

1 July, 2024

Nova Explosion

Context: In September, astronomers anticipate a once-in-a-lifetime nova explosion occurring 3,000 light-years from Earth, illuminating our night sky.

➤ What is a nova explosion?

- A nova explosion occurs when a dense white dwarf star interacts with a neighboring red giant star in a binary system.
- This interaction leads to a buildup of pressure and heat, triggering a thermonuclear explosion on the surface of the white dwarf.
- Unlike a supernova, which destroys the star completely, a nova event leaves the white dwarf intact, allowing the process to repeat over time.

➤ T Coronae Borealis (T CrB): The Blaze Star

- T CrB is a binary star system consisting of a white dwarf and a red giant.
- Known as the Blaze Star, T CrB undergoes nova explosions approximately every 80 years.
- Previous eruptions of T CrB were observed in December 1787 and October 1217 AD.

➤ Categories of Novae

Novae are categorized based on the speed of their light curve decay:

- **NA:** Fast novae exhibit a rapid increase in brightness, followed by a decline of 3 magnitudes—reducing to about 1/16 of their peak brightness—within 100 days.
- **NB:** Slow novae experience a brightness decline of 3 magnitudes over 150 days or more.
- **NC:** Very slow novae, also known as symbiotic novae, maintain maximum brightness for a decade or longer before gradually fading.
- **NR/RN:** Recurrent novae show multiple eruptions separated by intervals of 80 years or less.

➤ Difference Between Nova and Supernova

- A nova event does not destroy the white dwarf star, distinguishing it from a supernova, which results in the total destruction of the star.
- Supernovae are much more powerful and can outshine entire galaxies, whereas novae appear as new stars in the sky.

➤ Appearance of a Nova

- A nova explosion appears as a sudden increase in brightness in the night sky.
- To the naked eye, it resembles the appearance of a new star.
- Observers with telescopes can see the nova's luminosity and the blast of ejected star matter.

➤ Visibility of T CrB Nova

- The T CrB nova explosion in September 2024 is expected to be visible to the naked eye for several days.

- Located near the Northern Crown constellation, T CrB can be located by tracing a line between the stars Arcturus and Vega.

➤ Historical Sightings

- The last recorded nova event of T CrB was observed in 1946.
- The first known sighting of T CrB's nova was documented over 800 years ago in 1217 AD by an abbot in Ursberg, Germany.

Artificial Intelligence Preparedness Index 2024

Context: The International Monetary Fund (IMF) has launched a Dashboard for the Artificial Intelligence Preparedness Index (AIPI).

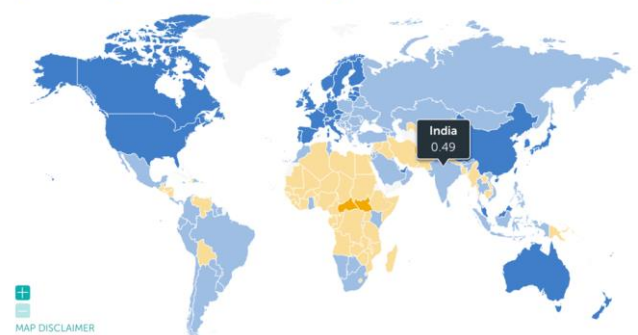
➤ About Artificial Intelligence Preparedness Index (AIPI):

- The AIPI evaluates AI readiness across 174 countries.
- Countries are assessed based on digital infrastructure, human capital policies, innovation and economic integration, and regulation and ethics.
- Countries are categorized as Advanced Economies (AE), Emerging Market Economies (EM), and Low-Income Countries (LIC).

➤ Country Ratings and Categories:

- Top-ranked AEs include Singapore (0.80), Denmark (0.78), and the United States (0.77).
- India is classified as an EM with a score of 0.49, ranking 72nd globally.
- Bangladesh (0.38), Sri Lanka (0.43), and China (0.63) are also categorized, ranking 113th, 92nd, and 31st respectively.

● 0.8 and more ● 0.6 - 0.8 ● 0.4 - 0.6 ● 0.2 - 0.4 ● under 0.20 ● no data



➤ Evaluation Criteria:

- AI readiness is assessed across digital infrastructure, human capital and labor policies, innovation and economic integration, and regulatory frameworks.

➤ Implications of AI on Global Employment:

- AI could impact up to 33% of jobs in AEs, 24% in EMs, and 18% in LICs, threatening 40% of jobs globally.

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1 July, 2024

- Despite job threats, AI can enhance productivity and foster new industries and jobs.

