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THURSDAY, 9th OCTOBER 2025

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1. New Biodiversity Conservation Projects

- **Prelims** -New Biodiversity Projects
- **Mains** - GS 3 - Environment

Why in the news?

- During Wildlife Week 2025 celebrations at the Forest Research Institute (FRI), Dehradun, Union Environment Minister launched five major conservation projects and four national-level wildlife monitoring programmes.

Five Major Conservation Projects

- **Tigers Outside Tiger Reserves (TOTR)**
  - ➔ **What is it?**: The Tigers Outside Tiger Reserves (TOTR) is a new national-level initiative by the Ministry of Environment, Forest and Climate Change (MoEFCC) and the National Tiger Conservation Authority (NTCA).
  - ➔ **Aim:**
    - ★ To reduce human–tiger conflicts in non-reserve landscapes by ensuring safe coexistence between people and dispersing tigers.
    - ★ To protect tigers that move beyond reserve boundaries due to habitat fragmentation, growing populations, and shrinking corridors.
    - ★ To foster a landscape-level conservation approach, balancing ecological sustainability with human safety and livelihoods.
  - ➔ **Period**: The project will be implemented over 2025–28
- **Project Dolphin (Phase II)**
  - ➔ **Aim**: Conservation of river and marine cetaceans, including the endangered Ganga River Dolphin and Indus Dolphin.

Project Dolphin

- **Aim**: Conservation of river and marine cetaceans, including the endangered Ganga River Dolphin and Indus Dolphin.
- **Launch**: 2020
- **Time Period**: 10 years
- **Objectives**
  - ➔ The main objective of the Project is to safeguard India's diverse Dolphin

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population, riverine as well as oceanic, by addressing the multifaceted threats they face.

➔ The project aims to address existing conservation concerns while also empowering stakeholders to participate in dolphin conservation.

- **Project Sloth Bear**
  - ➔ **Aim**: Establishing the first-ever national conservation framework for sloth bears, which face habitat loss and poaching threats.
  - ➔ **Features**: Habitat protection, mitigation of bear–human conflict, rescue and rehabilitation centres, and awareness campaigns.
- **Project Gharial:**
  - ➔ **Aim**: Strengthening recovery of the critically endangered gharial population in river ecosystems such as the Chambal and Gandak.
- **Centre of Excellence for Human-Wildlife Conflict Management**
  - ➔ Established at Sálim Ali Centre for Ornithology and Natural History (SACON), this national center provides policy support, research, and field-based mitigation strategies for human-wildlife conflict management.

Monitoring Initiatives

- Second Cycle of Population Estimation of River Dolphins and Other Cetaceans, including release of the brochure and field guide.
- All India Tiger Estimation Cycle–6 that include release of the field guide in eight regional languages.
- Action Plan for the Second Cycle of Snow Leopard Population Estimation.
- Progress report on the Population Estimation of Great Indian Bustard and Lesser Florican.

2. Swell waves

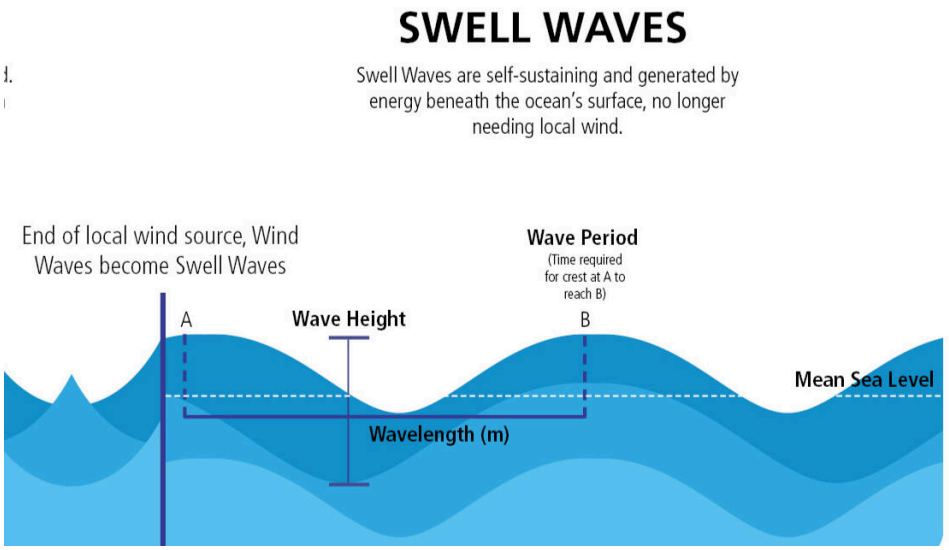
- **Prelims** - Swell waves
- **Mains** - GS 1 - Geography

Why in the news?

