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MINISTRY OF SCIENCE AND TECHNOLOGY

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THE HINDU Page 11

ORGANISATION OF ISLAMIC COOPERATION

(Syllabus: GS Paper 2 - International Relations)

India hits out at OIC chief for visit to LoC from Pakistani side

The Hindu Bureau
NEW DELHI

India on Tuesday strongly condemned the Organisation of Islamic Cooperation (OIC) saying the organisation had "lost its credibility".

The comment from the Ministry of External Affairs (MEA) came after OIC Secretary-General Hissein Brahim Taha visited the Line of Control (LoC) from the Pakistani side and was briefed by the situation by the Pakistan military.

Mr. Taha also offered prayers and met the people, who were allegedly affected by shelling from the Indian side.

"Let me reiterate that OIC has no *locus standi* in matters related to Jammu and Kashmir, which is an integral and inalienable part of India. Any attempt of interference and meddling in India's internal affairs by the OIC and its Secretary-General is completely unacceptable," MEA Official spokesperson Arindam Bagchi said in response to the visit of Mr. Taha.



Arindam Bagchi

Mr. Bagchi said the OIC Secretary-General had become a "mouthpiece" of Pakistan and that the organisation had been taking "blatantly communal, partisan and factually incorrect approach to issues".

'Promoting terrorism'

"We hope that he would refrain from becoming a partner in carrying out the nefarious agenda of Pakistan of promoting cross-border terrorism into India, especially in Jammu and Kashmir," said the Indian spokesperson.

Earlier Mr. Taha, who hails from Chad, had met the Pakistani leadership, including Prime Minister Shehbaz Sharif.

Context: India strongly condemned the **Organisation of Islamic Cooperation (OIC)** saying the outfit has "lost its credibility".

Organisation of Islamic Cooperation (OIC)

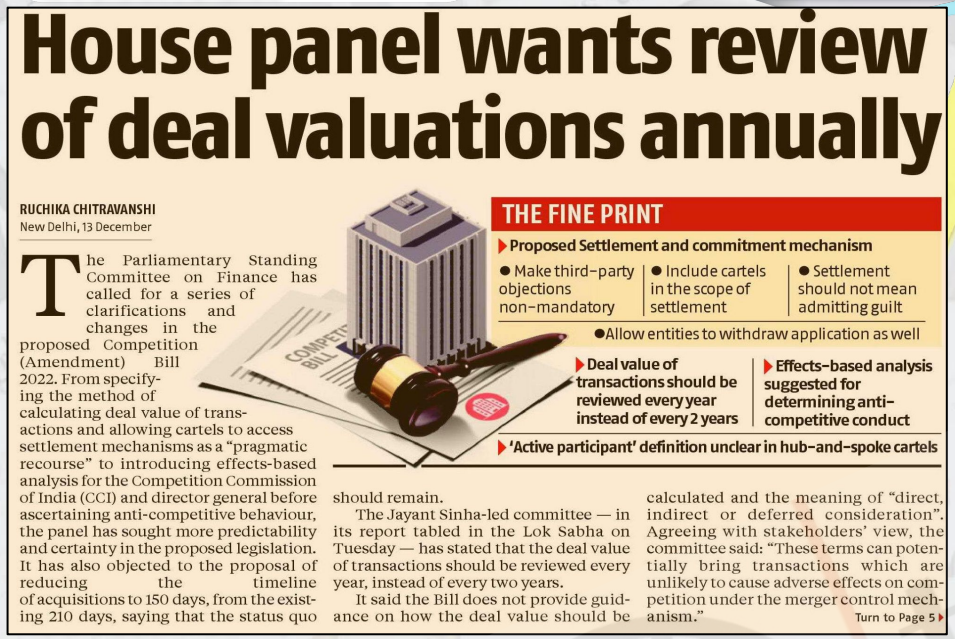
- **About**: Previously known as the **Organization of The Islamic Conference** is an international organisation of Muslim countries. It is the **second-largest intergovernmental body** next to the United Nations.
- **Origin**: Established on the **25th of September 1969** when an Islamic Conference took place with 24 members.
  - The OIC was officially founded in **1972**.
- **Headquartered**: **Jeddah**, Saudi Arabia.
- **Objectives**: The organisation was set up to **safeguard and protect the interests of the Muslims in the world** and also to promote international peace and harmony among various people of the world.
  - OIC **expresses solidarity with conflict-hit Muslim regions** such as Palestine, Iraq, Afghanistan, Syria and Bosnia, as well as with the peoples of the Turkish Cypriot state, Kosovo and Jammu and Kashmir.
- **Members**: 57 members, **56 of which are also member states of the United Nations** with 49 countries being Muslim majority countries.
  - **Palestine** is also a member of the OIC (it is **not a member of the UN**).
  - **Not all members are Muslim-majority** ones although they have a significant Muslim population. (E.g. Countries in West Africa and South America).
  - **India is not a member** of the OIC.
- **Observer states**: Bosnia and Herzegovina, Central African Republic, Northern Cyprus (Turkish Cypriot State), Thailand and Russia.
- **Observer International Organisations**: NAM, UN, League of Arab States, African Union and Economic Cooperation Organisation.
  - The OIC has permanent delegations to the **United Nations and the European Union**.
- **Official languages**: Arabic, English and French.

