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Current affairs summary for prelims

29 February, 2024

Karnataka Hindu Religious Institutions and Charitable Endowments (Amendment) Bill

Context: *The Karnataka Hindu Religious Institutions and Charitable Endowments (Amendment) Bill was approved by the Assembly but faced defeat in the Legislative Council.*

➢ Proposed Changes in Temple Taxation:

- The amendment proposed diverting 10% of the gross income of temples with an annual income exceeding Rs 1 crore to a common pool for temple maintenance. Previously, 10% of the net income of temples earning over Rs 10 lakh annually was directed to this pool.
- Gross income refers to the total earnings of the temple, while net income is calculated after deducting expenses.
- Additionally, 5% of the income of temples earning between Rs 10 lakh and Rs 1 crore would be allocated to the common pool, changing the previous income bracket from Rs 5 lakh to Rs 10 lakh.

➢ Purpose of the Common Fund:

- The common fund pool was established in 2011 by the BJP government to support religious studies, temple maintenance, and charitable causes.
- The proposed amendments aimed to generate an extra Rs 60 crore, benefiting temples with high incomes.

➢ Other Proposed Changes:

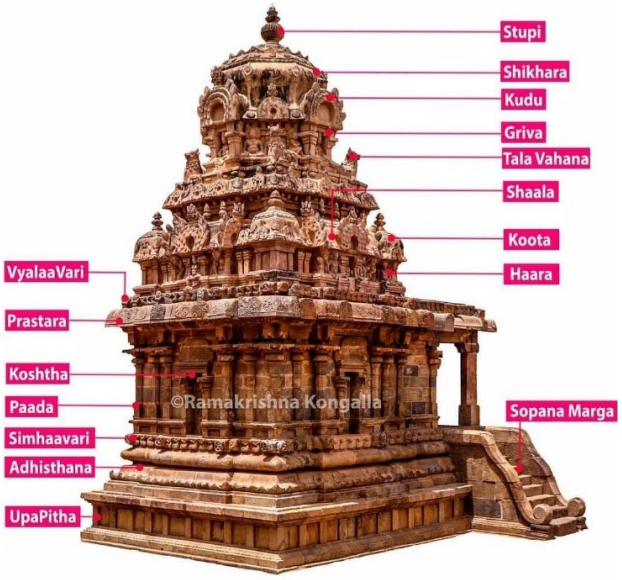
- The Bill proposed to include a member skilled in Vishwakarma Hindu temple architecture and sculpture in the temple management committee.
- It empowered the Rajya Dharmika Parishat to appoint the chairman of these committees.
- The state government would be required to establish district-level and state high-level committees to oversee infrastructural projects facilitating temple pilgrimage for temples with an annual income exceeding Rs 25 lakh.

➢ Comparison with Other States:

- Telangana employs a similar model where temples contribute a percentage of their annual income to a Common Good Fund, used for temple maintenance and establishment of new temples.
- Kerala, on the other hand, manages temples through state-run Devaswom Boards, each with its budget and laws governing temple administration.

➢ Dravidian Temples:

- Dravidian temples are enclosed within a compound wall, with the front wall featuring a central entrance gateway called a Gopuram.
- The main temple tower, known as vimana, in Tamil Nadu has a stepped pyramid shape, unlike the curving shikhara seen in North Indian temples.
- In South Indian temples, the term 'shikhara' refers to the crowning element at the top, resembling a small stupika or octagonal cupola, equivalent to the amalak and kalasha in North Indian temples.
- Fierce Dvarapalas guard the entrance to the garbhagriha or sanctum sanctorum.
- Temple complexes often include a large water reservoir or temple tank.
- Some of the most sacred South Indian temples have smaller towers over the main garbhagriha, as it is usually the oldest part of the temple.
- Subsidiary shrines can be incorporated within the main temple tower or located as separate small shrines beside the main temple.
- The Kailashnath temple at Ellora is a renowned example of a Dravidian-style temple.
- Dravidian temples are classified based on their shape, which can be square (kuta), rectangular (shala), elliptical (Gaja-Prishta), circular (vritta), or octagonal (ashtasra).



