

Prelims Exam Topics

QUTUB SHAHI HERITAGE

GS 1: History & A&C

Context

Filmmaker Mohammad Ali Baig (Padma Shri awardee) took the Qutub Shahi heritage to the Cannes Film Festival 2026.

About Qutub Shahi Dynasty

1. **Founded:** 1518 by Sultan Quli Qutb Shah; ended 1687 when Aurangzeb annexed Golconda after an 8-month siege.
2. **Capital:** Golconda Fort (earlier); Hyderabad founded 1591 by Muhammad Quli Qutb Shah- fifth sultan of the dynasty.
3. **Religion:** Shia Islam-promoted Shia traditions, built Ashurkhanas; but also deeply syncretic, patronising Telugu and Persian literature.
4. **Language & Culture:** Muhammad Quli Qutb Shah was the first poet to compose extensively in Telugu; his famous "Piya Baaj Piyaala" composition is considered foundational Urdu poetry.

Ruler	Notable Contribution
Sultan Quli Qutb Shah (1518-43)	Founded dynasty; declared independence from Bahmani Sultanate
Ibrahim Quli Qutb Shah (1550-80)	Patronised Telugu literature; great administrative reforms
Muhammad Quli Qutb Shah (1580-1612)	Founded Hyderabad (1591); built Charminar; prolific poet in Telugu, Persian and Urdu
Abdullah Qutb Shah (1626-72)	Built Taramati Baradari; courtesan Taramati and Premamati were luminaries of his court
Abu'l-Hasan Tana Shah (1672-87)	Last ruler; defeated and imprisoned by Aurangzeb at Golconda (1687)

Key Architectural Contributions

1. **Charminar (1591):** Built by Muhammad Quli Qutb Shah to mark founding of Hyderabad; four minarets each 48.7 m high; mosque on top floor.
2. **Golconda Fort:** Massive fortification known for its acoustic system -- a hand-clap at the main gate heard at the summit 1 km away.

3. **Mecca Masjid:** One of India's oldest and largest mosques; construction begun by Muhammad Quli Qutb Shah; completed under Aurangzeb.
4. **Qutb Shahi Tombs:** Necropolises of the seven rulers of the dynasty; located near Golconda. Listed on UNESCO Tentative List; recently restored by Aga Khan Trust for Culture.

CHOLA ERA COPPER PLATES

GS 1: History, A&C

Context

The Anaimangalam copper plates, popularly known as the Leiden plates were formally handed back to India at The Hague during PM Modi's visit to the Netherlands.

About the Leiden Plates

- **Composition of the Plates:** The inscription consists of a complete set of 21 large copper plates along with 3 smaller plates. The large plates contain a total of 21 inscriptions, including 5 inscriptions written in Sanskrit and 16 inscriptions written in Tamil.
- **Issued under Rajendra Chola I:** The copper plate charter was issued during the reign of Rajendra Chola I and was promulgated in implementation of the oral command earlier given by his father, Raja Raja Chola I.
 - **Grant to the Chulamanivarma Vihara:** The plates record the grant of land at Anaimangalam village, near Nagapattinam in present-day Tamil Nadu, by Raja Raja Chola I to the Chulamanivarma Vihara, a Buddhist monastery.
 - The vihara had been constructed by **Sri Mara Vijayotunga Varman** in memory of his father, reflecting the maritime and cultural links between the Chola kingdom and Southeast Asia.
- **Later Additions in the Small Plates:** The three smaller plates contain a later inscription issued during the reign of Kulottunga Chola I.
- **Royal Insignia and Symbolism:** All the plates are fastened together by a ring bearing the Chola royal insignia.
 - The emblem depicts the tiger of the Cholas, the twin fish of the Pandyas, and the bow of the Cheras, symbolising Chola supremacy over the formerly rival kingdoms of South India.
- **Destruction of the Chulamanivarma Vihara:** The Chulamanivarma Vihara, also known as the “Raja Raja Cholan Perumpalli” or the Great Vihara, survived for centuries as an important Buddhist institution.

Ruler	Period	Key Role in the Plates
Raja Raja Chola I	985-1014 CE	Gave oral command; great temple builder

		(Brihadeeswarar, Thanjavur); naval expeditions to Sri Lanka and SE Asia
Rajendra Chola I	1014-1044 CE	Executed father's command; Gangaikonda Cholapuram; naval expedition reached SE Asia (Kadaram/Kedah)
Kulottunga Chola I	1070-1120 CE	Additional grants; unified Eastern Chalukya and Chola power; reformed revenue administration

INDIA UPGRADES BILATERAL TIES WITH THE NETHERLANDS

GS 2: IR

Context

PM Narendra Modi visited the Netherlands and bilateral ties were elevated to a Strategic Partnership.