BUSINESS STANDARD

Page 1

COMPETITION (AMENDMENT) BILL 2022

(Syllabus: GS Paper 3 - Economy)



House panel wants review of deal valuations annually

RUCHIKA CHITRAVANSHI
New Delhi, 13 December

The Parliamentary Standing Committee on Finance has called for a series of clarifications and changes in the proposed Competition (Amendment) Bill 2022. From specifying the method of calculating deal value of transactions and allowing cartels to access settlement mechanisms as a "pragmatic recourse" to introducing effects-based analysis for the Competition Commission of India (CCI) and director general before ascertaining anti-competitive behaviour, the panel has sought more predictability and certainty in the proposed legislation. It has also objected to the proposal of reducing the timeline of acquisitions to 150 days, from the existing 210 days, saying that the status quo should remain.

The Jayant Sinha-led committee — in its report tabled in the Lok Sabha on Tuesday — has stated that the deal value of transactions should be reviewed every year, instead of every two years.

It said the Bill does not provide guidance on how the deal value should be calculated and the meaning of "direct, indirect or deferred consideration". Agreeing with stakeholders' view, the committee said: "These terms can potentially bring transactions which are unlikely to cause adverse effects on competition under the merger control mechanism."

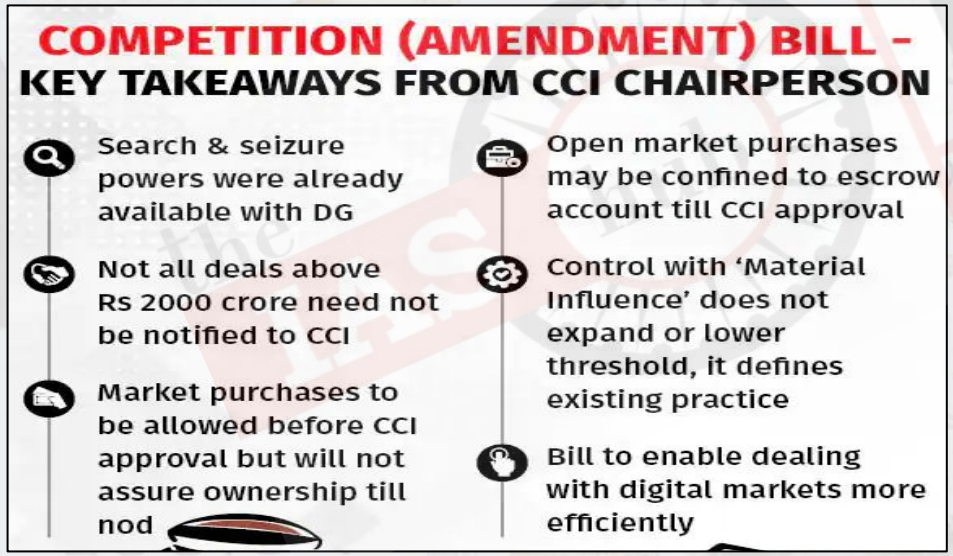
Turn to Page 5

THE FINE PRINT

Proposed Settlement and commitment mechanism

- Make third-party objections non-mandatory
- Include cartels in the scope of settlement
- Settlement should not mean admitting guilt
- Allow entities to withdraw application as well

- Deal value of transactions should be reviewed every year instead of every 2 years
- Effects-based analysis suggested for determining anti-competitive conduct
- 'Active participant' definition unclear in hub-and-spoke cartels



Context: The Parliamentary Committee called for a clarifications **changes in proposed Competition (Amendment) Bill 2022.**

- The Bill has proposed to amend the **Competition Act, 2002.**

Highlights of the Bill

- **Mergers and acquisitions:** The Bill seeks to amend the Competition Act, 2002, to **regulate mergers and acquisitions based on the value of transactions.**
  - Deals with transaction value of more than **Rs 2,000 crore will require CCI's approval.**
  - The Bill proposes to **reduce the timeline for the CCI** to pass an order on such transactions from **210 days to 150 days.**
- **Anti-competitive agreements:** Currently, enterprises or persons engaged in similar businesses can be held to be a part of anti-competitive agreements.
  - The Bill **expands the scope of entities** that can be adjudged to be a part of anti-competitive agreements.
  - The Bill expands this to also include enterprises or persons who are not engaged in similar businesses.
- **Settlement and commitment:** The Bill provides a framework for settlement and commitment for **faster resolution of investigations** of anti-competitive agreements and abuse of dominant position.
- **Decriminalises offences**: The Bill **decriminalises certain offences** under the Act by changing the nature of punishment from imposition of fine to civil penalties.
  - These offences **include failure to comply with orders** of the CCI and directions of the Director General related to anti-competitive agreements and abuse of dominant position.
- **Appointment of Director General**: Appointment of the Director General by the Commission with the **prior approval of the Central Government.**
- **Gun Jumping:** Earlier the **penalty for gun-jumping** was a total of 1% of the asset or turnover which is now proposed to be 1% of the deal value.
  - **When merging parties fail to notify a merger to the competition authority,** implement all or parts of the merger during mandatory waiting periods or co-ordinate their competitive behaviour before closing, this is commonly **called "gun jumping".**
- **Exemption of Open Market Purchases:** It proposes to **exempt open market purchases and stock market transactions** from the requirement to notify the Commission in advance.

INDIAN EXPRESS

Page 4

KRISHI-DSS

(Syllabus: GS Paper 3 - Sci & Tech)

Agri, space depts ink pact to develop support system using data from satellites

EXPRESS NEWS SERVICE
NEW DELHI, DECEMBER 13

THE MINISTRY of Agriculture and Department of Space signed a Memorandum of Understanding (MoU) on Tuesday to develop a Krishi-Decision Support System (Krishi-DSS) using satellite data.

