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Magnetofossils

Goa scientists find 50,000-year-old magnetic fossils in Bay of Bengal.

- Magnetofossils are the fossilised remains of particles created by magnetotactic bacteria or magnetobacteria.

Magnetotactic bacteria (MTB)
• MTB are a group of phylogenetically diverse and morphologically varied microorganisms with a magneto responsive capability called magneto taxis or microbial magneto reception. • Magnetotactic bacteria are mostly prokaryotic organisms that arrange themselves along the earth's magnetic field. • These unique creatures were first described in 1963, by Salvatore Bellini, an Italian doctor and then again in 1975 by Richard Blakemore. • These organisms were believed to follow the magnetic field to reach places that had optimal oxygen concentration. • The bacteria contained novel structured particles, rich in iron in small sacs that essentially worked as a compass.

- Magnetofossils are found preserved within the geological records.
- The magnetotactic bacteria create tiny crystals made of the iron-rich minerals magnetite or greigite.
- The crystals help them navigate the changing oxygen levels in the water body they reside in.
- The fossils left behind by the crystal-creating bacteria help scientists glean conditions that prevailed millions of years ago and which contributed to the sediment magnetic signal.
- **Sources –** Previous studies on magnetofossils ascertained their origins to be hyper-thermal vents, comet impacts, changes in oceanic ventilation, weathering or the presence of oxygen-poor regions.
- Most giant magnetofossils have been found in sediments dating to the late Paleogene period, some 56 million years ago, suggesting they formed only during periods of extreme warming.

Paleogene Period
• Paleocene Epoch, first major worldwide division of rocks and time of the Paleogene Period, spanning the interval between 66 million and 56 million years ago. • The Paleocene Epoch was preceded by the Cretaceous Period and was followed by the Eocene Epoch.

- **Bay of Bengal Sediment –** Scientists found the sediment in the Bay of Bengal to be from the late Quaternary period, or about 50,000 years ago, making it the youngest giant magnetofossil to have been found yet.

- The three-metre-long sediment core from the southwestern Bay of Bengal consisted mainly of pale green silty clays.

Quick Facts
Geological Record
• The geologic record is the history of Earth as recorded in the rocks that make up its crust. • Rocks have been forming and wearing away since Earth first started to form, creating sediment that accumulates in layers of rock called strata. • The way these strata are arranged and what fossils are in them give scientists clues about what Earth was like billions of years ago. • Geologists have divided the geologic record into periods that can be organized or charted onto a timescale. • The major divisions of geologic time are known as eras which are described by some as chapters in Earth's history. • Each era is naturally different from another, especially in terms of the nature of life it contained. • The eras are then divided into periods. • These have nothing to do with the passage of a certain amount of time, meaning that they are not of equal length. • Instead, they are based upon the nature of the rocks and fossils found there. • Some may be longer than others. • The main subdivisions of periods are called epochs. • These eras, periods, and epochs usually were named after places on Earth (mostly in Western Europe) where the rocks of those times were first discovered.

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Mushk Budiji

Study unravels the recipe that gives Kashmiri rice variety, Mushk Budiji its unique aroma.

- The Kashmir Himalaya is known for the cultivation of mushk budiji, an indigenous rice variety distinguished for its rich aroma and unique taste.
- Mushk budiji was on the verge of extinction for some time due to various factors.
- Chief among them was the prevalence of rice blast disease, its low yield, and lack of profitability.
- However, a revival programme launched in 2007 by the Sher-e-Kashmir University of Agricultural Sciences and Technology (SKUAST) scientists saw the crop make a slow comeback.
- Mushk Budiji received a Geographical Indication (GI) tag in August 2023.
- The niche crop is grown under specific climatic conditions.

