DAILY CURRENT AFFAIRS 09-06-2025

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Ancient Human Presence in the Great Rann of Kutch

Syllabus: GS-1: Art and Culture & Geography.

Context:

- Recent research by **IIT Gandhinagar** & collaborating institutions has revealed evidence of human habitation in the **Great Rann of Kutch**, dating back **at least 5,000 years before the Harappan civilisation**.

Key Archaeological Discoveries

- Site located near **Dholavira**.
- **Marine shells, tools, pottery** unearthed.
- First reported in **19th century** by geologist **Arthur Beavor Wynne**.
- Recent finds: **house complexes**, artefacts indicating a **vibrant prehistoric community**.

Coastal Hunter-Gatherer Communities

- Lifestyle: **Primarily hunter-gatherers**.
- Dependency on **local mangrove environment** for sustenance.
- Shell species (e.g. *Terebralia palustris*) show **foraging** and **shellfish cooking**.
- **Seasonal lifestyle**—movements based on resource availability.

Tools and Trade

- **Stone tools** of basalt & quartzite.
- Tools used for **hunting** and **processing food**.
- Presence of **non-local materials** → suggests **trade with neighbouring regions**.

Radiocarbon Dating

- Site dated between **3,300 BCE – 1,400 BCE**.
- Implies **human activity predating Harappan civilisation** by several millennia.
- Further dating underway for refining the **prehistoric timeline**.

Environmental Context

- **Great Rann of Kutch** was once a **coastal environment** with **higher sea levels**.

- Climate change led to **landscape transformation** → impacted human settlement patterns.
- Current **mangrove remnants** indicate **adaptation to changing environment**.

Future Research Directions

- Further excavations aim to explore:
  - **Lifestyle**, **diet**, **social structures**.
  - **Inter-regional connections** and prehistoric **human behaviour**.
- Continued **multi-institutional collaboration**.

Significance

- Enhances understanding of **prehistoric human presence** in western India.
- Highlights **coastal adaptations** of ancient communities.
- Provides insight into **pre-Harappan cultural evolution**.

About the Rann of Kutch

- **Geography**
  - Large area of **salt marshes** spanning the border of **India (Gujarat)** and **Pakistan (Sindh)**.
  - Divided into:
    - **Great Rann of Kutch** (larger portion)
    - **Little Rann of Kutch** (southeast of Great Rann)
  - Bordered by:
    - **Thar Desert** (north)
    - **Low hills of Kutch** (south)
    - **Indus River Delta** (west, in Pakistan)
    - **Gulf of Kutch** (southeast)
- **Climate**
  - **Hot summers**: Avg. 44 °C, can reach up to 50 °C.
  - **Cold winters**: Temps can drop to or below freezing.

- Unique as the **only large flooded grassland zone** in the **Indomalayan realm**.
  - Indomalayan realm spans **South, Southeast, and parts of East Asia**.

➢ **Ecology**

- Diverse ecosystems: **desert**, **salt marsh**, **grassland**, **mangroves**.
- **Little Rann of Kutch** is home to the **Indian wild ass** (*khur*).
- **Wild Ass Wildlife Sanctuary**:
  - Largest wildlife sanctuary in India.
  - Located entirely in the **Little Rann of Kutch**.
  - Features **baits** (small grass-covered areas) that sustain local fauna.

➢ **Geological Aspects**

- A notable example of **Holocene sedimentation**.
- Connected to the Arabian Sea through:
  - **Kori Creek** (west)
  - **Gulf of Kutch** (east)
- Situated very close to **sea level**.

- **Historical Significance**
  - Early **Neolithic settlements**.
  - Inhabited by:
    - **Indus Valley Civilization**
    - **Maurya Empire**
    - **Gupta Empire**
- **Strategic and Cultural Importance**
  - Border region with **Pakistan**.
  - Host to **international festivals** like the **Rann Utsav**, boosting tourism.

National e-Vidhan Application (NeVA)

Syllabus: GS-2: Governance – e-Governance.

Context:

Union Minister will inaugurate NeVA for Puducherry Legislative Assembly on 9th June 2025.

What is NeVA?

- NeVA is a **digital platform** that enables **paperless conduct of legislative business** across India's State and Union Territory legislatures.
- It embodies the vision of **'One Nation – One Application'** by integrating all Houses onto a **single interface**.