About the Change in Relationship

- **New Status (2026):** India-Netherlands ties elevated to Strategic Partnership — the most comprehensive framework governing their bilateral engagement.
- **17 Agreements signed:** Broadly grouped under the "WAH" framework: Water, Agriculture, and Health, along with semiconductors, critical minerals, and renewable energy.
- **Flagship MoU:**
 - Tata Electronics and Dutch chip giant ASML signed an MoU to establish a **semiconductor fabrication facility** in Gujarat.
 - Joint MoUs on offshore **wind, green hydrogen**. India targets 500 GW renewables by 2030.
 - MoU for **joint exploration and processing** of Critical Minerals(It helps India in supply chain diversification away from China)
 - **Green & Digital Shipping Corridor:** plans for a Green and Digital Sea Corridor linking Indian ports with the Port of Rotterdam.
 - **Semiconductor Brain Bridge Initiative:** Partnership between IITs/IISc and Dutch universities

India–Netherlands Bilateral Relations

- **Diplomatic Relations:** India and the Netherlands established diplomatic relations in 1947; 2022 marked 75 years of ties.
- **Priority Areas (WAH):** Water, Agriculture and Health (WAH) are the core pillars of bilateral cooperation.
- **Trade Relations:** Netherlands is India's 11th largest trading partner, 3rd largest export destination globally and largest in Europe. Bilateral merchandise is USD 27.8 billion (FY 2024-25).

- **Investment Relations:** Netherlands is the 4th largest investor in India with cumulative investments of around USD 55 billion since 2000.
 - Indian companies invested around USD 28 billion, making it the 4th largest ODI destination for India.
- **Indo-Pacific Convergence:** Netherlands' Indo-Pacific Guidelines (2020) identify India as a key strategic partner for a free and open Indo-Pacific.
- **Space & S&T Cooperation:** ISRO cooperates with the European Space Agency's ESTEC centre located in Noordwijk, Netherlands.
- **Indian Diaspora:** Netherlands hosts around 300,000 people of Indian origin, including a large **Surinami-Hindustani community**.

OPERATION RAGEPILL

GS 3: Internal Security

Context

Narcotics Control Bureau (NCB) launched **Operation RAGEPILL**, leading to India's first-ever seizure of Captagon tablets and powder.

About the Operation

- **Conducted By:** Operation carried out by the Narcotics Control Bureau under India's anti-narcotics framework.
- **Objective:** To dismantle transnational synthetic-drug trafficking networks and prevent India from being used as a transit route for narcotics.
- **First-Ever Captagon Seizure:** Marks India's first seizure of Captagon, also referred to as the "Jihadi Drug".
- **About Captagon:** Captagon mainly contains **Fenetylline and Amphetamine**, classified as psychotropic substances under the **NDPS Act, 1985**.
- **Global Concern:** Captagon abuse is a major law-enforcement and public-health issue in the Gulf and West Asia, especially in Saudi Arabia and neighbouring countries..
- **Citizen Reporting Mechanism:** NCB urged citizens to report narcotics-related information through the MANAS Helpline (1933)

EBOLA VIRUS DISEASE (EVD)

GS 3: S&T

Context

World Health Organization (WHO) declared the Ebola outbreak in Democratic Republic of the Congo and Uganda a **Public Health Emergency of International Concern (PHEIC)**

About Ebola Virus Disease (EVD)

- **Nature:** Ebola is a severe zoonotic viral disease causing haemorrhagic fever with high fatality rates.
- **Caused by:** Viruses of the genus Orthoebolavirus. Major strains include Ebola virus, Sudan virus and Bundibugyo virus.
 - Present outbreak is caused by the **Bundibugyo strain**, first identified in Uganda in 2007.
- **Why Current Outbreak Is Different:** Unlike the Zaire strain, the Bundibugyo strain currently has no approved vaccine or targeted therapeutics.
 - Existing vaccines include **Ervebo** and **Zabdeno–Mvabea**, mainly effective against the Zaire strain.
- **Natural Reservoir:** Fruit bats are considered the primary natural reservoir of Ebola viruses.
- **Animal Hosts:** Can spread through infected chimpanzees, gorillas, monkeys, forest antelopes and porcupines.
- **Transmission:** Spreads through direct contact with infected blood, bodily fluids, organs or contaminated materials.
- **Diagnostic Tests:** RT-PCR, ELISA, antigen-detection tests and virus isolation through cell culture.
- **Treatment:** WHO recommends monoclonal antibody therapies such as mAb114 (Ansuvimab) and REGN-EB3 (Inmazeb).
- **WHO Classification:** WHO declared the outbreak a PHEIC, but not a pandemic emergency like COVID-19.

