



Cauvery Water Sharing Dispute

For Prelims: [Cauvery and its tributary Arkavathi](#), Cauvery Water Disputes Tribunal, [Central Water Commission \(CWC\)](#)

For Mains: Interstate water disputes, Diplomacy in resolving interstate water disputes, Water governance

[Source: TH](#)

Why in News?

The [Cauvery water dispute](#) has once again taken center stage, as Tamil Nadu appeals to the [Supreme Court of India](#) for intervention in **ensuring the release of 24,000 cubic feet per second (cusecs) from its reservoir's water by Karnataka.**

- Tamil Nadu also urged the Court to direct **Karnataka to ensure the release of 36.76 TMC (thousand million cubic feet) stipulated for September 2023** as per the **Cauvery Water Disputes Tribunal (CWDT)'s final award of February 2007** that was modified by the SC in 2018.

What Led to Tamil Nadu's Appeal to the Supreme Court?

- **Tamil Nadu's Appeal to SC:**
 - The issue arose from Karnataka's refusal to abide by previously agreed-upon water release quantities.
 - Tamil Nadu advocates for the release of **10,000 cusecs of water for the stipulated 15-day duration.** On the other hand, Karnataka has suggested a reduced **water release of 8,000 cusecs for the same 15-day timeframe.**
- **Karnataka's Explanation:**
 - Karnataka cites **poor inflow due to reduced rainfall in Cauvery catchment, including origin point Kodagu.**
 - Karnataka highlights a **44% rainfall deficit in Kodagu from June to August.**
 - Karnataka rejects Tamil Nadu's distress-sharing formula demand.
- **Implications:**
 - Tamil Nadu's farmers await Karnataka's response, as the Mettur reservoir **holds only 20 TMC, lasting ten days.**
 - The Supreme Court's decision holds significance in resolving the complex dispute.
 - Collaborative solutions are crucial for equitable water management and conflict resolution.

How is the Cauvery Water Being Shared?

- A carefully crafted monthly schedule governs the distribution of water between Karnataka and Tamil Nadu, the two riparian states of the Cauvery basin.
 - In a **"normal" water year**, Karnataka is bound to **release 177.25 TMC (thousand million cubic feet) of water from June to May to Tamil Nadu.**
 - This annual **quota includes 123.14 TMC** allocated during the monsoon months from June

to September.

- The ongoing southwest monsoon season often triggers disputes when rainfall falls short of expectations.

What is the Cauvery River Dispute?

▪ River Cauvery (Kaveri):

- It is known as '**Ponni**' in Tamil and is a sacred **river of southern India**.
- It **rises on Brahmagiri Hill** of the **Western Ghats** in southwestern Karnataka state, flows in a southeasterly direction through the states of **Karnataka and Tamil Nadu**, and descends the **Eastern Ghats** in a series of great falls and **drains into Bay of Bengal** through **Pondicherry**.
- **Left Bank Tributary:** Arkavathi, Hemavathi, Shimsa, and Harangi.
- **Right Bank Tributary:** Lakshmantirtha, Suvarnavati, Noyil, Bhavani, Kabini, and Amaravathi.



▪ The Dispute:

- As the river originates in Karnataka, flows through Tamil Nadu with major tributaries coming from Kerala and drains into the Bay of Bengal through Pondicherry the **dispute therefore involves 3 states and one Union Territory**.
- The genesis of the dispute is **150 years old and dates back to the two agreements of arbitration in 1892 and 1924** between the then **Madras presidency and Mysore**.
- It **entailed the principle that the upper riparian state** must obtain consent of lower riparian state for any construction activity viz. reservoir on the river Cauvery.
- The Cauvery water dispute between Karnataka and Tamil Nadu began in 1974 when Karnataka started diverting water without Tamil Nadu's consent.
 - After several years, the **Cauvery Water Disputes Tribunal (CWDT)** was established in 1990 to resolve the issue. It took 17 years for the CWDT to reach a final order in 2007, which outlined the sharing of Cauvery water among the four riparian states. In distress years, water would be shared on a **pro-rata basis**.
 - CWDT issued its final award in February 2007, specifying **water allocations among the four states in the Cauvery basin**, considering the total availability of 740 TMC in a normal year.
 - The allocation of water among the four states is as follows: **Tamil Nadu - 404.25 TMC, Karnataka - 284.75 TMC, Kerala - 30 TMC, and Puducherry - 7 TMC**.
- In 2018, the Supreme Court declared the Cauvery a national asset and largely upheld the water-sharing arrangements determined by the CWDT.
 - It also directed the Centre to notify the **Cauvery Management Scheme**.
 - The central government notified the 'Cauvery Water Management Scheme' in June 2018, constituting the '**Cauvery Water Management Authority**' and the '**Cauvery Water Regulation Committee**'.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Which of the following Protected Areas are located in Cauvery basin? (2020)