"This will enhance the evidence-based decision-making capability of all the stakeholders in the agriculture sector by way of integration with MOSDAC and BHUVAN (Geo-platform) of ISRO and systems of ICAR," the Ministry of Agriculture said in a statement. Krishi-DSS is being developed on the lines of Gati Shakti, using RISAT-1A and VEDAS of the Department of Space, it added.

The MoU was signed in the presence of Agriculture Minister Narendra Singh Tomar and MoS Science & Technology Jitendra Singh. The statement quoted Tomar as saying that the agreement will further enhance the strength of the agriculture sector.

Addressing the gathering at the event, Jitendra Singh said RISAT-1A data will be extremely useful in developing decision support systems for agriculture, bioresources, environment, water resources and disaster management.

Context: The Ministry of Agriculture and Department of Space signed a Memorandum of Understanding (MoU) to develop a **Krishi-Decision Support System (Krishi-DSS)** using satellite data.

Krishi-Decision Support System (Krishi-DSS)

- **About**: The Ministry of Agriculture and Farmers Welfare is developing Krishi-DSS, a decision support system, on the lines of **Gati Shakti, using RISAT-1A and VEDAS** of Department of Space.
  - The **Gati-Shakti programme** is structured to prioritise all–mega infrastructure and connectivity targets by 2024-2025.
  - **RISAT (Radar Imaging Satellite)** is a series of Indian radar imaging reconnaissance satellites built by ISRO. They provide all-weather surveillance using synthetic aperture radars (SAR).
  - **VEDAS (Visualisation of Earth observation Data and Archival System)** is an online geoprocessing platform that uses optical, microwave, thermal, and hyperspectral EO data covering applications particularly meant for academia, research and problem solving.
- **Significance**: This will enhance the evidence-based decision-making capability of all the stakeholders in the agriculture sector by way of integration with MOSDAC and BHUVAN (Geo-platform) of ISRO and systems of ICAR.
  - **Meteorological and Oceanographic Satellite Data Archival Centre (MOSDAC)** is a Data Centre of Space Applications Centre (SAC) and has facility for satellite data reception, processing, analysis and dissemination.
  - **BHUVAN**, also called the Indian version of Google Maps, is a multi-purpose end-user satellite application platform.
    - It is powered by the **Indian Space Research Organization (ISRO).**
    - This software application allows the users to explore a 2D/3D representation of the surface of the Earth.
- **Decision support systems (DSSs):** DSSs are **used in agriculture to collect and analyze data** from a variety of sources with the ultimate goal of providing end users with insight into their critical decision-making process.

LIVEMINT

Page 2

MODELS OF PPP

(Syllabus: GS Paper 3 - Economy)

Govt drops PPP plan for railway stations

PTI
feedback@livemint.com

The ministry of railways has dropped its proposal for monetisation of stations on public-private partnership mode, and projects are now being taken up under engineering, procurement and construction (EPC) mode, a source said.

The source also said that the ministry of railways has been asked to expedite monetisation of other assets, including trains, goodsheds, hill rail, stadiums, railway colonies and railway land parcels.

Projects are now being taken up under engineering, procurement and construction mode

"Largest asset class (stations) dropped. Stations earlier proposed on PPP mode are now being taken up under EPC mode," the source said. The ministry has so far raised only ₹1,829 crore against the target of ₹30,000 crore in the current financial year, the source added.

"Likely realisation from asset monetisation of Indian Railways assets under NMP (National Monetisation Pipeline) in the current fiscal has been now estimated at ₹4,999 crore," the source said.

Finance minister Nirmala Sitharaman in a meeting with Niti Aayog CEO Parameswaran Iyer on 14 November reviewed the progress of NMP implementation.

An e-mail sent to the official spokesperson of the ministry of railways seeking comments remained unanswered. Earlier this year, the then NITI Aayog CEO Amitabh Kant had said the government's plan to monetise railway assets by allowing private players to run trains did not attract enough investors due to a lack of proper structuring and that the railway ministry is looking at it afresh.

According to the NMP document, a total of 400 stations, 90 passenger trains, railway stadiums and colonies, and the famed Konkan and hill railways were among the assets identified for monetisation.

Context: The ministry of railways has dropped its proposal for monetisation of stations on **public-private partnership mode**, and projects are now being taken up under **engineering, procurement and construction (EPC) mode.**

Models of PPP

- **Engineering, procurement, and construction (EPC)**: The **government bears the entire cost**. The government asks private parties to submit bids for engineering expertise. The government pays for the purchase of raw materials and building expenditures.
- **Build-Operate-Transfer (BOT):** A **private player is given the right to finance, develop, and manage a project** for a set amount of time (20 or 30 years), with the developer bearing some of the financial risk while recovering the costs through user fees or tolls collected from users of the facility.
- **Hybrid Annuity Model (HAM):** The new HAM in India **combines the elements of EPC and BOT-Annuity models**. According to the plan, the government will make annual payments totaling 40% of the project's cost over the first five years (annuity). Based on the assets produced and the developer's performance, the remaining sum will be paid.
- **Build-Own-Operate (BOO):** A **private entity will retain ownership of the newly constructed facility**. Public sector partner agrees to 'buy' the products of the project on mutually acceptable terms and conditions.
- **Build-Own-Operate-Transfer (BOOT):** After the negotiated period of time, the **project is transferred to the government** or to the private operator. BOOT model is used for the development of highways and ports.
- **Build-Own-Lease-Transfer (BOLT):** In this approach, the **government gives a concession to a private entity** to build a facility (and possibly design it as well), own the facility, lease the facility to the public sector and then at the end of the lease period transfer the ownership of the facility to the government.
- **Design-Build-Finance-Operate (DBFO):** In this model, the entire responsibility for the design, construction, finance, and operation of the project for the period of concession **lies with the private party.**
- **Lease-Develop-Operate (LDO)**: In this type of investment model either the government or the public sector entity retains ownership of the newly created infrastructure facility and receives **payments in terms of a lease agreement** with the private promoter. It is mostly followed in the development of airport facilities.