➤ **AI, Inequality, and Policy Response:**

- AI's rapid growth poses challenges and opportunities for economic inequality, productivity enhancement, job creation, and industry innovation.
- The AIPI Dashboard aims to equip policymakers, researchers, and the public with data for informed decision-making on AI's societal impacts.

New crimes under the Bharatiya Nyay Sanhita

Context: Three new legislations, the *Bharatiya Nyaya Sanhita (BNS)*, *Bharatiya Nagrik Suraksha Sanhita (BNSS)*, and *Bharatiya Sakshya Adhiniyam (BSA)*, passed in Parliament last December, are set to replace the *IPC, 1860*, the *CrPC, 1973*, and the *Indian Evidence Act, 1872* respectively, from today.

Notable New Crimes in the Bharatiya Nyaya Sanhita (BNS)

➤ **Clause 69: Sexual Intercourse through Deceitful Means**

- Penalizes sexual intercourse obtained through false promises of employment, promotion, marriage, or identity suppression
- Carries a punishment of up to 10 years imprisonment and fine
- Critics argue it may criminalize consensual relationships and promote the "love jihad" narrative

➤ **Clause 103: Murder on Grounds of Race, Caste, or Community**

- Recognizes such crimes as a separate offense for the first time
- Follows a 2018 Supreme Court directive to consider a separate law for lynching
- Aims to legally recognize these crimes which have been on the rise

➤ **Organized Crime and Terror Offenses**

- Brought under the BNS from specific stringent laws like UAPA and state laws
- Clause 111(1) defines organized crime extensively but has vague descriptions

➤ **Snatching as a Distinct Offense from Theft**

- Defined as forcibly seizing movable property to commit theft

- Both theft and snatching prescribe a punishment of up to 3 years in jail

New Timelines and Processes

➤ **Expanded Detention in Police Custody**

- Up to 90 days, expanded from the 15-day limit in CrPC
- Intended to incentivize police to complete investigations timely and curtail custodial torture

➤ **Victim-Centric Approach**

- Tighter timelines for trial completion
- Victim's opportunity to be heard before withdrawal of cases with 7+ years punishment

➤ **Trials in Absentia**

- Accused can be tried and convicted in absence
- Burden of proof on accused to prove innocence
- Critics argue it allows the state to forgo its duty to properly locate the accused

➤ **Removal of Statutory Bail Provision**

- Accused with multiple offenses cannot be granted bail if served less than half the maximum sentence
- Aims to ensure trials don't take forever and accused don't suffer continued incarceration

Positive Changes

➤ **Community Service as Alternate Punishment**

- For minor offenses like small theft, defamation, attempt to die by suicide
- Keeps first-time convicts and those convicted for minor offenses out of prison

➤ **Marital Rape of Minors Criminalized**

- Sexual intercourse with minor wife brought under rape
- Addresses the 15-18 year old married girls' grey area under IPC

➤ **Inclusion of Mob-Lynching Offenses**

- Acknowledges such hate crimes legislatively
- Video-conferencing of trials and timelines for speedy trials to improve justice delivery

Remaining Grey Areas

➤ **Sedition Law Retained with Wider Definition**

- Despite claims of doing away with it
- Incorporates SC guidelines from Kedarnath Singh case upholding its constitutional validity

➤ **Lack of Gender-Neutral Rape Laws**

- Exclusion of Section 377 leaves little recourse for male victims of sexual assault
- Specific rape laws still apply only to women victims

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1 July, 2024

NEWS IN BETWEEN THE LINES

Interest Equalisation Scheme



Recently, the Department of Commerce has extended the Interest Equalisation Scheme for pre- and post-shipment rupee export credit for Micro, Small and Mediumscale (MSME) exporters till August 31.

About the Interest Equalisation Scheme:

- The Interest equalisation Scheme (IES) is a **government program** that helps exporters access bank credit at a subsidized rate.
- The scheme was **launched** by the Government of India in **2015**.
- The scheme provides subsidies for **pre-and post-shipment rupee** export credit to exporters in identified sectors and all MSME manufacturer exporters.
- The interest subsidy is provided directly to banks, which then pass on the benefit to exporters by reducing the interest rate on export credit.
- The scheme covers both pre-shipment (**up to 180 days**) and post-shipment (**up to 360 days**) export credit in rupee terms.
- The scheme's interest equalisation **benefit is 2%** for merchant and manufacturer exporters of 410 identified tariff lines and 3% for all MSME manufacturer exporters.
- It is administered by the **Reserve Bank of India (RBI)** and implemented through scheduled banks.

White Paper



Recently, amid the stand-of between the Raj Bhavan and the West Bengal government, Governor C.V. Ananda Bose has called upon Chief Minister Mamata Banerjee to table a White Paper on the State's financial situation.