1. Nagarhole National Park
2. Papikonda National Park
3. Sathyamangalam Tiger Reserve
4. Wayanad Wildlife Sanctuary

Select the correct answer using the code given below:

- (a) 1 and 2 only
(b) 3 and 4 only
(c) 1, 3 and 4 only
(d) 1, 2, 3 and 4

Ans: (c)

Mains

Q. Constitutional mechanisms to resolve the inter-state water disputes have failed to address and solve the problems. Is the failure due to structural or process inadequacy or both? Discuss. (2013)

Indian Pharmacopoeia Recognition in Suriname

For Prelims: Indian Pharmacopoeia Recognition in Suriname, [Indian Pharmacopoeia Commission \(IPC\)](#), Indian Pharmacopoeia, [Intellectual Property Rights](#), Atmanirbhar Bharat.

For Mains: Indian Pharmacopoeia Recognition in Suriname.

Source: [PIB](#)

Why in News?

Recently, a Memorandum of Understanding (MoU) has been signed between the [Indian Pharmacopoeia Commission \(IPC\)](#) and the Ministry of Health of Suriname, aiming to recognize the **Indian Pharmacopoeia (IP)** as a standard for medicines in Suriname.

- The signed MoU exemplifies the **mutual commitment of India and Suriname** to collaborate closely in the **realm of medicine regulation**.
- This collaboration is rooted in the recognition of the importance of adhering to respective laws and regulations **while ensuring the quality of medicines in both countries**.

What is the Indian Pharmacopoeia Commission (IPC)?

- IPC is an **Autonomous Institution** of the Ministry of Health and Family Welfare.
- IPC is created to **set standards of drugs in India**. Its basic function is to regularly **update the standards of drugs** commonly required for treatment of diseases prevailing in this region.
- It publishes **official documents for improving Quality of Medicines** by way of adding new and updating existing monographs in the form of **Indian Pharmacopoeia (IP)**.
- It further **promotes rational use of generic medicines** by publishing **National Formulary of India**.
- IP prescribes standards for identity, purity and strength of drugs essentially required from the health care perspective of human beings and animals.
- IPC also provides **IP Reference Substances (IPRS)** which act as a fingerprint for identification of an article under test and its purity as prescribed in IP.

What are the Key Highlights of the MoU?

- **Acceptance of Indian Pharmacopoeia (IP):**
 - The MoU solidifies the **acceptance of the IP as a comprehensive** book of standards for medicines in Suriname.
- **Streamlined Quality Control:**
 - The requirement for duplicate testing of medicines **within Suriname is eliminated through the acceptance of the Certificate** of Analysis issued by **Indian Manufacturers** adhering to the IP standards.
 - This streamlining **reduces redundancy, saving time and resources**.
- **Cost-effective Standards:**
 - The MoU facilitates access to **IP Reference Substances (IPRS)** and Impurity standards from the IPC at reasonable costs.
 - This provision benefits **Suriname by enhancing its quality control** analysis procedures.

What is the Significance of the MoU?

- **Affordable Medicines:**
 - The recognition of IP opens **doors for the development of generic medicines in Suriname**. This translates to increased availability of cost-effective medicines for the citizens of Suriname, aligning with the goal of enhancing public health.
- **Economic Advantages:**
 - For India, the recognition of the Indian Pharmacopoeia in Suriname is a step towards an **'Atmanirbhar Bharat' (self-reliant India)**. This recognition facilitates the export of Indian medical products, generating foreign exchange earnings and reinforcing India's pharmaceutical industry on the global stage.
- **Boosting Indian Pharmaceutical Exports:**
 - The recognition of IP by Suriname removes the need for duplicative testing and checks, giving Indian drug exporters a competitive edge. The reduction in regulatory hurdles leads to more remunerative trade for the Indian pharmaceutical sector.
- **Wider International Recognition:**
 - The Indian Pharmacopoeia's official recognition has already extended to **Afghanistan, Ghana, Nepal, Mauritius, and now, Suriname**. This expansion reflects India's efforts to enhance its influence and cooperation in the global pharmaceutical landscape.

What are the Key Facts about Suriname?