- The Indian National Centre for Ocean Information Services (INCOIS) has issued extensive advisories for swell waves for coastal India including Andaman and Nicobar and Lakshadweep islands.

Swell Waves

- **Definition**: Swell waves are long-period waves generated by distant storms or winds blowing over a large expanse of water.
- **Characteristics**: They have a longer wavelength and travel faster than wind-generated waves, with smoother crests and troughs.
- **Formation**: Swell waves form when wind energy transfers to the water's surface, creating a regular and uniform wave pattern.
- **Travel**: Swell waves can travel across entire ocean basins, maintaining their energy and shape over long distances.
- **Impact**: They affect coastal areas by influencing surf conditions, beach erosion, and sediment transport, and can contribute to coastal flooding during extreme events.



3. Biodiversity Heritage Sites (BHS)

- **Prelims -** Biodiversity Heritage Sites (BHS)
- **Mains -** GS 3 - Environment

Why in the news?

- The Tamil Nadu government has notified the Nagamalai hillock in Erode district as the State's fourth Biodiversity Heritage Site (BHS) under the Biological Diversity Act, 2002.

Biodiversity Heritage Sites (BHS)

- **Definition:** Areas recognized for their unique ecosystems and rich biodiversity, including terrestrial, coastal, marine, and inland waters.
- **Legal Framework:**
  - ➔ Governed by Section 37 of the Biological Diversity Act, 2002.
  - ➔ State governments can designate BHS in consultation with local bodies.
  - ➔ Focus on enhancing local community quality of life rather than imposing restrictions.
- **Criteria for Identification:**
  - ➔ **Biodiversity Richness**: Areas with significant species diversity and high endemism.
  - ➔ **Cultural Significance**: Includes sacred groves and community-conserved areas.
  - ➔ **Habitat for Threatened Species**: Provides refuge or corridors for endangered species.
  - ➔ **Domesticated Biodiversity**: Represents important agro-ecosystems.
- **Importance:**
  - ➔ Protects biodiversity while promoting conservation ethics among local communities.
  - ➔ Recognizes and supports traditional conservation practices.
  - ➔ Attracts funding for conservation initiatives.
- **Community Involvement:**
  - ➔ Encourages local participation in sustainable biodiversity management.
  - ➔ Respects and preserves traditional practices of local communities.

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4. Moscow Format Talks

- **Prelims -** Moscow Format Talks
- **Mains -** GS 2 - International Relations

Why in the News?

- Seventh round of Moscow Format consultations was held in Moscow.

Moscow Format Talks

- **What is it?:** It is a regional diplomatic platform focused on Afghanistan, led by Russia; established in 2017, based originally on a six-party mechanism (Russia, Afghanistan, China, Pakistan, Iran, India) and now expanded to include Central Asian republics and others.
- **Members:** Russia, China, Pakistan, Iran, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, and India.
- **Key Objective:** To facilitate a national reconciliation process in Afghanistan, promote peace and stability, discuss humanitarian assistance, inclusive governance, counter-terrorism, and regional security.
- **Evolution:**
  - ➔ Began as a dialogue platform *before the Taliban takeover of Kabul* (August 2021).
  - ➔ Provides a forum for major regional stakeholders to discuss Afghanistan's future and ensure that Afghan territory is not used for terrorism.
- **Significance for India:**
  - ➔ India's participation indicates its commitment to a stable, independent, and peaceful Afghanistan.
  - ➔ Ensures that India remains a key player in any future Afghan peace process and protects its strategic interests (prevents safe havens for anti-India terrorist groups).
  - ➔ Allows engagement with regional powers and coordination on counter-terrorism and humanitarian issues.
- **Recent Developments:**

- In **October 2025**, the **7th round** of Moscow Format consultations was held in Moscow.
- For the first time, **Afghanistan's interim Taliban government** was included as an official participant (represented by its Foreign Minister **Amir Khan Muttaqi**).
- In these talks, Russia openly urged **Western countries** to thaw their policies toward Afghanistan- calling for the release of seized Afghan assets and reduction of sanctions.
- A unified stance emerged rejecting **U.S. proposals to re-establish military presence** (notably the Bagram Air Base) in Afghanistan
- India supported deepening **economic ties and investment cooperation** with Afghanistan during these consultations.

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5. PM-KUSUM

- **Prelims -** PM-KUSUM
- **Mains** - GS 3 - Economy

Why in the news?