ECONOMIC TIMES

Page 1

DATA LOCALISATION

(Syllabus: GS Paper 3 - Internal Security)

RESPONSE TO REGULATOR'S CONSULTATION PAPER

FPIs Argue against Sebi Mandate for Data Localisation

Body representing likes of Citi, CLSA assures timely data access, even if not locally maintained

Pavan.Burugula
@timesgroup.com

Mumbai: Overseas investors have raised concerns about the capital markets regulator's plans to push data localisation under proposed cloud computing models for the investment industry, with a platform representing bulge bracket entities such as Citi and Amundi citing global precedents to argue against the proposal.

In a discussion paper floated on November 4, the Securities and Exchange Board of India (Sebi) proposed uniform standards for regulated entities — including foreign portfolio investors (FPIs), mutual funds and brokerages — while storing information on cloud.

In its response to Sebi, the Asia Securities Industry and Financial Markets Association (Asifma) that represents the likes of Citi, CLSA and Amundi, urged the regulator not to insist on mandatory data localisation for its members. "The financial sector is committed to providing Sebi with timely access to data needed to fulfil Sebi's regulatory and supervisory mandate — no matter where the data is stored," Asifma said in its letter to Sebi. "This is also a principle widely adopted in international trade agreements and the financial regulatory community."

Safety and Expense ▸▸ 8



Cloud Or Not?

FPIs express concern over Sebi cloud storage framework

Regulator proposed data localisation for regulated entities

Foreign funds store data centrally in hubs such as Singapore

Easier to protect centralised servers from breaches

It is also cost effective for FIs to maintain a single server

FPIs assure they will provide all data sought by Sebi even if not stored locally

Context: Overseas investors have raised concerns about the capital markets regulator's plans to **push data localisation under proposed cloud computing models** for the investment industry, with a platform representing bulge bracket entities such as Citi and Amundi citing global precedents to argue against the proposal.

Data Localization

- **About**: The **practice of keeping data within the region** it originated from. For example, if an organization collects data in the India, they store it in the India rather than transferring it to another country for processing.
- **Data sovereignty**: Data localization builds upon the concept of data sovereignty that r**egulates certain data types by the laws** applicable to the data subjects or processors.
- **Data sovereignty vs Data localization**: While data sovereignty may require that records about a nation's citizens or residents follow its personal or financial data processing laws, data localization goes a step further in requiring that initial collection, processing, and storage first occur within the national boundaries.
- **Data residency vs Data localization**: Data residency **refers to the place where data is stored**. Data residency requirements may compel organizations to change where their data resides. Data localization is the action of complying with data residency requirements.
    - Data localization or data residency law **requires data about a nation's citizens or residents** to be collected, processed, and/or stored inside the country, often before being transferred internationally.
- **Data Localization In India:**
    - **Srikrishna Committee Report:** One of the notable proposals in the Srikrishna Report is the requirement that **companies have to store certain categories of user data on Indian territory.**
    - **Personal Data Protection Bill, 2019**: It was introduced in Lok Sabha to protect individual rights by regulating the collection, movement, and processing of data that is personal, or which can identify the individual.
        - In 2022, the Personal Data Protection Bill **withdrew from Parliament by the government.**
    - **Draft National E-commerce policy:** The Draft Policy deals with issues in **6 broad themes**: i) data; (ii) infrastructure development; (iii) e-commerce marketplaces; (iv) regulatory issues; (v) stimulating domestic digital economy; and (vi) export promotion through e-commerce.
        - It **recommended data localisation** and suggested a two-year sunset period for the industry to adjust before localization rules became mandatory.
        - It **proposes incentives to encourage data localization** and grant infrastructure status to data centers.
    - **Payment system data information**: Due to the increasing number of digital payments in the country, the **Reserve Bank of India** has also mandated payment system data information to be **stored in India for better monitoring and safety.**

TIMES OF INDIA

Page 1

POLITICAL DEVELOPMENT IN BARBADOS

(Syllabus: GS Paper 2 - International Relations)