- **About:**
 - Suriname is located on the **northeastern coast of South America**. It is bordered by the **Atlantic Ocean to the north, French Guiana to the east**, Brazil to the south, and Guyana to the west.
 - The capital city of **Suriname is Paramaribo**, which is situated on the banks of the Suriname River.
 - Suriname is a democratic republic with **a president as the head of state and**

government. The country has a multi-party political system.



▪ **Official Language:**

- The official language is Dutch, reflecting the **country's colonial history**. However, several other languages are spoken, including Sranan Tongo (**Surinamese Creole**), **Hindustani, Javanese, and English**.
 - Formerly a Dutch colony known as Dutch Guiana, Suriname gained independence from the Netherlands on November 25, 1975.

▪ **Economy:**

- The economy of Suriname is diverse, **with key sectors including mining** (gold, bauxite, oil), agriculture (rice, bananas, timber), and services.
- Suriname is rich in **natural resources, particularly gold, bauxite**, and recently discovered oil reserves.

Conclusion

- The MoU signed underscores the advancement of **pharmaceutical cooperation, quality control**, and trade between India and Suriname.
- This strategic collaboration not only benefits both countries' pharmaceutical sectors but also aligns **with India's aspiration for self-reliance and leadership** in the international pharmaceutical market.

NMC Registered Medical Practitioner (Professional Conduct) Regulations 2023

For Prelims: [National Medical Commission](#), **Generic Drugs**

For Mains: National Medical Commission (NMC) in transforming medical education and healthcare in India, Ethical and legal considerations surrounding the prescription of generic drugs.

Source: [IE](#)

Why in News?

Recently, the [National Medical Commission \(NMC\)](#), the apex regulatory body for **medical education and practice in India**, issued new guidelines on professional conduct for doctors, which mandate them to **prescribe only generic drugs instead of specific brands**.

- This has sparked a protest from the [Indian Medical Association \(IMA\)](#), the largest body of doctors in the country, which has called the guidelines “**unscientific**” and “**impractical**”.

What are the National Medical Commission (NMC) Guidelines?

- **Social Media Usage Guidelines:**
 - Doctors can provide **information online, ensuring it is verifiable and not misleading**.
 - Prohibition on discussing patient treatment specifics or sharing patient scans.
 - **Restriction on sharing patient testimonials, images, and videos.**
 - Prohibition on soliciting patients directly or indirectly through social media.
- **Right to Refuse Treatment:**
 - Doctors may refuse treatment to **abusive, unruly, or violent patients and relatives**.
 - Doctors may **deny treatment if the patient cannot afford it but not in medical emergencies**.
 - Prohibition on discrimination based on **gender, race, religion, caste, socio-economic factors**.
- **Prescription and Medication Guidelines:**
 - Prescriptions to be **written in legible, capital letters**.
 - **Generic medicines should be prescribed, except for specific cases**.
 - Judicious use of fixed-dose combinations, prescribing approved combinations only.
 - Encouraging **education about the equivalence of generics and branded medicines**.
- **Continuous Professional Development (CPD):**
 - Mandatory for **doctors to continue learning throughout their active years**.
 - **Doctors should undertake 30 credit points in their relevant fields every five years**.
 - Annual CPD sessions are recommended, with a maximum of 50% online training.
 - **Recognized degrees and courses added to the national medical register**.
- **Conference Participation Guidelines:**
 - CPD sessions or conferences cannot be sponsored by the **pharmaceutical industry**.
 - Doctors should not participate in **third-party educational activities with pharma sponsorships**.
 - Doctors or their families **should not receive gifts, hospitality, cash, or grants from pharmaceutical companies**.
 - Prohibition on accepting commissions from diagnostic centers, medical equipment, etc., for referrals or endorsements.

What is the National Medical Commission?

- **About:**
 - The NMC, is a **statutory body** established in 2019, replaced the **Medical Council of India (MCI)** and functions under the **National Medical Commission Act, 2019**. It serves as **India's regulatory body for medical education**.
- **Mission and Vision:**
 - Ensure availability of adequate and high quality medical professionals in all parts of the country.
 - Promote **equitable and universal healthcare that encourages community health perspective** and makes services of medical professionals accessible to all the citizens.
 - Encourages **medical professionals to adopt the latest medical research** in their work and to contribute to research.
 - Enforce high ethical standards in all aspects of medical services.
 - It also has the authority to **regulate fees for medical courses** and to conduct inspections of medical colleges to ensure that they meet the necessary standards.

What are the Issues with the NMC Guidelines?