Developed and Implemented By

- **Developed by:** Ministry of Parliamentary Affairs (MoPA).
- **Supported by:** Ministry of Electronics and Information Technology (MeitY).
- **AI-Powered Translation:** Integrated with **BHASHINI** for AI-based multilingual translation.
- **Approval:** Approved by **Public Investment Board** on 15 January 2020.

- **Project Cost:** ₹673.94 crore, under a **centrally sponsored model** (shared funding to support States equitably).

Aim of NeVA

- To **digitize legislative proceedings** and make all Houses **paperless**.
- To create a **unified national repository** of all legislative data on a single digital platform.

Key Features of NeVA

- **End-to-End Paperless Functioning**
  - Complete digitization of the legislative process: uploading of **agenda, bills, speeches, responses**.
  - Reduces paper use and enhances efficiency.
- **AI/ML-Powered Real-Time Translation via BHASHINI**
  - Instant **translation of speeches and documents** into multiple Indian languages using AI/ML.
  - Promotes linguistic inclusivity.
- **Unified Digital Workspace**
  - Creates a **single digital platform** for:
    - Legislators (MLAs/MLCs)
    - Government departments
    - Assembly secretariats
- **Secure Document Management & Searchable Archives**
  - All records are digitally stored with:
    - **Multi-layered security**
    - **Role-based access control**
    - **Searchable digital archives** for easy retrieval.
- **Training Modules & Simplified Workflows**
  - Hands-on **training for MLAs and staff** for effective usage.
  - Designed for **simplified workflows** to encourage smooth digital adoption.

Significance

- **Promotes transparency**, **efficiency**, and **environmental sustainability**.
- Encourages **uniformity and interoperability** across Indian legislatures.
- Enhances **public accessibility** to legislative information.

4th India-Central Asia Dialogue

Syllabus: GS-2: International Relations – Multilateral Relations.

Context:

The 4th India-Central Asia Dialogue was held in New Delhi under the chairmanship of EAM Dr. S. Jaishankar.

What is it?

- A **multilateral platform** for Foreign Ministers of India and Central Asian countries to engage in structured dialogue.
- **Launched:** 2019 (Samarkand).
- **Members:**
  India, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan.
- **Objective:**
  Deepen **strategic, political, and economic cooperation**.

Key Objectives

- Enhance cooperation in:
  - Trade & Transport
  - Security & Counter-Terrorism
  - Energy & IT
  - Health & Traditional Medicine
  - People-to-people ties
- Foster **regional stability** and **sustainable development**.

Major Outcomes of the 4th Dialogue

Counter-Terrorism

- Condemned **Pahalgam attack**.
- Urged early adoption of the **UN Comprehensive Convention on International Terrorism (CCIT).**

Rare Earth & Critical Minerals

- Joint interest in **exploration** and **investment**.
- **2nd India-Central Asia Rare Earth Forum** to be convened soon.

Connectivity & Trade

- Emphasized use of:
    - **International North-South Transport Corridor (INSTC)**
    - **Chabahar Port**
- Supported **Uzbekistan** and **Turkmenistan** joining INSTC.

Financial & Digital Integration

- Promotion of:
    - Digital payment systems
    - Interbank cooperation
    - Trade in national currencies

Health & Traditional Medicine

- Following topics were discussed:
    - Universal Health Coverage (UHC)
    - Medical tourism
    - Integration of traditional medicine.

Energy & Technology Partnership

- Supported cooperation on:
    - India Stack (Digital Public Infrastructure)
    - International Solar Alliance
    - Biofuels

- Clean energy & digital resilience.

Support for India's Global Role

- Reaffirmed backing for:
  - **India's permanent UNSC membership**.
  - India's enhanced role in **SCO** and **UN**.

Challenges in India–Central Asia Relations

- **Geographical Disconnect**
  - No direct land borders.
  - Pakistan's denial of transit limits overland connectivity.
- **Chinese Strategic Depth**
  - China's **BRI** dominates infrastructure and trade.
- **Afghan Security Volatility**
  - Instability in Afghanistan impedes connectivity projects.
- **Low Trade Volume**
  - India–Central Asia trade <**$2 billion** in 2022–23.
- **Language & Bureaucratic Barriers**
  - Cultural and regulatory differences slow progress.

Way Forward

Strengthen Connectivity

- **Chabahar Port** and **INSTC** integration.
- Streamline customs via **TIR Convention**.

Deepen Digital Diplomacy

- Leverage **India Stack** and DPI models.

