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Current affairs summary for prelims

30 September, 2024

Chola Empire

Context: *Recent discussions in the Indian military include incorporating Chola Empire strategies and modernizing colonial practices.*

➢ **Overview:**

- Mid-career courses focus on historical strategies, unified governance, cultural integration, and regional diversity in the Army.
- The syllabus may include land campaign studies of Indian generals like the INA, Marathas, and Sikhs, along with ancient maritime strategies of rulers like Raja Raja Chola I, Rajendra Chola, Marthand Varma, and Kunjali Marakkar IV.

➢ **About the Medieval Chola Empire**

- **Time Period:** 8th to 12th century AD
- **Significance:** The Chola Dynasty is celebrated as one of the longest-ruling dynasties in southern India, marked by extensive territorial expansion, cultural flourishing, and architectural achievements.

➢ **Historical Context**

- **Rise to Power:** The Cholas came to prominence in the 9th century by defeating the Pallavas. Their rule lasted over five centuries until the 13th century.

Key Rulers:

- ✓ **Vijayalaya Chola:** Founder of the dynasty, established control over the Tanjore kingdom.
- ✓ **Aditya I:** Expanded the empire significantly, defeating the Pandya kings and asserting dominance over the region.
- ✓ **Rajaraj Chola:** Strengthened the kingdom and laid the groundwork for further expansion.
- ✓ **Rajendra Chola:** Known as the "Victor of the Ganges," he marked the dynasty's golden age through extensive military campaigns and cultural patronage.

➢ **Administration and Governance**

- The Chola Empire was structured as a sustained monarchy with a centralized authority.
- **Administrative Divisions:**
  - ✓ The kingdom was divided into mandalams (provinces), each governed by appointed officials.
  - ✓ Further divided into nadus (districts) and then tehsils.
  - ✓ Villages operated as self-governing units, promoting local governance.
- The Cholas were known for their patronage of arts, literature, and temple construction, emphasizing cultural development alongside governance.

Army

➢ **Composition:**

- The Chola army consisted of infantry, cavalry, and war elephants.
- Soldiers were often recruited from local populations, including skilled warriors from the Tamil region.

➢ **Military Organization:**

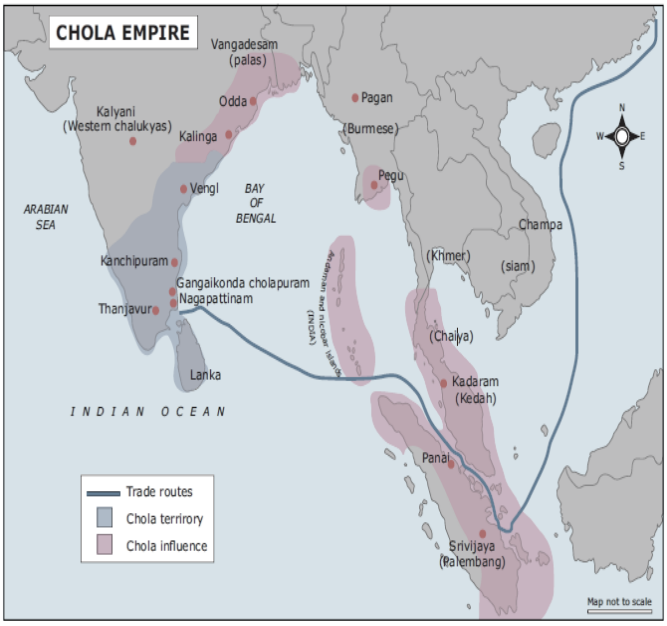
- The army was well-organized into units called "Velaikkarar" (infantry) and "Kaval" (cavalry).
- The king held supreme command, with generals appointed to lead various campaigns.

➢ **Tactics and Strategies:**

- The Cholas employed effective military strategies, including surprise attacks and coordinated assaults.
- They utilized war elephants as a psychological weapon against enemies.

➢ **Land Warfare:**

- The Chola army was instrumental in establishing dominance over rival kingdoms through a series of well-planned military campaigns.
- Key battles included the naval battle of Kandalur Salai against the Cheras, which demonstrated their superiority in both land and naval warfare.



Navy

- The Chola navy was one of the most formidable maritime forces of its time, crucial for expanding trade routes and military conquests.
- It played a significant role in establishing Chola dominance in Southeast Asia, particularly in Sri Lanka and the Maldives.

➢ **Shipbuilding:**

- The Cholas developed advanced shipbuilding techniques, constructing large ships capable of long voyages.
- Ships were equipped for both trade and warfare, enhancing their capability to project power across the Indian Ocean.