▪ Generic Medicine Prescription:

- One of the main concerns raised by doctors is the **quality and efficacy of generic drugs available in India.**
 - They claim that there is a lack of standardization and regulation of generic drugs and that **many of them are substandard, spurious, or counterfeit.**
- According to IMA less **than 0.1% of the drugs manufactured in India are tested for quality.** Doctors argue that prescribing generic drugs without ensuring their **quality and safety could compromise patient care** and outcomes, and expose them to **legal and ethical risks.**
 - They also point out that there is no mechanism to monitor the adverse effects or drug interactions of generic drugs in India.
- The new guidelines do not allow doctors to write a specific brand, which means that you will get **whichever medicine with the relevant active ingredient in pharmacist stocks.**
 - Additionally, doctors' choice in prescribing the most suitable drug for a patient may be **restricted, potentially affecting treatment efficacy.**
- Doctors also allege that there is a nexus between **drug manufacturers, wholesalers, retailers, and regulators,** which allows substandard and spurious drugs to enter the market.
 - They demand that the government should ensure strict quality control and testing of generic drugs before making them mandatory for prescription.

▪ Other Issues:

- Imposing an additional burden on doctors to accumulate credit points through CPD sessions.
 - Limited availability of **recognized continuous training courses for doctors to meet CPD requirements.**
- Reduced **educational sessions due to prohibition of pharmaceutical industry sponsorships.**
 - Impact on **doctors' exposure to medical advancements and research.**
- Doctors expressing concerns about **increased administrative burden due to adherence to the comprehensive guidelines.**
 - Balancing ethical conduct with the practical challenges faced by medical practitioners in diverse healthcare settings.
- Challenges in clearly delineating situations in which doctors may ethically refuse treatment.
 - Legal and ethical concerns arising from doctors refusing treatment **based on patients' ability to pay.**

Way Forward

- Enhance the **quality and safety of generic drugs** by setting up more testing labs, conducting regular inspections, **imposing strict penalties, and creating a national database for drug quality.**
 - Educate doctors and patients **about the pros and cons of generic drugs,** using scientific evidence, dispelling myths, and promoting rational medication practices.
 - Encourage **medical institutions and professional bodies to organize regular CPD sessions** that cover a wide range of medical advancements.
 - Facilitate open discussions and consultations between the **NMC, medical practitioners, pharmaceutical industry representatives, and patient advocacy groups.**
 - Create platforms for ongoing feedback and suggestions to refine and adapt the guidelines to address emerging challenges and ensure ethical patient care.
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Complexities of Bihar's Ongoing Caste Survey

[Source: TH](#)

For Prelims: [Socio-Economic and Caste Census](#), [Census in India](#), [Supreme Court](#), Caste-based Survey, Indra Sawhney Case, Article 16(4) of the Constitution.

For Mains: Purpose of the Caste-based Survey, Positive and Negative Aspects of Caste Based Survey.

Why in News?

The **ongoing caste-based survey in Bihar** has garnered significant attention, leading to legal battles and debates surrounding its **constitutionality, necessity, and potential implications**.

What is the Purpose of the Caste-based Survey?

- The caste-based survey was initiated by the **Bihar government** on 7th January 2023. The government stated that detailed information on socio-economic conditions would help create better **policies and schemes for disadvantaged groups**.
- The survey encompasses the recording of **economic status alongside caste information**, with a target population of **12.70 crore in Bihar's 38 districts**.

Note: In 2011, the Union government undertook a [Socio-Economic and Caste Census \(SECC\)](#); however, due to data inaccuracies, the raw data collected from almost **1.3 billion Indians** was never disclosed.

Why is the Caste-based Survey Facing Legal Challenges?

- **Critics' Opposition to the Caste-Based Survey:**
 - The survey was challenged by several petitioners in the Patna High Court on various grounds, such as **violating the Constitution, infringing on privacy, being beyond the competence of the state government, being politically motivated**, and being based on unreliable methods.
 - The petitioners assert that the State government lacks the legal competence to **appoint District Magistrates and local authorities for data collection without a notification under Section 3 of the Census Act, 1948**, issued by the Central government.
 - Also, **assigning a caste identity to all citizens**, regardless of whether they intend to use State benefits, goes against the Constitution.
 - This is against the **right to identity, right to dignity, right to informational privacy, and right of choice guaranteed by Article 21**.

Note: The **Constitution's Entry 69 in the Seventh Schedule's Union List** gives the sole authority to the **central government** to conduct a census.

- **Halt on the Second Phase by High Court:**
 - The first phase of the survey involved listing houses. The government was in the midst of the second phase when the **survey was stopped due to a High Court order on May 4, 2023**.
- **High Court's Validation of the Survey:**
 - However, with the recent High Court verdict **dismissing all petitions opposing the**

move, the government **resumed work on the second phase of the survey**.