Chromophores and Quantum Computing

Context: *Researchers are exploring alternative, simplified technologies to reduce costs by utilizing various physical systems, including 'colour molecules,' as qubits for a room-temperature quantum computer.*

➢ Chromophores and Excited States:

- The system studied by the Japanese team comprises zirconium as the metal component, linked by an organic molecule containing the chromophore pentacene.
- Chromophores are organic molecules that absorb specific colours of light, influencing the perceived colour of objects.
- In its ground state, a chromophore molecule features a singlet configuration with electrons possessing opposite spin directions.
- Light absorption prompts a chromophore molecule to enter a singlet excited state, where one electron transitions to a higher energy level while maintaining opposite spins.

➢ Singlet Fission and Energy Transfer:

- Singlet fission occurs when a singlet excited state chromophore transfers energy to a neighboring chromophore, inducing it to transition to a triplet excited state.

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- This process involves the release of excess energy, initiating the transition of a chromophore from a singlet excited state to a triplet excited state.
- Molecular frameworks (MOF networks) enable chromophores to rotate slightly, modulating the interaction strength between adjacent chromophores.

➢ **Stability of Triplet States:**

- Interactions between chromophores facilitate singlet fission while maintaining coherence in the resulting triplet states.
- Even at room temperature, the coherence of the superposition of triplet states persists for a fraction of a microsecond, which is a notable achievement compared to other qubit systems requiring extremely low temperatures.

➢ **Implications and Future Directions:**

- Room-temperature qubits represent a significant advancement, potentially reducing costs and complexity associated with quantum computing.
- Further research is needed to demonstrate quantum gate operations, assemble multiple qubits, and achieve controllability in these systems, inviting exploration by numerous research groups.

➢ **Chromophores**

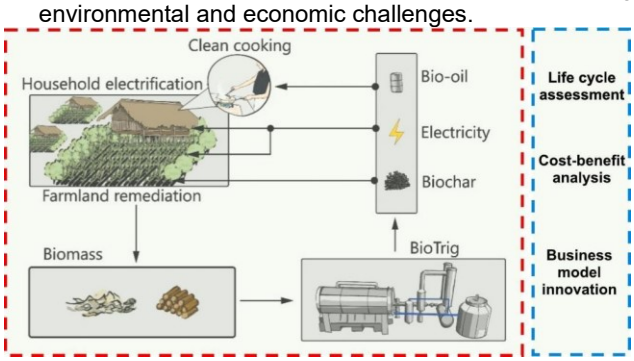
- A chromophore, derived from the Greek words "chroma" meaning colour and "phoros" meaning carrier of, is a molecule that absorbs light at a specific wavelength, resulting in the emission of colour.
- Chromophores are commonly referred to as coloured molecules due to their ability to absorb and emit light.
- Examples of chromophores in nature include chlorophyll, which imparts green colour to leaves, and porphyrin moieties in red blood cells, responsible for the red colour of blood.
- **Energy Absorption and Excitation:**
  - Chromophores absorb light by exciting an electron from its ground state to an excited state, causing a conformational change in the molecule.
  - In biological systems, chromophores play a crucial role in capturing or detecting light energy, triggering various physiological responses.
- **Metal Complex Chromophores:**
  - Some chromophores contain metal atoms in coordination complexes with ligands, such as chlorophyll and haemoglobin.
  - The metal-macrocycle complex absorbs visible light due to its highly conjugated pi-bonding system, with the central metal influencing its absorption spectrum.
- **Auxochrome and Halochromism:**
  - Auxochrome groups attached to chromophores modify their light-absorbing properties, altering the wavelength or intensity of absorption.
  - Halochromism occurs when substances change colour based on changes in pH, with the molecular structure of pH indicators affecting chromophores, leading to colour changes.

BioTRIG

Context: *Researchers propose "BioTRIG," a community-level pyrolysis system utilizing villagers' waste, to benefit BPL rural communities.*

➢ **Introduction:**

- The "BioTRIG" project proposes a novel pyrolysis system aimed at utilizing rural waste in India, particularly targeting communities living below the poverty line.
- Its objective is to provide multiple benefits to these underserved communities while addressing environmental and economic challenges.