Other GI tagged rice varieties in India		
Rice Variety	**States**	**Characteristics**

Basmati Rice	Punjab, Haryana, Himachal Pradesh, Delhi, Uttarakhand, Uttar Pradesh, Jammu & Kashmir	• Basmati in Sanskrit means perfumed or fragrant happens to be long-grain aromatic rice. • Basmati gets its name also from the region it's like Taraori basmati and Dehraduni basmati and so on.
Kala Namak Rice	Uttar Pradesh	• This rice also known as Bhuddha Rice as this is a rare, ancient and aromatic rice. • Kalanamak cultivation almost dates back to 600BC.
Gobindobhog rice and Tulaipanji rice	West Bengal	• Gobindobhog is cultivated during the Kharif season. • As the cooked rice is offered to Lord Krishna (Govind) hence the name Gobindobhog. • The fragrance of the Tulaipanji rice remains for almost a year.
Navara rice, Kaipad, Pokkali rice, Gandhakasala, Wayanad Jeerakasala and Palakkadan	Kerala	• Navara also known as Sastika rice. • The unpolished type is mostly used in many Ayurvedic therapies. • This one finds a mention even in Ayurvedic texts. • The Palakkadan or the Kerala Rice is also called as Rose Matta rice. • Pokkali rice is a single season paddy, has the ability to survive adverse climatic conditions. • Pokkali is known to have therapeutic effects.
Chak-Hao rice	Manipur	• Also known as Manipuri black rice Chak means rice and Hao means delicious. • Being high in anthocyanins it is also a potent antioxidant.
Ambemohar rice and Ajara Ghansal	Maharashtra	• Ambemohar means mango blossom as the rice has the aroma of mango blossoms. • The Ajara Ghansal gets its name from words ghan which means fragrance, and sal which means gracefully thin.
Katarni rice	Bihar	• It's best known for its sweet, soft, and fragrant cheura (beaten rice).
Joha rice, Boka Chaul rice and Chokuwa rice	Assam	• The Joha rice is farmed in the Garo Hills. • It is also known by the names winter rice, Jaha rice or mi Jaha. • Boka Chaul also known as mud rice. • The rice does not need to be cooked and is edible by adding water to the rice.

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3. Times of India – GI-tagged rice varieties

Investment Facilitation for Development (IFD) Agreement

India and South Africa formally opposed the adoption of IFD agreement for consideration during the 13th Ministerial Conference (MC13) of WTO.

- **IFD –** A most-favoured-nation-based, plurilateral agreement of World Trade Organization (WTO).
- The agreement explicitly excludes market access, investment protection and investor-state dispute settlement.
- **Launch –** Originally launched in 2017 on a plurilateral basis by few WTO countries through a process known as the Joint Statement Initiative.
- It was finalized in 2023.
- **Aim –** To create legally binding provisions to facilitate investment flows.
- To develop predictable, transparent and open investment rules that will contribute to more efficient investment flows and increased business confidence.
- **Membership –** Open for all WTO members to join.
- Currently, it has 120 of 166 WTO member countries (more than 70% of the membership).
- India is not a member as it opined that investment-related issues can't be brought under the WTO's ambit.

- **Plurilateral agreement –** The 120 countries wanted to include the IFD Agreement as a plurilateral agreement (PA) within Annex 4 of the WTO Agreement.
- While the WTO is a multilateral trade organisation, Article II.3 of the WTO Agreement categorically allows for PAs.
- According to the Marrakesh Agreement (the WTO's constitution), a new PA can only be adopted through 'Annexure 4' rules, by explicit consensus of all WTO Members.
- Unlike multilateral agreements, PAs under the WTO are binding only on those members that have accepted them.

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Black Carbon

At the COP26 climate talks in Glasgow in November 2021, India pledged to achieve net-zero emissions by 2070, positioning itself as a frontrunner in the race to carbon neutrality.

- Black carbon is the dark, sooty material emitted alongside other pollutants when biomass and fossil fuels are not fully combusted.
- It contributes to global warming and poses severe risks.
- Studies have found a direct link between exposure to black carbon and a higher risk of

heart disease, birth complications, and premature death.