- In the second phase, **data related to castes, sub-castes, and religions of all people is to be collected**.
- The Court relied on the ruling in [Indra Sawhney Case](#) to rule that there is **no fault with the identification of caste in a bid to ameliorate social backwardness** as envisioned under **Article 16(4) of the Constitution**.
- Numerous petitions have also been submitted to the [Supreme Court](#), contesting the verdict of the Patna High Court that upheld the ongoing caste survey.

What are the Positive and Negative Aspects of Caste Based Survey?

▪ Positive:

- **Informed Policy Making:** Accurate and up-to-date information about caste-based disparities can help policymakers design and implement more effective policies and programs to **uplift marginalized communities and reduce social inequalities**.
 - The last caste-based census that is openly available to the public dates back to **1931**.
- **Addressing Intersectionality:** Caste intersects with other factors such as **gender, religion, and region**, leading to compounded disadvantages.
 - A survey can reveal these **intersections**, leading to more **nuanced policy approaches** that target multiple dimensions of marginalization.

▪ Negative:

- **Potential Stigmatization:** Disclosure of caste identities **could lead to individuals being stigmatized or discriminated** against based on preconceived notions associated with certain castes.
 - This can **deter honest responses** and undermine the survey's accuracy.
- **Political Manipulation:** Caste-based data can be **exploited by politicians for short-term gains**, leading to **identity-based vote bank politics**. This can divert attention from genuine policy issues and perpetuate divisive politics.
- **Fluidity of Caste Identities:** Simplistic interpretations might overlook **intra-caste variations and historical changes**, leading to policies that fail to address the nuances of contemporary caste dynamics.
 - Also, **caste identities are not static**; they can **change due to factors like inter-caste marriages**. A survey might struggle to capture these dynamic changes, leading to inaccurate representations of reality.

Conclusion

A balanced approach to conducting a caste-based survey should involve establishing a clear **ethical framework that prioritizes participant privacy and dignity**. Ensuring informed consent, maintaining confidentiality.

Public awareness campaigns, regular reviews, and capacity-building initiatives can contribute to a long-term vision of **reducing inequalities and fostering social integration** aligned with the principles of the [United Nations Sustainable Development Goal-10](#).

UPSC Civil Services Examination Previous Year Question

Prelims

Q. Consider the following statements: (2009)

1. Between Census 1951 and Census 2001, the density of the population of India has increased more than three times.
2. Between Census 1951 and Census 2001, the annual growth rate (exponential) of the population of India has doubled. Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (d)

Mains:

Q. How do you explain the statistics that show that the sex ratio in Tribes In India is more favourable to women than the sex ratio among Scheduled Castes? **(2015)**

Q. Though there have been several different estimates of poverty in India, all indicate reduction in poverty levels over time. Do you agree? Critically examine with reference to urban and rural poverty indicators. **(2015)**

AYUSH Sector's Growth

For Prelims: [AYUSH](#), [World Health Organization \(WHO\)](#), Global Traditional Medicine Summit

For Mains: Initiatives Related to AYUSH, Importance of Traditional Medicine

Source: [IE](#)

Why in News?

The [Ayurveda, Yoga, Naturopathy, Unani, Siddha, and Homeopathy \(AYUSH\)](#) sector is witnessing a remarkable growth trajectory. This growth is poised to continue, with projections indicating a leap to **24 billion USD by the end of 2023**.

- Amidst this promising landscape, the Ayush sector is set to take centre stage at the [World Health Organization \(WHO\) Global Traditional Medicine Summit](#).

What is the AYUSH Sector?

- **About:**
 - The AYUSH sector represents India's traditional healthcare systems.
 - Indian systems of medicine are **diverse, accessible, and affordable, with broad public acceptance**, making them vital healthcare providers. Their economic value is growing, offering crucial services to a significant population.
- **Diverse Disciplines Under AYUSH:**
 - **Ayurveda:** Ancient system emphasizing holistic well-being.
 - **Yoga:** Union of body, mind, and spirit through physical postures and meditation.
 - **Naturopathy:** Natural healing using elements like water, air, and diet.
 - **Unani:** Balance restoration through herbal medicines and humoral theory.
 - **Siddha:** Traditional Tamil medicine with roots in five elements and humors.
 - **Homeopathy:** Highly diluted remedies stimulating self-healing responses.
- **Growth of AYUSH Sector:**
 - **Exponential Financial Surge:**

- Production of AYUSH medicines and supplements has seen exponential growth.
- **Revenue surged from 3 billion USD (2014) to 18 billion USD (2020).**
- Anticipated growth to **24 billion USD in 2023 showcases its financial impact.**
- **Integration in Healthcare:**
 - AYUSH-based health and wellness centres garner significant response.
 - **7,000 operational centers; 8.42 crore patients availed services (2022).**
 - Increasing integration in modern healthcare systems.