- **Maritime Expeditions:**
  - Rajendra Chola I's naval expeditions included successful raids on Southeast Asian kingdoms, such as Srivijaya (modern-day Indonesia).
  - These expeditions not only expanded territorial influence but also facilitated trade relationships with distant lands.
- **Architectural Achievements**
  - **Chola Architecture:** Exemplified the Dravida style of temple architecture, producing grand temples that became architectural landmarks.
- **Notable temples include:**
  - **Brihadeeswara Temple:** A UNESCO World Heritage Site, renowned for its scale and intricate carvings.
  - Gangaikonda Cholapuram Temple: Showcasing the heights of Chola architectural achievement.

Small Modular Reactors

Context: *India's recent move into Small Modular Reactors attracts private interest for deployment at captive sites.*

- **Overview:**
  - India's recent push for Small Modular Reactors attracts private interest for captive power projects amid global competition.
  - As Russia and China face challenges, they seek nuclear cooperation with India on Small Modular Reactors.

Small Modular Reactors (SMRs) or Bharat Small Reactors (BSRs) are nuclear reactors with a power output of up to 300 MW, designed for flexibility, safety, and reduced construction time compared to traditional reactors.

SMRs are pivotal for India's clean energy transition and achieving net-zero emissions by 2070.

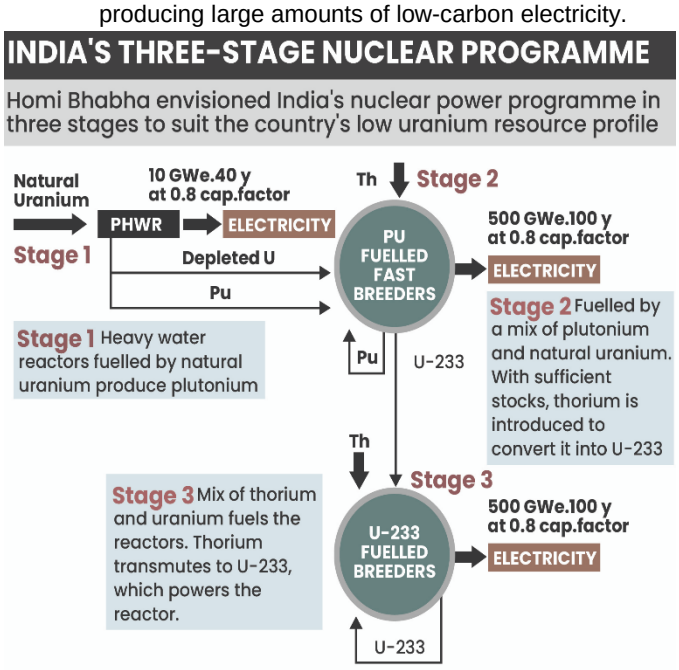
- **Key Characteristics of SMRs:**
  - **Small:** Up to 300 MW(e), are smaller than conventional reactors, enabling flexible placement.
  - **Modular:** Factory-assembled components for faster construction and cost savings; allows phased deployment.
  - **Reactor:** Utilizes nuclear fission for energy generation.
- **Safety Features**
  - **Passive Safety Systems:** Utilize natural processes (gravity, convection) to maintain safe operation without human intervention, enhancing overall safety.
  - **Enhanced Safety Margins:** Lower operating pressures and temperatures reduce the risk of accidents.
- **Coolant Varieties**
  - **Diverse Coolants:** While many SMRs use light water, others may employ liquid metals or molten salts, allowing for design flexibility based on application needs.
- **Fuel Efficiency**
  - **Longer Refueling Intervals:** SMRs may operate for 3 to 7 years without refueling, some up to 30 years, improving operational efficiency.
- **Versatile Applications**
  - **Beyond Electricity:** SMRs can also provide process heat for industries and support water desalination, making them suitable for diverse energy needs.
- **Advantages of SMRs**
  - **Flexible Deployment:** SMRs can be installed in areas lacking infrastructure and can operate off-grid.
  - **Simpler Designs:** Many SMR designs emphasize passive safety features, which reduce the need for human intervention in emergencies.
  - **Reduced Fuel Needs:** Some SMRs can operate for 3 to 7 years without refueling, and certain designs can last up to 30 years without refueling.
  - **Cost-Effective:** The smaller scale reduces upfront capital costs and financial risks, making them easier to finance and implement.
- **Global Status of SMRs**
  - Countries like Russia, Argentina, Canada, China, South Korea, and the U.S. are actively developing SMRs, with over 80 commercial designs in progress.
  - Russia's Akademik Lomonosov, a floating nuclear power plant, is a notable example.
- **Role in Sustainable Development**
  - SMRs offer a reliable energy source that complements renewables, improving energy access in rural areas.
  - Their deployment can significantly aid global clean energy transitions and support SDG 7 for universal energy access.
- **IAEA's Involvement**

The International Atomic Energy Agency (IAEA) supports SMR development through forums, safety assessments, and coordinated research projects, promoting sustainable nuclear energy worldwide.