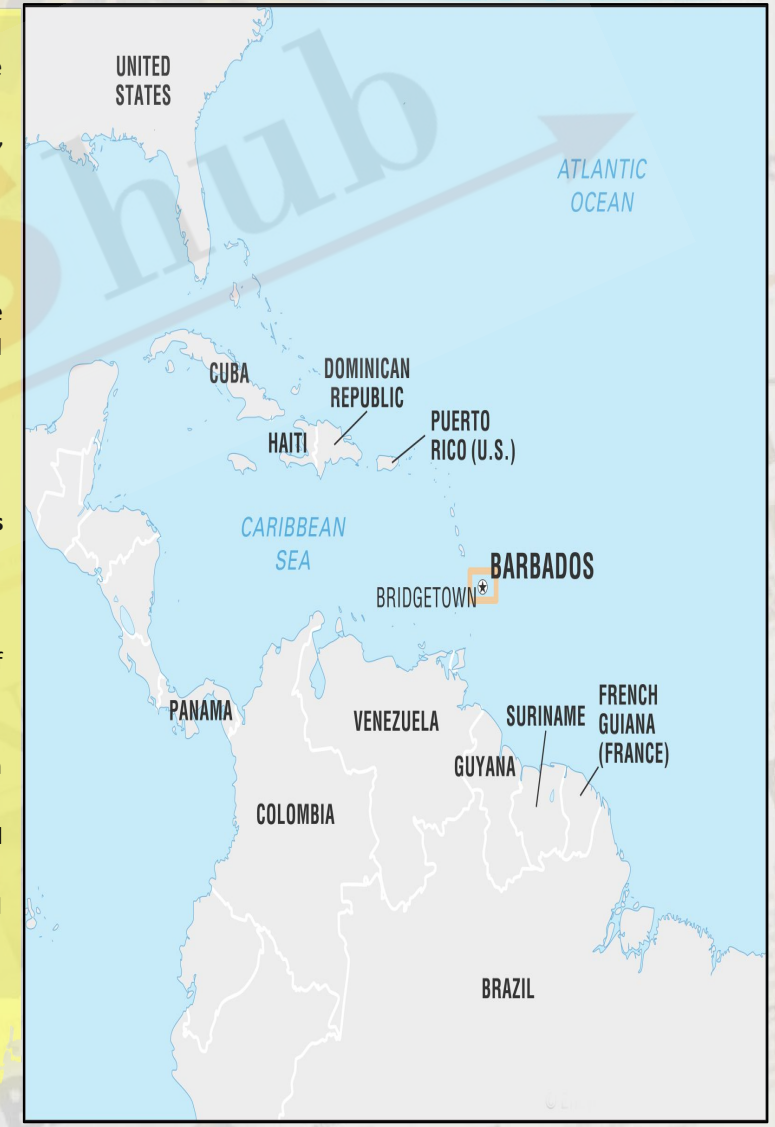
Barbados top court repeals laws that criminalise gay sex

Suan Juan: A top court in Barbados has struck down colonial-era laws that criminalise gay sex, becoming the third nation in the conservative Caribbean region to do so this year. The ruling issued on Monday by the Barbados High Court is a pivotal moment for activists who have fought against such laws on the island, including one that demands up to a life sentence for gay men found guilty of having sex. UNAIDS celebrated the ruling, saying it will help reduce the stigma that can prevent LGBTQ people from seeking HIV treatment services. AP

Context: A top court in Barbados has struck down colonial-era laws that criminalise gay sex, becoming the **third nation in the conservative Caribbean region** to do so this year.

Barbados

- **About:** An **island country in the Lesser Antilles of the West Indies**, in the Caribbean region of the Americas, and the most easterly of the Caribbean Islands.
  - Its neighbours include **Saint Lucia, to the north, Saint Vincent and the Grenadines**, to the west, and Trinidad and Tobago to the south.
- **World's Newest Republic**: On 30 November 1966, Barbados became an independent state and Commonwealth realm with Elizabeth II as Queen of Barbados.
  - On 30 November 2021, **Barbados transitioned to a republic within the Commonwealth**.
- **Historical aspects**: Barbados **first became an English colony in 1625**. It was a part of the British Empire for over 400 years, a link in the lines of trade, commerce and oppression that English mercantilism and colonialism fostered for centuries.
- **Capital**: Bridgetown
- **Habitants**: Inhabited by **Kalinago** people since the 13th century, and prior to that by other Amerindians.
- **Political system**: Barbados functions as a **two-party system.**
  - The dominant political parties are the **Democratic Labour Party and the incumbent Barbados Labour Party.**
- **Economy**: According to the World Bank, **Barbados is one of 83 high income economies in the world**.
- **Part of CARICOM**: Barbados is **part of Caribbean Community (CARICOM)** which was formed in 1973.
- **Barbados and India:** Approximately 2500 people of Indian origin have settled in Barbados and most of them have since acquired local nationality.
  - Barbados **supported the G-4 resolution** on expanding the UN Security Council in 2007.
    - The G4 nations, comprising Brazil, Germany, India, and Japan, are four countries which support each other's bids for permanent seats on the United Nations Security Council.
  - The country **voted for India's candidature for Non-Permanent seat** on the UN Security Council in 2011–12, and supports India's candidature for a permanent seat on the Security Council.
  - India and Barbados have **signed the Air Services Agreement in 2015,** for facilitation of travel arrangements for the citizens.
  - **Barbados is a** signatory to International Solar Alliance and has ratified it in January, 2021.



PIB

Dec 14

SRI AUROBINDO

(Syllabus: GS Paper 1 - Personality in news)