Energy & Minerals Partnership

- Accelerate **critical mineral agreements**.
- Promote **green energy** investments and **joint R&D**.

Cultural & Academic Exchange

- Expand:
    - ITEC programs
    - Language training
    - Higher education scholarships.

Institutional Mechanisms

- Regularize **Joint Working Groups** on:
    - Health
    - FinTech
    - Climate
    - Counter-terrorism.

Conclusion

- The Dialogue **reaffirms India's strategic vision** for regional cooperation rooted in **shared civilizational ties**.
- To overcome **geopolitical constraints**, India must focus on:
    - Multimodal connectivity
    - Economic linkages
    - Institutional frameworks.
- A **proactive** and **resilient approach** can ensure **long-term stability** and **mutual growth** in India-Central Asia relations.

Know more

Central Asia: Overview

Central Asia is a region of Asia that includes the following five countries:Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan&Uzbekistan.

Common Name: These countries are often referred to collectively as the **"-stans"**, because their names end with the Persian suffix **"-stan"** meaning "**land**" (e.g., *Kazakh-land* = Kazakhstan).

Geographical Boundaries:

- **West & Southwest:** Caspian Sea, Iran
- **Northwest:** European Russia
- **North:** Siberia (Russia)
- **East:** China, Mongolia
- **South:** Afghanistan, Iran

Importance:

- Historically part of the **Silk Road** trade route.
- Rich in **natural resources** (oil, gas, minerals).
- Strategically located between major powers (**Russia**, **China**, **Iran**).
- Plays a growing role in **regional security** and **connectivity** (focus of dialogues like **India-Central Asia Dialogue**).

Quantum Computing: Journey from bits to qubits

Syllabus: GS-3: Science and Technology –Computer Science.

Context:

IBM has built devices with over 100 qubits and is pursuing a 1,000-qubit machine.

What is Quantum Computing?

Quantum computing harnesses the principles of **quantum mechanics**, rather than classical physics, to perform complex computations using **quantum bits (qubits)**.

- **Origin**: Concept proposed by **Richard Feynman (1981)** to simulate quantum systems using machines that follow quantum principles like *superposition* and *entanglement*.

How it Works

- **Superposition**: Qubits can represent both 0 and 1 simultaneously, enabling **massive parallel processing**.
  - *Example*: A 100-qubit system can represent $\mathbf{2^{100}}$ **(~**$\mathbf{10^{30}}$**)** states at once.
- **Entanglement**: Qubits become interlinked so that the state of one instantly affects another, regardless of distance.
  - Einstein famously termed this "**spooky action at a distance**."
- **Quantum Gates and Circuits**: Logical operations are performed using **quantum gates**, manipulating qubits' phase and entanglement.

Applications of Quantum Computing

- **Drug Discovery & Material Science**
  - Simulate molecular interactions to design drugs and materials at the atomic level.
  - *Example*: Pfizer & IBM collaborate on quantum simulations for drug development.
- **Logistics and Optimization**
  - Solve complex optimization problems in **supply chains**, **traffic control**, and **portfolio management**.
- **Cybersecurity**
  - Enables **Quantum Key Distribution (QKD)** for secure communication.
  - Could break current encryption using **Shor's Algorithm**.
- **High-Precision Sensing**
  - Applied in **mineral detection**, **gravitational field mapping**, and **medical imaging**.

Progress So Far

- **Google Sycamore (2019)**: Performed a task in **200 seconds** that would take a supercomputer **10,000 years**.
- **IBM**: Built systems with **over 100 qubits**, aiming for **1,000-qubit machines**.
- **China's Jiuzhang**: Demonstrated **quantum advantage** using **photonic qubits**.
- **Startups**: IonQ and PsiQuantum explore **trapped ions** and **photonic methods** for scalability.

Challenges in Implementation

- **Decoherence and Fragility**: Qubits are highly unstable—may collapse in $\mathbf{10^{-4}}$ **seconds**.
- **Error Correction**: Large overhead; multiple physical qubits needed for one reliable **logical qubit**.
- **Scalability**: Current 100–200 qubit systems yield only about **5 stable logical qubits**.
- **Infrastructure Costs**: Require **ultra-cold environments**, vacuum chambers, and advanced labs.