The Government of India has several initiatives to promote Small Modular Reactors (SMRs), including:

- **Partnering with the private sector:** The government plans to partner with the private sector to set up Bharat Small Reactors (BSRs) and conduct research and development on SMRs.
- **Redesigning Pressurized Heavy Water Reactors (PHWRs):** The Department of Atomic Energy and Tata Consulting Engineers are redesigning PHWRs to develop the Bharat Small Modular Reactor.
- **Deploying SMRs:** India plans to deploy 40-50 SMRs, mostly to replace captive thermal power plants.

- **Making nuclear power more accessible:** The government aims to make nuclear power more accessible and versatile through the use of SMRs.
- **Moving away from fossil fuels:** SMRs can help India move away from fossil fuel consumption by producing large amounts of low-carbon electricity.



Induced Pluripotent Stem Cells (iPSCs)

Context: *Recently, the first successful treatment using chemically induced pluripotent stem cells was conducted.*

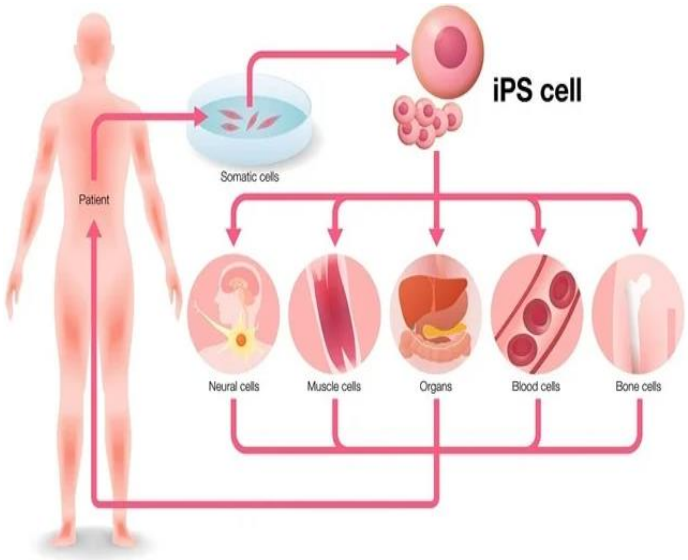
➢ **Overview:**

- Recently, a woman with type 1 diabetes began producing insulin after a transplant of her own reprogrammed induced pluripotent stem cells, the first person treated with cells extracted from her body.

Induced pluripotent stem cells (iPSCs) are adult cells that have been genetically reprogrammed to an embryonic stem cell-like state. This is achieved by forcing them to express specific genes and factors crucial for maintaining the properties of embryonic stem cells.

➢ **Applications:**

- **Drug Development:** iPSCs serve as valuable tools for testing new drugs.
- **Disease Modeling:** They help scientists understand disease mechanisms.
- **Transplantation Medicine:** Researchers hope to use iPSCs for regenerative therapies.



➢ **Stem Cells**

- Stem cells are unique cells capable of developing into various cell types in the body. They play a crucial role in growth and repair.

➢ **Key Characteristics:**

- **Self-Renewal:** They can divide indefinitely to replenish other cells.
- **Differentiation Potential:** They can be induced to become specialized cells, such as muscle or brain cells.

➢ **Role in Tissues:**

- In some organs (e.g., gut, bone marrow), stem cells regularly divide to repair and replace damaged tissues.
- In others (e.g., pancreas, heart), they divide only under specific conditions.

Aspect	Embryonic Stem Cells	Adult Stem Cells
Pluripotency	Pluripotent; can become any cell type in the body.	More limited; usually differentiate into cell types specific to their tissue of origin.
Cultivation	Easier to grow in culture; can proliferate indefinitely under optimal conditions.	Rare in mature tissues; isolation and expansion are challenging due to their limited availability.

NEWS IN BETWEEN THE LINES

World Food Programme

Recently, the World Food Programme (WFP) has launched an emergency operation to provide food assistance for up to one million people affected by the recent escalation between Israel and Hezbollah in Lebanon.