What are the Schemes Related to AYUSH?

- [National Ayush Mission.](#)
- [New Portals on Ayush Sector.](#)
- [AYUSH Entrepreneurship Programme.](#)
- [Ayush Wellness Centers.](#)
- [ACCR Portal and Ayush Sanjivani App.](#)

What is the WHO Global Traditional Medicine Summit?

- **About:**
 - The WHO Global Traditional Medicine Summit is a pivotal event that underscores the **importance of traditional medicine in global healthcare practices.**
 - This platform brings together **experts, policymakers, researchers, and stakeholders** to discuss and shape the future of traditional medicine.
 - The **First WHO Traditional Medicine Global Summit** will take place in Gandhinagar, Gujarat, India.
 - The summit is a collaborative **effort between the WHO and the Indian Government, which holds the G20 presidency in 2023.**
- **Global Participation:**
 - Participation from more than 90 countries.
 - Gathering of diverse stakeholders representing various sectors.
- **Objectives and Focus Areas:**
 - Aimed at sharing **best practices, evidence, data, and innovations in traditional medicine.**
 - Platform to discuss the role of traditional medicine in health and sustainable development.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Mains

Q. How is the Government of India protecting traditional knowledge of medicine from patenting by pharmaceutical companies? **(2019)**

Non-Invasive Archaeological Survey at Gyanvapi Mosque

Source: [TH](#)

Why in News?

Recently, the [Supreme Court of India](#) directed the [Archaeological Survey of India \(ASI\)](#) to conduct a detailed **non-invasive survey** of the [Gyanvapi mosque](#) in Varanasi, Uttar Pradesh to determine if the

mosque was built atop a temple.

What is the Purpose of the Survey?

- The petitioners argued that the mosque was built on the **foundation of the temple** and that there were several Hindu idols and structures hidden inside the mosque.
- The court directed the ASI to form a five-member committee of experts to conduct a comprehensive physical survey of the entire Gyanvapi compound using **non-invasive techniques such as ground-penetrating radar (GPR) and carbon dating**.
- The survey is expected to reveal whether there are any traces of a temple or other Hindu structures below or within the mosque and to **establish the age and origin of the existing structures**.
- The court also appointed an observer to monitor and supervise the survey process and report any irregularities or violations.

What are Non-Invasive Methods in Archaeological Prospecting?

- Non-invasive methods are used when investigations are **undertaken inside a built structure and no excavation is permitted**.
- **Types of Methods:**
 - **Active Methods:** Inject energy into the ground and measure the response. The methods provide an estimate of the ground's material properties, such as density, electrical resistance, and wave velocity.
 - **Seismic Techniques:** Use shock waves to study subsurface structures.
 - **Electromagnetic Methods:** Measure electromagnetic responses after energy injection.
 - **Passive Methods:** Measure existing physical properties.
 - **Magnetometry:** Detect magnetic anomalies caused by buried structures.
 - **Gravity Surveying:** Measure gravitational force variations due to subsurface features.
 - **Ground-Penetrating Radar (GPR):**
 - ASI will use GPR to produce a **3-D model of buried archaeological features**.
 - GPR operates by introducing a short radar impulse from a surface antenna and records time and magnitude of return signals from the subsoil.
 - Radar beam spreads like a cone, causing reflections before the antenna passes over the object.
 - Radar beams spread out in a cone, leading to reflections that may not directly correspond to physical dimensions, creating false images.
 - **Carbon Dating:**
 - Determine organic material age by measuring carbon content.

What are the Limitations of Various Methods in Archaeological Surveys?

- Similar **physical properties of different materials** can generate the same response, leading to ambiguity in identifying targets.
- **Data collected is limited and contains measurement errors**, making it challenging to accurately estimate the spatial distribution of properties.
- Archaeological structures are often made of **heterogeneous materials with complex geometry, making data interpretation challenging**.
- Geophysical tools **might not accurately reconstruct target images**, especially in complex scenarios.
- In cases like disputes over religious sites, **emotional and political factors can influence interpretations and decisions**.

Archaeological Survey of India (ASI)

- ASI, under **the Ministry of Culture**, is the **premier organization for the archaeological research and protection of the cultural heritage** of the nation.