- The Union government is looking to showcase the PM-KUSUM (Pradhan Man tri Kisan Urja Suraksha evam Utthan Mahabhiyan) programme to several African countries and island nations, Union Minister for Renewable Energy (MNRE) said

Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM - KUSUM)

- **Launch**: 2019
- **Ministry**: Union Ministry for Renewable Energy (MNRE)
- **Aim**: To help farmers access reliable daytime solar power for irrigation, reduce power subsidies, and decarbonise agriculture.
- **Components**
  - ➔ **Component A:**
    - ★ 10,000 MW decentralized solar plants (up to 2 MW each) on barren/fallow land
    - ★ Power purchased by DISCOMs at regulated tariff
  - ➔ **Component B:**
    - ★ 17.5 lakh standalone solar pumps for irrigation (off-grid)
  - ➔ **Component C:**
    - ★ Solarization of 10 lakh existing grid-connected pumps
    - ★ Farmers can sell surplus solar power to DISCOMs
- **Funding**
  - ➔ **Central Government**: 30% subsidy
  - ➔ **State Government**: 30% subsidy
  - ➔ **Farmer's contribution**: 40% (which can be partly financed through bank loans)
- **Target**: To add 30.8 GW of solar capacity by 2026 (extended from 2022)
- **Implementation**: Implemented through State Nodal Agencies (SNAs) and DISCOMs.

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- **Significance**
  - ➔ **Energy Security**: Ensures reliable power for irrigation, reducing grid load.
  - ➔ **Doubling Farmers' Income**: Farmers earn by selling surplus solar energy.
  - ➔ **Climate Benefits**: Reduces diesel consumption → lowers CO_2 emissions.
  - ➔ **Decentralized Power**: Encourages local generation and rural employment.
  - ➔ **Land Utilization**: Enables productive use of barren/fallow land.
- **Challenges**
  - ➔ High upfront cost for farmers despite subsidies.
  - ➔ Delayed payments from DISCOMs.
  - ➔ Land identification and connectivity issues in rural areas.
  - ➔ Awareness gaps and slow bank credit support.

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6. Carbon Capture and Storage

- **Prelims -** Carbon Capture and Storage
- **Mains** - GS 3 - Environment

Why in the news?

- A new report highlighted that the push given to Carbon Capture and Storage by Asian countries could threaten the climate goals of the world.

Carbon Capture and Storage

- **What is it?:** It is a climate mitigation technology to capture carbon dioxide emissions from large point sources (e.g., power plants, refineries, cement and steel industries), transport the carbon dioxide, and store it underground in geological formations to prevent its release into the atmosphere.
- **Aim: Prevent significant amounts of** carbon dioxide **from entering the atmosphere, thus mitigating global warming and anthropogenic climate change.**
- **Mechanism:**
  - ➔ **Capture:** Carbon dioxide is separated from gases produced by industrial processes or power plants.
    - ★ **Pre-combustion capture:** Removed before fuel is burned, common in gasification plants.
    - ★ **Post-combustion capture:** Removed from flue gases after burning fossil fuels; often used in existing thermal plants.
    - ★ **Oxy-fuel combustion:** Fuel burned in nearly pure oxygen, producing a flue gas consisting mainly of carbon dioxide and water vapor; water is condensed, carbon dioxide is separated.
  - ➔ **Transport:** Captured carbon dioxide, usually compressed into liquid form, is transported to storage sites by pipeline or ship.
  - ➔ **Storage:** Carbon dioxide is injected into deep underground rock formations (e.g., saline aquifers, depleted oil and gas fields), where it can be securely stored for decades or longer.
- **Applications:**
  - ➔ Hard-to-abate sectors: cement, steel, chemicals.

- ➔ EOR (Enhanced Oil Recovery): Injected carbon dioxide helps extract additional oil from fields.
- ➔ Production of synthetic fuels, building materials (via mineralisation), dry ice, and use in greenhouses.

- **Advantages:**
  - ➔ Reduces greenhouse gas emissions from industries and power generation.
  - ➔ Essential for net-zero strategies, especially for sectors that cannot be easily decarbonized.
  - ➔ Can be combined with bioenergy (BECCS), leading to negative emissions.
- **Challenges:**
  - ➔ High costs: Investment and operational expenses are significant.
  - ➔ Storage risks: Leakage from storage sites is a concern.
  - ➔ Limited deployment: Only a few large CCS projects are globally operational (about 40 as of 2023, capturing ~45 Mt carbon dioxide/yr).
  - ➔ India-specific issues: Lack of geological data, limited suitable aquifers for storage, need for clear policy and regulatory framework.
- **Initiatives in India:**
  - ➔ NITI Aayog released a policy framework for Carbon Capture, Utilization and Storage (CCUS) to help India's target of net-zero by 2070.