About the World Food Programme:

- The World Food Programme (WFP) is a United Nations agency that works to fight hunger and promote food security around the world.
- The World Food Programme has been operating in India since 1963 with the mission to ensure access to enough nutritious food for everyone.
- It provides food assistance in emergencies, works with communities to improve nutrition, and helps build resilience.
- It also provides technical and development assistance, cash assistance and medical supplies.
- It was awarded the Nobel Peace Prize in 2020 for its work to provide food assistance in conflict areas and to prevent the use of food as a weapon of war.
- It produces the Global Report on Food Crises, which analyzes the scale of acute hunger in the world and the drivers that contribute to food crises.
- Its headquarter is located in Rome, Italy.

Crew-9 Mission

Recently, NASA and SpaceX launched the Crew-9 mission to the International Space Station (ISS)

About Crew-9 Mission:

- The Crew-9 mission is a joint NASA-SpaceX spaceflight mission.
- This mission aims to bring astronauts to the International Space Station (ISS) for a five-month science mission and return Indian-origin astronaut Sunita Williams and NASA astronaut Barry Wilmore in 2025.
- The mission was launched from Cape Canaveral Space Force Station in Florida. It is significant for being the first human spaceflight from Space Launch Complex-40.
- The mission includes Nick Hague (NASA) and Aleksandr Gorbunov (Roscosmos), with two empty seats for Sunita Williams and Barry Wilmore for their return in February 2025.
- The crew travelled aboard the SpaceX Dragon spacecraft, which successfully reached orbit and is on its way to the ISS.
- Williams and Wilmore's return was initially planned aboard Boeing's Starliner shuttle, but due to a technical malfunction, their return was delayed until 2025.

Pollen

Recently, a study suggested that giant woolly mammoths may have gone extinct due to pollen allergies.

About Pollen:

- Pollen is a vital reproductive substance used by many plants for reproduction, delivering male gametes to the stigma of seed-producing plants.
- It is considered a gametophyte, a multicellular organism involved in the fertilization process.
- Each pollen grain consists of reproductive cells (which form sperm) and non-reproductive cells (which produce the pollen tube).
- Pollen grains appear as a powder when aggregated and are protected by a natural polymer called sporopollenin, which shields them during transport and environmental conditions.
- Pollen from anemophilous plants (e.g., birch, hickory) can cause allergic reactions, with grass pollen leading to hay fever.
- The study of pollen is known as palynology.

Place in News

Recently, the Indian Cultural Association, in collaboration with Swami Vivekananda Cultural Centre, continued Onam celebrations in Colombo, Sri Lanka.

Sri Lanka:

- **Geographical Location:** Sri Lanka is an island country located in the Indian Ocean, south of India, separated by the Palk Strait and Gulf of Mannar.
- **Capital:** The official capital is Sri Jayawardenepura Kotte, while Colombo is the commercial

Sri Lanka

capital and largest city.

- **Boundaries:** It is surrounded by the Bay of Bengal (Northeast), the Lakshadweep Sea (West) and the Indian Ocean (South) and shares maritime borders with Maldives (Southwest) and India (Northwest).

Physical Features:

- The highest point of Sri Lanka is Pidurutalagala, also known as Mount Pedro.
- The major rivers of Sri Lanka include the Mahaweli River (longest river), Kelani River, Kalu River and Walawe River.
- The Adam's Bridge (Rama's Bridge) connects the Palk Strait with India.
- The island experiences tropical monsoon climates.
- Mannar Island and Kachchatheevu Island, located near India are important islands in Sri Lanka.
- Sri Lanka is rich in minerals such as graphite, ilmenite, zircon, rutile, quartz, mica and precious gemstones like sapphires and rubies.

Membership: Sri Lanka is a member of several international organizations, including United Nations (UN), Commonwealth of Nations, South Asian Association for Regional Cooperation (SAARC), Non-Aligned Movement (NAM), World Trade Organization (WTO), Asian Development Bank (ADB) and International Monetary Fund (IMF).

POINTS TO PONDER

- When is World Heart Day celebrated? **– 29 September**
- What is the name of the joint military exercise between India and Uzbekistan? **– Dustlik**
- When was the Ayushman Bharat Digital Mission launched? **– 2021**
- Who was the president of the 79th UNGA session? **– H.E. Mr. Philemon Yang**
- Where did the 20th Central Committee of the Communist Party of China hold its third plenary session? **– Beijing**