RAIL-LED INDUSTRIAL CORRIDORS

GS 3: Economy, Infrastructure

Context

India's Dedicated Freight Corridors (DFCs) are fundamentally transforming freight economics and industrial location decisions. With the Western DFC nearing completion, warehousing leasing hit a record 72.5 million sq ft in 2025 (+29% year-on-year), driven by firms relocating supply chains along freight corridors.

About Dedicated Freight Corridors (DFC)

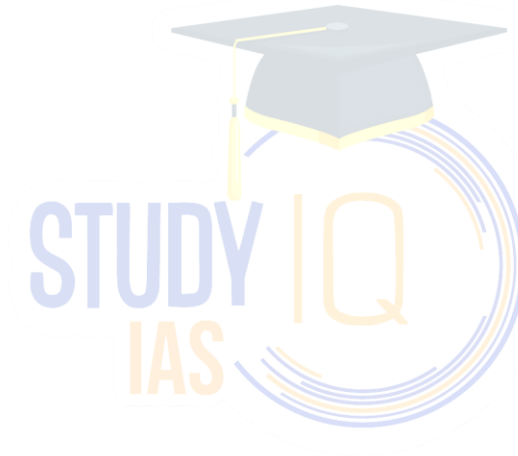
- **Concept:** DFCs are exclusive railway lines designed solely for freight movement, enabling faster transit, heavier loads, and lower logistics costs.
- **Western Dedicated Freight Corridor:** It connects Dadri in Uttar Pradesh to Jawaharlal Nehru Port over nearly 1,500 km and is close to operational completion.
- **Eastern Dedicated Freight Corridor:** The Eastern DFC links Ludhiana in Punjab to Dankuni in West Bengal across nearly 1,839 km and is being operationalised in phases.
- **Higher Freight Speed:** Freight trains on DFCs can operate at speeds of nearly 100 kmph compared to about 25 kmph on conventional shared railway lines.
- **Enhanced Carrying Capacity:** DFCs support double-stack container trains and significantly higher freight-carrying capacity than traditional rail corridors.
- **Implementing Agency:** The corridors are being developed by Dedicated Freight Corridor Corporation of India Limited under the Ministry of Railways.

Advantages of DFC-led Industrial Corridors

- **Cost Efficiency:** Dedicated Freight Corridors (DFCs) reduce freight transportation costs to nearly Rs 1.96 per tonne-km, making them around 40–50% cheaper than road transport for long-distance routes.
- **Decongestion of Passenger Network:** The separation of freight traffic from passenger lines frees up nearly 75% additional rail capacity which enables smoother passenger operations and reduces delays.
- **Industrial Relocation:** DFC corridors are driving the growth of warehousing, logistics parks, and manufacturing clusters, with warehousing leasing reaching a record 72.5 million sq ft in 2025.
- **Hub-and-Spoke Logistics Model:** Industries are shifting from scattered city warehouses to large DFC-linked logistics hubs to improve supply chain integration and operational efficiency.
- **Export Competitiveness:** Faster and cheaper freight movement to ports such as Jawaharlal Nehru Port and Mundra Port helps lower India's logistics costs and strengthens export competitiveness.
- **Employment Generation:** Industrial corridors linked with DFCs, including the Delhi-Mumbai Industrial Corridor and the Amritsar-Kolkata Industrial Corridor, are expected to create large-scale employment opportunities across sectors.

PM Gati Shakti National Master Plan	
Launched	October 2021 by PM Modi; named after the concept of Shakti (power) and speed
Purpose	Integrated multi-modal infrastructure development -- roads, railways, airways, waterways, ports, logistics, digital infrastructure -- through a unified GIS-based portal
Coverage	Covers 16 ministries; provides real-time data on infrastructure projects to

	eliminate delays caused by siloed planning
Key Feature	National Master Plan portal: GIS mapping of all infrastructure projects on a single platform; enables convergence of state and central projects
DFC Connect	PM Gati Shakti directly integrates DFCs with industrial corridors (DMIC, NICDC); ensures road-rail-port connectivity
Industrial Corridors	Delhi-Mumbai IC, Amritsar-Kolkata IC, Chennai-Bengaluru IC, Visakhapatnam-Chennai IC, Bengaluru-Mumbai IC -- all linked to the Gati Shakti framework
Significance	Aims to reduce India's logistics cost from ~14% of GDP to under 8% -- improving export competitiveness; directly linked to Make in India and PLI schemes



Mains Exam Topics

INDIA'S RENEWABLE SURGE

GS 3: Energy/Environment

Context

As India targets 500 GW of renewable energy capacity by 2030, energy storage has become crucial for ensuring reliable and stable power supply.