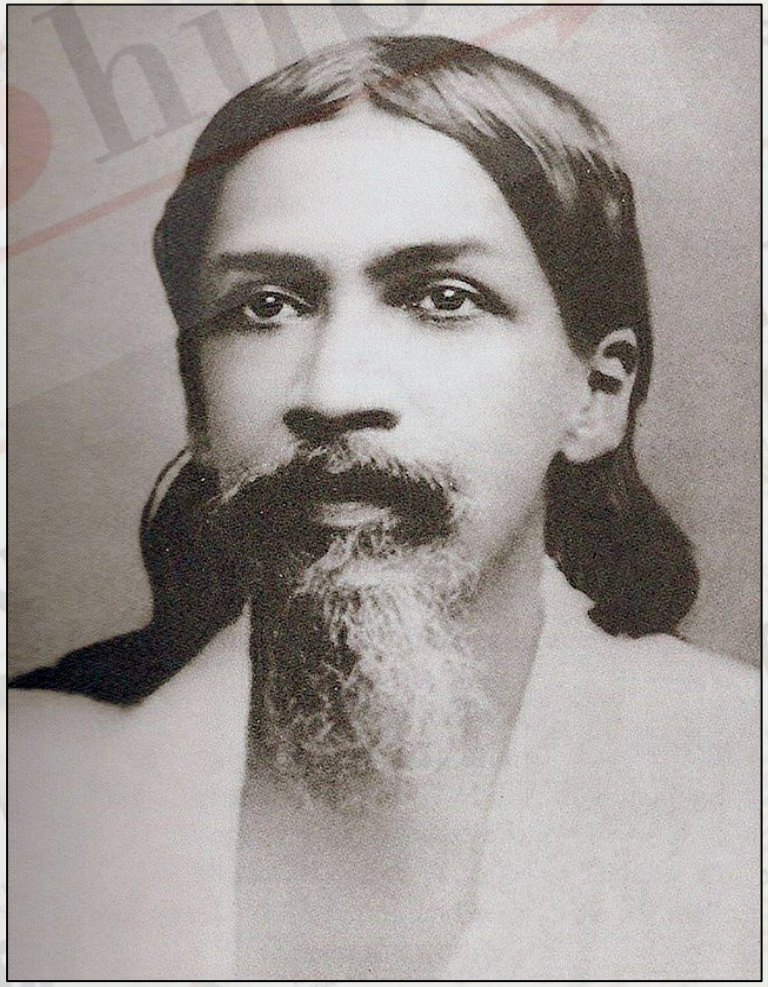
PM addresses programme commemorating Sri Aurobindo's 150th birth anniversary via video conferencing

Context: The Prime Minister addressed a programme celebrating **Sri Aurobindo's 150th birth anniversary** in Kamban Kalai Sangam, Puducherry under the aegis of Azadi ka Amrit Mahotsav.

- The Prime Minister also released a commemorative **coin and postal stamp in honour of Sri Aurobindo.**

Dare to Dream

- **About**: An Indian **philosopher, yogi, maharishi, poet, and Indian nationalist.**
  - He was also a journalist, editing newspapers such as **Vande Mataram, an english newspaper (1905).**
- **Early life:** Aurobindo Ghose was **born in Calcutta (now Kolkata)**, Bengal Presidency, India on 15 August 1872 in a Bengali family
- **Contribution in Indian movement for independence:** He involved in nationalist politics in the Indian National Congress and the nascent revolutionary movement in Bengal with the Anushilan Samiti.
  - From **1902 to 1910 he partook in the struggle to free India from the British**.
  - As a result of his political activities, he was imprisoned in 1908 **(Alipore Bomb case)**. However, Sri Aurobindo could only be convicted and imprisoned for writing articles against British colonial rule in India.
- **Philosophy**: Sri Aurobindo developed a **spiritual practice he called Integral Yoga at Pondicherry.**
  - He believed in a spiritual realisation that not only liberated but **transformed human nature, enabling a divine life on earth.**
- **Sri Aurobindo Ashram**: In 1926, with the **help of his spiritual collaborator, Mirra Alfassa (referred to as "The Mother")**, Sri Aurobindo Ashram was founded.
- **Main literary works:**
  - **The Life Divine**: deals with the philosophical aspect of Integral Yoga.
  - **Synthesis of Yoga**: deals with the principles and methods of Integral Yoga.
  - **Savitri**: A Legend and a Symbol, an epic poem.
- **Other Literary Works:**
  - Bases of Yoga
  - Bhagavad Gita and Its Message
  - The Future Evolution of Man
  - Rebirth and Karma
  - Hour of God



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KILONOVA EMISSION

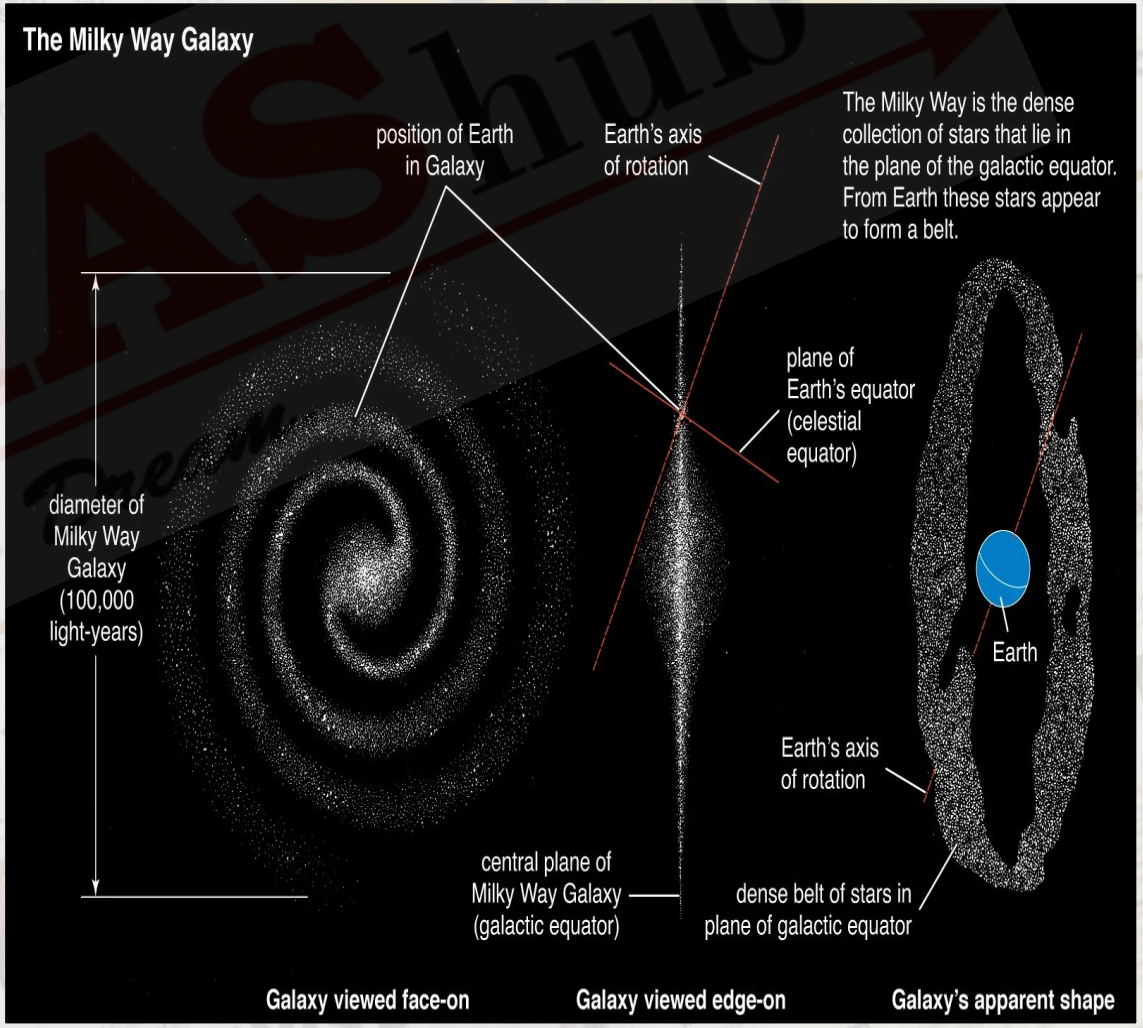
(Syllabus: GS Paper 3 - Sci & Tech)

