks or Sanctuaries, ensure undisturbed breeding and thriving.

• **Sariska Declaration -** Sariska Tiger Reserve's CTH was officially declared in December 2007.

• **Inviolability -** Human disturbances are minimized within CTH to protect tigers.

• **Conservation Goal -** CTHs are crucial for the long-term conservation of tiger populations.

Bone Collector" Caterpillar

A newly discovered carnivorous caterpillar on Oahu, Hawaii, has recently been dubbed the "bone collector" due to its peculiar behavior.

• **Protective Case -** This caterpillar constructs a protective casing using silk and the remains of its prey, such as ant heads and fly wings.

• **Carnivorous Diet -** Unlike many caterpillars, the "bone collector" feeds on insects it catches in spider webs.

• **Ancient Lineage & Habitat -** Found in a small, isolated mountain forest on Oahu, its evolutionary lineage dates back at least six million years. This fragile habitat faces threats from invasive species.

• **Hawaiian Context -** Hawaii, a US state in the Pacific, is an archipelago of volcanic origin with diverse landscapes. Oahu is one of its eight main islands.

• **Conservation Significance-** The discovery underscores the unique biodiversity of Hawaii and the importance of protecting its vulnerable ecosystems from invasive threats.

Miscellaneous

Padma Awards 2025

Recently, President of India presented the Padma Awards 2025 at the Civil Investiture Ceremony-I, held at Rashtrapati Bhavan. This prestigious event honored individuals for their exceptional contributions across various fields.

• **Instituted in** - 1954

• **Categories -Padma Vibhushan:** Awarded for exceptional and distinguished service.

• **Padma Bhushan -**Awarded for distinguished service of a high order.

• **Padma Shri -** Awarded for distinguished service in any field.

• **Eligibility -** All individuals, without distinction of race, occupation, position, or sex, are eligible.

• Government servants, including those in Public Sector Undertakings (excluding doctors and scientists), are not eligible.

• The awards are usually not conferred posthumously, but exceptions can be made in highly deserving cases if the person died recently (within one-year preceding Republic Day).

• A higher category of Padma Award can only be conferred if at least five years have passed since the previous Padma Award, although this can be relaxed in exceptional cases.



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