About Energy Storage

- **Meaning of Energy Storage:** Energy storage refers to technologies and systems that store surplus electricity during periods of excess generation and release it when power demand exceeds supply.
- **Enabling Reliable Renewable Energy:** Energy storage separates the timing of electricity generation from consumption, allowing renewable energy sources to function more reliably like dispatchable power.
- **Importance of Storage Systems:** Without energy storage, excess renewable power is wasted through curtailment, grid stability is affected during low-generation periods, and dependence on coal-based baseload power continues.

Types of Energy Storage Technologies

Technology	How It Works & India Status
Pumped Hydro Storage (PHS)	Pumps water from lower to upper reservoir using surplus electricity; releases water through turbines on demand. India's dominant storage technology: 94 GW installed; needs to grow to ~124 GW by 2036.
Battery Energy Storage System (BESS)	Li-ion batteries store surplus power; discharge on demand. Fast response (milliseconds). India has only ~0.27 GW installed vs 41 GW needed by 2030 -- the most critical gap.
Compressed Air Energy Storage (CAES)	Stores excess electricity as compressed air in underground caverns; released through turbines. Nascent stage in India.
Flywheels	Stores energy as rotational kinetic energy; provides rapid, short-duration grid stability. Used for frequency regulation.
Concentrating Solar (CSES)	Molten salt stores solar heat energy; turbines run on stored heat after sunset. Pilot stage in India; Rajasthan is ideal.
Gravity Storage	Uses heavy masses lifted by surplus electricity; lowered to generate power. Early commercial stage globally.

India's Storage Gap

- **Limited Battery Storage Capacity:** Despite having nearly 220 GW of installed renewable energy capacity in 2025, India's Battery Energy Storage System (BESS) capacity remains extremely low at only around 0.27 GW.
- **Rising Future Storage Requirement:** The Central Electricity Authority estimates that India will require 41 GW/160 GWh of BESS and 124 GW of pumped hydro storage by 2036 for reliable renewable integration.
- **Dependence on Chinese Imports:** India imports nearly 75-80% of its lithium-ion battery cells from China, creating strategic and economic vulnerabilities in the energy transition.
- **Emerging Duck Curve Challenge:** Grid operators increasingly face the "duck curve" problem, where excess solar generation during afternoons is followed by sharp electricity demand after sunset.

Associated challenges

- **High Cost of BESS:** Battery Energy Storage Systems remain expensive, with installation costs of nearly Rs 3-4 crore per MWh and heavy dependence on imported lithium-ion cells.
- **Chinese Dominance in Supply Chains:** China controls nearly 70% of global lithium-ion battery manufacturing and key mineral processing, while India has limited domestic refining and processing capacity.
- **Constraints in Pumped Hydro Projects:** Most suitable pumped hydro sites are located in ecologically sensitive regions such as the Himalayas and Western Ghats, leading to environmental and social concerns along with long gestation periods.
- **Weak Financial Health of DISCOMs:** State DISCOMs continue to face cumulative losses exceeding Rs 6 lakh crore, limiting their ability to invest in storage and grid modernisation.
- **Policy and Regulatory Gaps:** India lacks a mandatory storage procurement framework, resulting in fragmented BESS deployment and weak long-term investment signals.

Way Forward

- **National Battery Storage Policy:** India should mandate storage integration with large renewable energy projects and establish a predictable long-term procurement pipeline.
- **Expanding ACC Manufacturing:** The Production Linked Incentive Scheme for Advanced Chemistry Cells should be accelerated to achieve domestic battery manufacturing capacity of 50 GWh annually by 2030.
- **Diversifying Critical Mineral Sources:** India must strengthen partnerships with lithium-rich countries such as Australia, Chile, Argentina, and the Democratic Republic of the Congo while expanding the role of Khanij Bidesh India Limited.

- **Fast-Tracking Pumped Hydro Projects:** A dedicated approval mechanism should accelerate environmental clearances and promote community-linked pumped storage projects in hilly states.
- **Reforming DISCOMs:** Schemes such as Revamped Distribution Sector Scheme should be fully implemented to improve DISCOM finances and attract private investment in storage infrastructure.
- **Promoting Green Hydrogen Storage:** India should expand green hydrogen production using surplus renewable energy to complement battery storage for long-duration energy needs.