Global Race in Quantum Computing

Country/Region	Investment Focus
China	$15 billion public funding; national quantum networks
USA	$4 billion; private sector leadership (IBM, Google, Microsoft)
EU	€1 billion "**Quantum Flagship**" programme
UK, Japan, Canada	Quantum-safe encryption, hybrid computing
India	National Quantum Mission; ₹8,000 crore

India's Status

- **National Quantum Mission (2020)**: ₹8,000 crore funding.
- Leading institutes: **IITs, IISc, TIFR** — running 5–10 qubit systems; aiming for **50–100 qubits by 2030**.
- Focus areas:

- **Quantum-safe cryptography**
- **Quantum sensing**
- **Post-quantum communication**

- Among **top five global investors** (with China, US, EU, UK).

Future Outlook

- **2040s**: Full-scale, **fault-tolerant quantum computers** with **millions of qubits** expected.
- **Hybrid Model**: Quantum computers will **augment classical computing**, handling tasks like:
  - Quantum simulations
  - Decryption
  - Complex optimization
- **Global Priorities**:
  - Developing **quantum-safe systems**
  - Fostering **cross-border collaboration**
  - Driving **indigenous R&D**

Conclusion

Quantum computing marks a **paradigm shift** capable of transforming science, defence, and the economy. India's early and strategic investments position it to emerge as a **global quantum power**—if it sustains momentum in **research**, **capacity building**, and **international collaboration**. From **bits to qubits**, the future belongs to those who can **decode the quantum universe**.

Ocean Protection Funding Needs for 30×30 Target

Syllabus: GS-3: Environment and Ecology – Conservation and Protection of Oceans.

Context:

The global initiative to protect 30 per cent of the oceans by 2030 requires an annual investment of $15.8 billion.

The 30×30 Ocean Protection Target

- It is a global initiative under the **Kunming-Montreal Global Biodiversity Framework**.
- Goal: **Protect 30%** of the world's oceans by **2030**.
- New report: *"The Ocean Protection Gap – Assessing Progress toward the 30×30 Target."*
- Released ahead of **UN Ocean Conference 3** (June 2025, France).

Objectives

- Conserve **30%** of:
  - Terrestrial areas
  - Inland waters
  - Marine and coastal areas
- Tools:
  - **Marine Protected Areas (MPAs)** — formally protected zones for marine ecosystems.
  - **Other Effective Area-Based Conservation Measures (OECMs)** — informal or community-based areas that also conserve biodiversity.

Importance of Ocean Ecosystems

- Provide **50% of global oxygen**.
- Absorb **heat and carbon**, thus **regulating climate**.
- Economic contribution:
  - ~$2.6 trillion annually (ocean economy).
  - 7% of **global trade** in 2023.
- Threats:
  - Climate stress (warming, acidification).
  - **Policy fragmentation** → weak coordinated action.

Current Status of Ocean Protection (as of June 2023)

Metric	Status
% of ocean protected	**8.6%**
% effectively managed	**2.7%**
MPAs	Often underfunded, poorly staffed, weak enforcement.
Coastal countries	Many lack clear **plans and targets** for 30×30.

Financial Requirements & Gap

Component	Required Investment	Current Allocation	Funding Gap
Annual investment needed	$15.8 billion	$1.2 billion	$14.6 billion

- **Establishment of MPAs** → **$0.6 billion/year**.
- **Management of MPAs/OECMs** → **$15.2 billion/year**.
  - **Developing countries** → require ~**$4.2 billion/year**.
- Potential return: **$85 billion/year by 2050** (ecosystem services, sustainable fisheries, carbon sequestration, tourism).

Current Funding Sources

Source	% Contribution
Public funding	**90%** (mostly domestic — 78%)
Official Development Assistance (ODA)	**12%**
Private finance	Minimal currently, expected to grow post-2030

Strategies to Close the Funding Gap

- Repurpose **harmful fishing subsidies**.
- Introduce **taxes on fossil fuel extraction**.
- Develop innovative finance:
  - Blue bonds.
  - Debt-for-nature swaps.

- Enhance **international donor commitments**.
- Strengthen **ODA flows**.
- Support capacity-building in **developing countries**.

Role of Private Finance

- Short-term → **limited role**.
- Medium to long-term (post-2030):
    - Potential growth via:
        - Blue bonds (debt tied to marine conservation).
        - Blended finance models.
        - Impact investment.

Conclusion

- The 30×30 target is **critical** to preserving ocean health.
- Significant **funding gap** exists → urgent action required.
- **Multistakeholder approach** (public, private, international) needed to bridge the gap.
- The upcoming **UN Ocean Conference 3 (2025)** offers a vital platform to galvanize global support and commitments.