- It administers more than 3650 ancient monuments, archaeological sites and remains of national importance.
 - Its activities **include carrying out surveys of antiquarian remains, exploration and excavation of archaeological sites, conservation and maintenance** of protected monuments etc.
 - It was **founded in 1861 by Alexander Cunningham**- the first Director-General of ASI. Alexander Cunningham is also known as the **“Father of Indian Archaeology”**.
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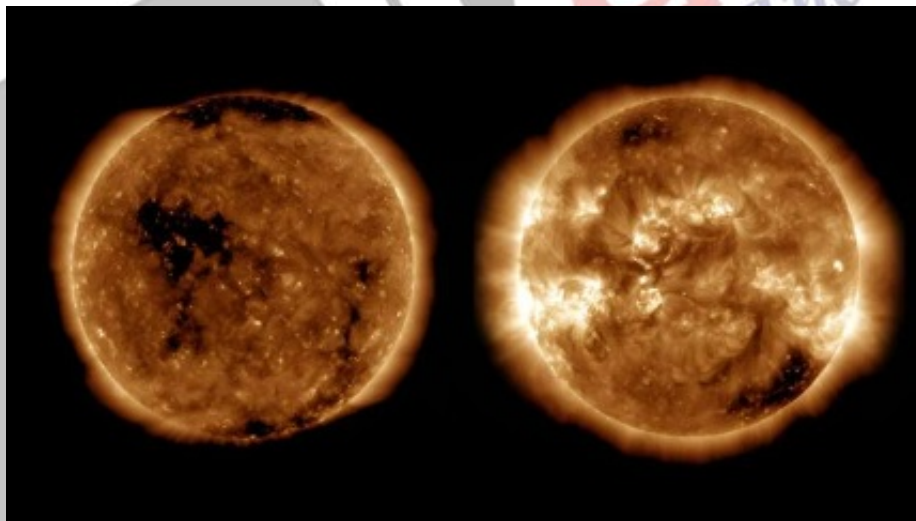
NASA's STEREO-'s Earth Flyby

[Source: HT](#)

Why in News?

In a significant development, [NASA's \(National Aeronautics and Space Administration\) Solar Terrestrial Relations Observatory \(STEREO-A\)](#) spacecraft has made its first Earth Flyby, nearly 17 years after its initial launch.

- During the Earth flyby, **STEREO-A will collaborate with Nasa's Solar and Heliospheric Observatory (SOHO)** and Nasa's Solar Dynamics Observatory (SDO), enhancing its observations.
- This collaboration aims to optimize the spacecraft's stereo vision to capture varying-sized solar features at different distances.



What are STEREO-A and STEREO-B?

- **STEREO-A (A stands for Ahead), along with its twin STEREO-B (B stands for Behind)**, was launched in 2006 to study the **Sun's Behavior** by charting Earth-like orbits around it.
 - Their primary goal was to provide a stereoscopic view of the Sun, **enabling researchers to study it from multiple perspectives.**
- In 2011, STEREO-A achieved a **pivotal milestone by reaching a 180-degree separation** in its orbit from STEREO-B. This spatial arrangement allowed humanity to **observe the Sun as a complete sphere** for the first time, offering **crucial insights into its complex structure** and activity.
 - STEREO-B broke contact with **mission control in 2014 after a planned reset (B's mission officially ended in 2018).**

What is the Purpose of STEREO-A's Earth Flyby?

- **Stereoscopic Vision of the Sun:**
 - STEREO-A's Earth flyby will enable it to once again employ stereoscopic vision, a technique mirroring human depth perception.
 - This method involves combining views from different locations to extract 3D information from 2D images of the Sun.
- **Scientific Objectives:**
 - Scientists plan to utilize this opportunity to identify active regions beneath sunspots and uncover 3D information about their structure.
 - Additionally, a new theory suggesting that coronal loops may be optical illusions will be tested.
 - The flyby also offers insights into the evolution of the magnetic field of Coronal Mass Ejections (CMEs) as they travel towards Earth.
 - CMEs, which are bursts of solar material, have the potential to disrupt satellite communications, radio signals, and even impact power grids on Earth.
 - By obtaining multipoint measurements from inside a CME, researchers aim to enhance their computer models and predictions about these solar eruptions.
- **Solar Activity Dynamics:**
 - This upcoming flyby will be starkly different from STEREO-A's early days in 2006, because at that time the Sun was in its Solar Minimum phase.
 - As the Sun approaches the predicted Solar Maximum for 2025, its heightened activity presents a distinct perspective for STEREO-A's observations.