➢ **Pyrolysis Process:**

- Pyrolysis is a chemical recycling method that transforms organic materials into useful chemicals.
- The process involves sealing waste in an oxygen-free chamber and heating it above 400 degrees Celsius.
- Three main products are generated: bio-oil, syngas, and biochar fertilizer, which have various applications.

➢ **Research Insights:**

- A comprehensive survey was conducted across 1,200 rural households in Odisha to gain insights into their needs and preferences.
- Findings revealed that over 80% of respondents were interested in transitioning to cleaner cooking alternatives.
- Nearly all participants expressed a strong desire for reliable grid electricity, while about 90% were willing to sell agricultural waste to support bioenergy initiatives.

➢ **Benefits of BioTRIG:**

- Bio-oil and syngas produced by the pyrolysis system can power the process itself and provide electricity to local households.
- Biochar, another byproduct, enhances soil fertility and aids in carbon sequestration.
- The adoption of BioTRIG could significantly reduce indoor air pollution and greenhouse gas emissions in rural areas.

➢ **Potential Impact:**

- Computer simulations indicate that widespread implementation of BioTRIG could lead to a substantial reduction in greenhouse gas emissions per capita.
- It aligns with the United Nations' sustainable development goals, particularly in addressing challenges faced by rural communities in India.

➢ **Business Models:**

- Two innovative business models have been proposed to facilitate the adoption of BioTRIG.

- One involves private sector partnerships to fund the setup and operation of pyrolysis units, creating job opportunities and delivering social benefits.
- Alternatively, communities could participate by providing waste feedstocks in exchange for free bio-products, such as biochar and discounted bio-oil

News in Between the Lines

The Hydrogen Fuel Cell Ferry Boat

Recently, the Prime Minister of India inaugurated India's first indigenously built hydrogen fuel cell ferry boat in virtual mode from Thoothukudi, Tamil Nadu.

About the Hydrogen Fuel Cell Ferry Boat:

- The hydrogen fuel cell ferry boat is the **first of its kind in India**.
- The vessel was constructed entirely in India **at the Cochin Shipyard,** highlighting the country's **indigenous** shipbuilding capabilities.
- It features **cutting-edge hydrogen fuel cell technology**, emphasizing India's commitment to clean energy alternatives and reducing carbon emissions.
- The **pilot vessel is a 24-meter catamaran** with a capacity to carry **50 passengers**, equipped with fully air-conditioned spaces for passenger comfort.
- The boat **aims to improve urban mobility** by offering smooth and easy transportation options, addressing the growing need for sustainable urban transport solutions.

The launch of the hydrogen fuel cell ferry boat aligns with India's national goals, including its commitment to **clean energy solutions** and the pursuit of a **net-zero emissions** future.

Leap Year

Today is February 29, making the year 2024 a leap year.

About the Leap Year:

- A leap year is a calendar year that **contains an additional day**, February 29, to adjust the calendar's discrepancy with the **Earth's orbit around the Sun**.
- Leap years **occur every four years** to account for the extra time it takes for the Earth to complete its orbit, approximately **365 days, 5 hours, 48 minutes and 46 seconds**.
- The concept of a leap year was **introduced by scholars engaged by Julius Caesar** in 46 BC, with further refinement added from 12 AD.
- In the 16th century, **Pope Gregory XIII introduced the Gregorian calendar**, which adjusted the leap year system by skipping **10 days in 1582** to align the calendar with astronomical observations more accurately.
- While leap years typically occur every four years, exceptions are made for years ending in 00, which are not leap years unless they are divisible by 400.
- The purpose of leap years is to ensure that the **calendar remains synchronized with the Earth's orbit,** preventing seasonal drift and maintaining consistency in timekeeping.

Cannabis Plant

Recently, there has been growing interest among psychiatrists in the therapeutic potential of cannabis due to its perceived effects on mood and cognition, leading to significant research in its potential therapeutic applications.