First data taken by the 3.6-meter telescope detects unexpected kilonova emission from a long-duration gamma-ray burst

Context: While tracing a burst of high-energy light detected on December 11, 2021, from the outskirts of the **Milky Way** located approximately 1 billion light-years away, astronomers have spotted the first astronomical event in which a long **gamma-ray bursts (GRBs)** has been accompanied by the unexpected discovery of a **kilonova emission.**

Kilonova Emission

- **About**: A kilonova (also called a macronova) is a **transient astronomical event** that occurs in a compact binary system when two neutron stars or a neutron star and a black hole merge.
  - These mergers are thought to **produce gamma-ray bursts** and emit bright electromagnetic radiation, called kilonova, due to the **radioactive decay of heavy r-process nuclei** that are produced and ejected fairly isotropically during the merger process.
    - In nuclear astrophysics, the **rapid neutron-capture process, also known as the r-process**, is a set of nuclear reactions that is responsible for the creation of approximately half of the atomic nuclei heavier than iron.
- **Gamma-ray bursts:** In gamma-ray astronomy, gamma-ray bursts (GRBs) are **immensely energetic explosions** that have been observed in distant galaxies.
  - The sources of most GRBs are **billions of light years away from Earth**, implying that the explosions are both extremely energetic (a typical burst releases as much energy in a few seconds as the Sun will in its entire 10-billion-year lifetime) and extremely rare (a few per galaxy per million years).



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ASTEROID RYUGU

(Syllabus: GS Paper 3 - Sci & Tech)

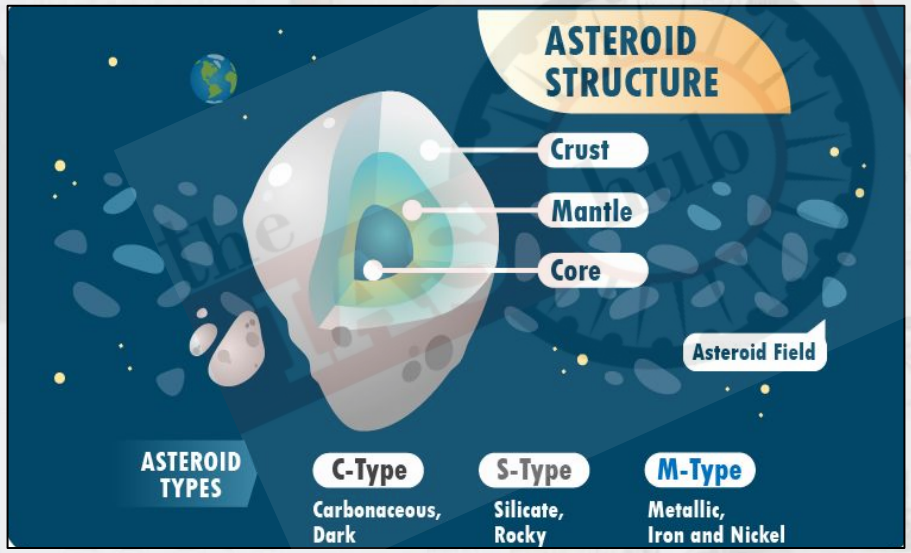


A chunk of space rock may hold clues to origin of Earth

Materials like Ryugu space rock make up 5% of the planet's mass, likely helped make planet habitable, finds study

NEXT NEWS >

By Rohini Krishnamurthy
Published: Tuesday 13 December 2022



Context: A sample of a space rock called **Ryugu** that returned to Earth almost two years ago may hold the answers to the origin of the planet, according to a new study.