- Most black carbon emissions in India arise from burning biomass, such as cow dung or straw, in traditional cook stoves.
- According to a 2016 study, the residential sector contributes 47% of India's total black carbon emissions.

According to the Ministry of New and Renewable Energy, India had installed a renewable energy capacity of over 180 GW by 2023 and is expected to meet its target of 500 GW by 2030.

Quick Facts
Other Colored Carbons
• Scientists use color to classify carbon at different points in the carbon cycle based on carbon function, characteristics, and location. • **Blue –** Carbon stored in ocean plants and sediments. • This carbon is captured by living organisms in oceans and is stored in the form of aquatic biomass. • Seagrasses, mangroves, and marshes are types of vegetated coastal blue carbon ecosystems, these habitats have a cover of approximately 49 million hectares worldwide. • Blue carbon ecosystems act as the major sink for capturing atmospheric carbon and reducing warming effects. • **Green –** Carbon stored in terrestrial plants. • Green carbon reflects the carbon sequestered by land ecosystems and incorporates carbon in soils and within biomass such as trees in forests. • **Brown –** Carbon released by incomplete combustion of organic matter. • It coexists with black carbon when released into the atmosphere. • It also changes the solar absorption pattern and the nature of clouds. • **Red –** Carbon released through biological particles on snow and ice that reduce albedo. • **Gray –** Carbon released through industrial emissions. • **Teal –** Carbon stored in freshwater and wetland environments. • **Purple –** Carbon captured through the air or industrial emissions.

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Current Account Deficit (Vs) Capital Account Deficit

Current account deficit narrows to 1.2% of GDP at $10.5 billion in Oct-Dec: RBI.

Current Account	Capital Account

• A current account records a country's transactions with the rest of the world in goods, services, income, and transfers. • Most of the traditional forms of international trade are included in the current account. • These transactions are usually more immediate and visible than those recorded in the capital account. • **Components –** 1. **Goods –** Export and import of physical goods such as raw materials, consumer goods, and machinery. 2. **Services –** Exchange of intangible services, like tourism, travel, freight services, insurance, repair, consulting, investment banking, brokerage, education, health care, accounting, etc. 3. **Income –** Refers to the flow of income between residents of different countries, including wages, salaries, and dividends. 4. **Current Transfers –** Current transfers are one-way payments made without the expectation of receiving anything in return, such as foreign aid and remittances from workers abroad. 5. **Net Exports –** Refers to the difference between a country's exports and imports of goods and services. • **Deficit –** The current account deficit is a measurement of a country's trade where the value of the goods and services it imports exceeds the value of the products it exports.	• Capital account inflows and outflows reflect changes in the value of an asset through investments, loans, bank balances, and property value. • It is not as immediate and invisible as the current account. • When there is an imbalance in trade in goods and services between two nations, these imbalances are financed by offsetting financial and capital flows. • A country with a large trade balance deficit will have large investment surpluses from foreign countries and large demands on foreign assets. • **Components –** 1. **Domestic Investment Abroad –** Includes investments made by residents of a country in foreign entities, such as FDI and portfolio investments. 2. **Additional Paid-in Capital –** It represents the amount received from the stockholders over face value. 3. It is also known as stock premium. 4. **Changes in Reserves –** Refers to changes in a country's foreign exchange reserves held by the central bank to manage exchange rate fluctuations. 5. **Debt Forgiveness –** Refers to the cancellation of debt owed by a country to another country or international organization. • **Deficit –** A deficit in the capital account means money is flowing out of the country, and it suggests the nation is increasing its ownership of foreign assets.

Surplus

- Surplus is a condition when incomes or receipts overreach costs or expenditures and normally refers to the financial conditions of the governments.
- The term savings is preferred over the term surplus, and surplus implies that the government is being effectively operated and regulated.

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