About Cannabis Plant:

- The cannabis plant, scientifically known as **Cannabis sativa**, **belongs to the Cannabaceae family** and is characterized by its distinct properties and compounds.
- Researchers have initiated clinical trials to explore the use of cannabis-based compounds, such as cannabidiol (CBD), in managing various psychiatric conditions like **schizophrenia**, **bipolar depression** and **cannabis-use disorders**.
- The major psychotomimetic agent in Cannabis sativa is **delta-9-tetrahydrocannabinol** (THC), while **cannabidiol** (CBD) is gaining interest for its potential **antipsychotic**, **anti-inflammatory** and **neuroprotective** properties.
- The human cannabinoid system comprises cannabinoid **receptors CB1 and CB2**, with naturally occurring substances like anandamide stimulating these receptors.
- The endocannabinoid system (ECS) modulates various bodily functions including **pain**, **memory**, **sleep** and **appetite**.
- Cannabis and its derivatives, including THC and synthetic cannabinoids, have medical applications in stimulating **appetite**, **managing nausea associated** with **chemotherapy** and treating acute and chronic pain syndromes.

Jacaranda Tree

Recently, Mexico witnessed an early bloom of jacaranda trees, sparking a heated climate debate as scientists link the phenomenon to climate change.

About Jacaranda Tree:

- The Jacaranda tree belongs to the **genus Jacaranda**, with various species found in tropical and subtropical regions worldwide.
- It is known for its stunning **purple-blue flowers**, which bloom in clusters during the spring season.
- Native to South America, particularly **Argentina and Brazil,** the Jacaranda tree has been introduced to various parts of the world, including **Mexico**.
- It **attracts pollinators such as bees, butterflies and birds** with its abundant flowers, contributing to local ecosystems' biodiversity.

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Personality in News

Morarji Desai

Morarji Desai (29 February 1896-10 April 1995)

Morarji Desai, freedom fighter and former Indian Prime Minister was born at Bhadeli village in Gujarat.

Contributions:

- He joined the Congress during the Civil Disobedience **Movement led by Mahatma Gandhi in 1930**.
- He imprisoned multiple times during the freedom struggle, **participated in individual Satyagraha** and supported the Quit India Movement in 1942.
- He was arrested during the Emergency in 1975 and **supported the Nav Nirman Andolan in Gujarat.**
- He **served as the 4th Prime Minister** of India.

Awards and Honours:

Morarji Desai was honoured with **Nishaan-e-Pakistan** in Pakistan in 1990 and **Bharat Ratna** in 1991.

Ethical Values: Integrity, Social Justice, Truthfulness, Non-violence, etc.

Place in News

Albania

Recently, Ukrainian President Zelensky attended a summit in Albania, where he sought arms and support from Balkan nations amidst escalating tensions with Russia.

Albania (Capital: Tirana)

Location: Albania, officially known as the Republic of Albania is a country located in **Southeastern Europe on the Balkan Peninsula.**

Boundaries: Albania shares its border with **North Macedonia** (East), **Kosovo** (Northeast), **Montenegro** (Northwest), **Greece** (South & Southeast), the **Adriatic Sea** (West) and the **Ionian Sea** (Southwest).

Physical Features:

- **Mount Korab,** located on the border with North Macedonia, is the highest peak in Albania.
- The major rivers in Albania include the **Drin**, **Mat** and **Vjose** rivers, which flow through various regions of the country.
- Albania is home to several lakes, including **Lake Shkodra** (shared with Montenegro), **Lake Ohrid** (shared with North Macedonia), and **Lake Prespa** (shared with North Macedonia and Greece).
- Albania possesses significant mineral resources, including **chromium**, **copper**, iron, **nickel** and **petroleum**, contributing to its economy and industrial sector.

POINTS TO PONDER

- Who has been recently appointed as the chairperson of Lokpal? **- Former Supreme Court judge Justice Ajay Manikrao Khanwilkar**
- Which organization recently commenced its largest military exercise in Europe, named Steadfast Defender 2024? **- North Atlantic Treaty Organization (NATO)**
- Which ministry launched the SWAYAM Plus Platform, an extension of the SWAYAM Massive Open Online Course platform? **- Ministry of Education (MoE)**
- Under which scheme did the Prime Minister lay the foundation stone for the redevelopment of 554 railway stations recently? **- AMBS (Amrit Bharat Station Scheme)**
- Which European country is set to join the North Atlantic Treaty Organization (NATO)? **- Sweden**

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