- Roughly 5 percent of materials that assembled to form Earth more than 4.5 billion years ago could have come from space rocks similar to **near-Earth asteroid Ryugu.**

Key Points

- **Ryugu's sample**: Samples of Ryugu were carried to Earth in 2020 by the Japanese space agency's asteroid sample-return mission, **Hayabusa 2.**
  - Hayabusa2 is a **Japanese spacecraft** that explored asteroid Ryugu (162173) from June 2018 to November 2019.
  - It dispatched a series of landers and a penetrator, and it collected multiple samples from the asteroid.
  - JAXA launched Hayabusa2 in December 2014 to **collect samples from Ryugu.**
- **Significance**: These asteroid samples represent the first solids to be formed in the solar system. This means they could be the building blocks of Earth.
  - These samples could also **help evaluate the role of Ryugu-like objects** in depositing volatile elements to terrestrial planets.
  - **Volatile elements** such as hydrogen, carbon, nitrogen and oxygen are thought to have played a key role in forging complex organic molecules - ingredients essential to build habitable worlds like Earth.
- **Analysis of Zinc and Copper**: Scientists' analysis of isotopic ratios of zinc and copper showed that Ryugu was similar in composition to CI chondrites.
  - They are a **group of rare carbonaceous chondrite (CC)**, a type of stony meteorite.
  - They are **primitive because they likely formed in the outer solar system**, where volatile elements are preserved.
  - In contrast, materials **created closer to the Sun** may have lost a part of their volatile inventory due to evaporation.

Asteroid Ryugu

- **About**: It is a **near-Earth object** and a potentially hazardous asteroid of the Apollo group.
- **Origin**: Ryugu was discovered in 1999 by the Lincoln Near-Earth Asteroid Research (LINEAR) project.
- **Size**: It measures approximately 1 kilometre in diameter.
- **Orbit**: Ryugu is orbiting the sun between **Earth and Mars and occasionally crosses Earth's orbit.**

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GIANT KELP

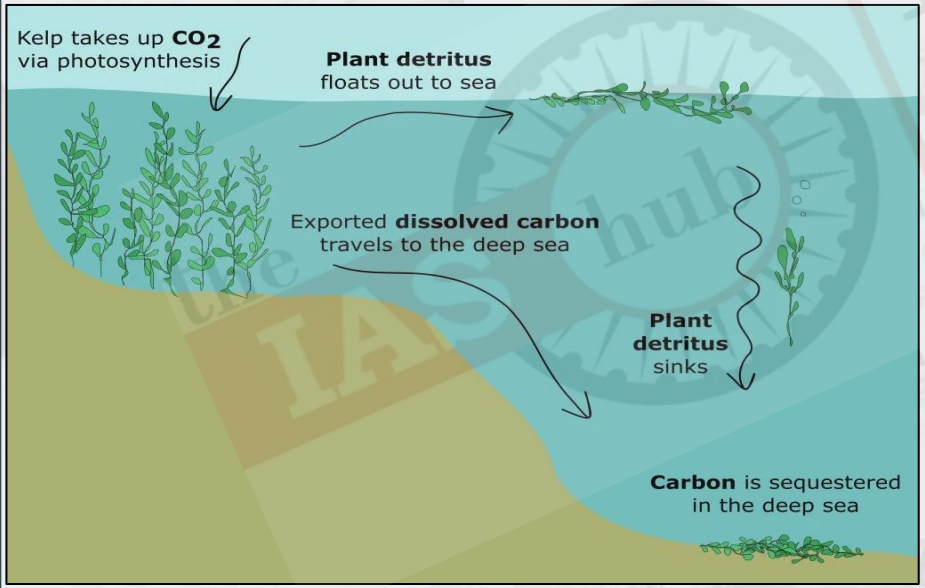
(Syllabus: GS Paper 3 - Env & Eco)

Study unravels how ocean warming impacts early development of Giant Kelp, can aid conservation

At higher temperatures, spore release increased but other reproductive processes were hindered

By Preetha Banerjee
Published: Tuesday 13 December 2022





Context: Ocean warming disrupts early-stage development of **Giant Kelp, the largest marine algae** that are intrinsic to sea life, leading to rapid decline in kelp forests across the world, a new study found.

Key Points

- The world has lost **much of its kelp forests in the last century to rising sea temperatures**, but the mechanism of deterioration was not fully understood by scientists.
- The **Giant Kelps reproduce by releasing single-cell units called spores** that grow into 'germ tubes' that gather nutrients and develop into adults.
- At higher temperatures, **spore release increased** but "spore settlement**,** germination and germ-tube length" were negatively impacted.
- In the last 30 years, s**ea surface temperatures have gone up by 0.13°C per decade** and oceans are expected to heat up by 1-3°C by the turn of the century.

Giant Kelp

- **About**: **Macrocystis pyrifera**, commonly known as giant kelp or bladder kelp, is a species of kelp (large brown algae), and one of four species in the genus Macrocystis.
- **Key features**: It is **not a plant** but it is a **heterokont**.
  - Heterokonts are a **group of protists (any eukaryotic organism).** Most are algae which is a primary component of plankton.
  - It is **one of the fastest-growing organisms** on Earth.
  - In the healthy state, they **act as carbon sinks.**
  - As they are damaged, they **release much of the sequestered carbon** into the atmosphere.
- **Distribution**: Common along the coast of the northeastern P**acific Ocean, from Baja California north to southeast Alaska,** and is also found in the southern oceans near South America, South Africa, Australia, and New Zealand.
- **Commercialisation**: The primary commercial product obtained from giant kelp is **alginate**.
- **Usage**: Humans harvest this species on a limited basis for **use directly as food,** as it is rich in iodine, potassium, and other minerals.
  - It can be **used in cooking in many of the ways other sea vegetables** are used, and particularly serves to add flavor to bean dishes.

THANK YOU!

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