Note: Solar Maxima and Minima refer to the two phases of the [Solar Cycle](#) that occur over an approximately **11-year period**. These cycles are characterized by changes in the number of **sunspots, solar flares, and other solar phenomena**.

- The solar maximum is the phase **when the Sun is most active**, with many sunspots and intense eruptions.
- The solar minimum is the phase **when the Sun is least active**, with few or no sunspots and calm surface.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. If a major solar storm (solar flare) reaches the Earth, which of the following are the possible effects on the Earth?(2022)

1. GPS and navigation systems could fail.
2. Tsunamis could occur at equatorial regions.
3. Power grids could be damaged.
4. Intense auroras could occur over much of the Earth.
5. Forest fires could take place over much of the planet.
6. Orbits of the satellites could be disturbed.
7. Shortwave radio communication of the aircraft flying over polar regions could be interrupted.

Select the correct answer using the code given below:

- (a) 1, 2, 4 and 5 only
- (b) 2, 3, 5, 6 and 7 only
- (c) 1, 3, 4, 6 and 7 only
- (d) 1, 2, 3, 4, 5, 6 and 7

Ans: (c)

Rapid Fire Current Affairs

Nanomechanical Testing Technology

An Indian scientist, Dr. Sudharshan Phani has developed a novel method for precise **nanomechanical testing of materials** at extremely small scales .

- The new technique enhances the precision and accuracy of **nanoindentation testing**, allowing for high throughput testing at higher rates.
 - **Nanoindentation** has widespread applications, including measuring semiconductor device strength and understanding material properties in various fields such as **cancer cell** research and **Meteorite** formation.
- The approach involved extensive modeling and simulation to understand material responses during indentation tests, leading to tailored improvements in precision and accuracy.
- The new methodology sets the stage for high precision and high accuracy nanoindentation measurements at faster rates, impacting diverse scientific research areas related to material strength measurement.

Read more: [Nanotechnology and Health](#)

Chandrayaan-3 Moon Lander Separates from Propulsion Module



After 34 days on board the **Chandrayaan-3** spacecraft, **the propulsion module** and the lander module parted ways on 17th August, and have now embarked on their respective journeys.

- **ISRO's** Chandrayaan-3 mission involves a lander module (LM), a propulsion module (PM), and a rover for **lunar exploration**.
- LM and PM were successfully separated, with the LM set to **descend to a lower orbit** through planned deboosting.
- The propulsion module's main role is to transport the lander from **launch vehicle** injection to a 100-km orbit around the moon.
- The lander's primary function is soft landing and deploying the rover for **in-situ** chemical analysis of the lunar surface.

Read more: <https://www.drishtiias.com/daily-updates/daily-news-analysis/chandrayaan-3-2>

Baghjan Oil Spill

The [National Green Tribunal \(NGT\)](#) ordered the [Assam](#) government to provide interim compensation to victims of [Baghjan oil and gas leak](#). This site belongs to [OIL India Ltd](#) near [Dibru Saikhowa National Park](#).

- NGT-formed **committee led by Justice BP Katakey** found [environmental violations](#), declaring Baghjan oil and gas field illegal.
- [Maguri Motapung Beel](#) (also known as Maguri Motapung Bill, Maguri Bill and Maguri Beel) is a wetland and lake located near to [Dibru-Saikhowa National Park](#) and Motapung Village of Tinsukia district in Assam.

Read more: [Assam Gas Leak](#)

National Automated Fingerprint Identification System (NAFIS)

National Automated Fingerprint Identification System (NAFIS) of [National Crime Records Bureau \(NCRB\)](#), won the **Gold Award** under the Excellence in Government Process Reengineering for [Digital Transformation Category-1](#) of [Department of Administrative Reforms and Public Grievances \(DARPG\)](#).

- **NAFIS**, a nationwide database managed by NCRB, swiftly stores crime-related fingerprints and assigns a **unique 10-digit National Fingerprint Number (NFN)** to apprehended criminals within 24 hours.
 - NFN remains with the offender for life, connecting various crimes under different FIRs to the same ID.
 - ID comprises state code (first two digits) and sequential number, specific to states.
 - NAFIS swiftly identifies persons of interest, linking their names to warrants, warnings, and related criminal data in police reference systems.
- Operates from New Delhi's **Central Fingerprint Bureau (CFPB)**.
- NAFIS aims to collect fingerprint data of criminals from all Indian states and Union Territories, offering a web-based platform for real-time uploading, tracking, and retrieval of information by law enforcement agencies.

Read more: <https://www.drishtias.com/printpdf/35-th-inception-day-of-ncrb>

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