About White Paper:

- A white paper is a **blueprint for future policy** that provides information, analysis and proposals on a specific issue.
- It can also be a **detailed assessment of economic indicators and reforms** and their implications for various sectors.
- It serves to **provide transparency and clarity on specific topics**, such as financial status, policies, or future plans, to stakeholders and the public.
- A **government may present a white paper to make people aware of the nature and scope of a problem** and the possible ways to resolve it. For example, the government may present a white paper on black money.
- White Papers can **cover a wide range of topics** including **economic reforms, national security strategies, healthcare policies and environmental initiatives**.

Hool Diwas



Recently, the President of India paid her tributes to all the immortal fighters of the Santhal rebellion on 'Hool Diwas'.

About Hool Diwas:

- Hool Diwas marks the **anniversary of the Santhal rebellion**, also known as the Santhal Hul, which began on **June 30, 1855**.
- Hool Diwas is celebrated **every year on June 30** to honor the bravery and sacrifice of the Santhal rebels.
- The rebellion was led by the Santhal tribal leaders and heoros like **Sido-Kanhu, Chand-Bhairav** and **Phoolo-Jhano** against the oppressive British colonial authorities and the exploitative practices of landlords and moneylenders.
- The rebellion is **remembered for its fierce resistance** and the **martyrdom of many Santhals** who fought for their rights and dignity.
- The Santhal rebellion is **considered a precursor to later tribal** uprisings and movements against colonial rule and exploitation in India.

Shyok River



Recently, five Indian soldiers lost their lives after a tank was swept away by strong water currents in the Shyok river during military training in Ladakh.

About the Shyok River:

- The Shyok River **flows through the Ladakh** region in the northern part of India and also **crosses parts of Gilgit-Baltistan** (a region administered by Pakistan).
- It is a right bank tributary of the Indus River, one of the major rivers of the Indian subcontinent.
- It **originates from the Rimo Glacier**, which is part of the **Karakoram Range**.
- It flows through the **Nubra Valley** and joins the Indus River near the village of Keris in Pakistan-administered Gilgit-Baltistan.
- Major tributaries of the Shyok River include **Nubra River, Galwan River, Saltoro River** and **Chang Chen Mo River**.
- The Shyok River valley is of strategic importance due to its proximity to the Line of **Actual Control (LAC)** between India and China.

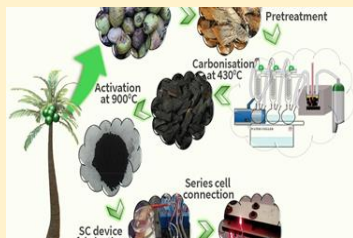
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1 July, 2024

Activated Carbon



Recently, the researchers at the Government College for Women in Thiruvananthapuram, Kerala have developed a method to produce activated carbon from coconut husks.

About the Activated Carbon:

- Activated carbon is a **form of carbon processed** to have small, low-volume pores that increase the surface area available for adsorption or chemical reactions.
- It is typically **produced from carbonaceous materials** such as **coconut shells, coal, wood or peat**, through processes like carbonization and activation.
- It is **known for its high surface area**, which enables it to adsorb a wide range of substances including gases, liquids and impurities.
- Activated carbon is **utilized in water purification, air filtration, chemical processes, medical filters and energy storage applications**.
- This method is specifically **tailored for supercapacitor fabrication**, utilizing coconut husks, a major agricultural residue in Kerala.
- Prototype supercapacitors** made from coconut husk-derived activated carbon were found to be four times more efficient than existing supercapacitors.
- The coconut husk-derived activated carbon **offers promising sustainable and efficient green solutions** for high-performance supercapacitors, owing to its availability, low cost, and eco-friendly nature.

Place in News

Japan



Recently, Japan announced it will start issuing new banknotes on July 3rd, featuring cutting-edge 3D holography and tactile marks for the visually impaired.

Japan (Capital: Tokyo)

Location: Japan is an island country in East Asia, located in the **Pacific Ocean**.

Boundaries:

- Japan is surrounded by the **Pacific Ocean** (East), the **Sea of Japan** (West), the **Sea of Okhotsk** (North) and the **East China Sea** (Southwest).
- It shares maritime borders with **China, North Korea, South Korea, the Philippines, Russia, the Northern Mariana Islands** and **Taiwan**.

Physical Features:

- The country's five main islands, from north to south, are **Hokkaido, Honshu, Shikoku, Kyushu** and **Okinawa**.
- Major rivers in Japan include the **Shinano, Tone, Ishikari, Kiso, Yodo** and **Tama** rivers.
- The country is **part of the Ring of Fire** and is prone to earthquakes, tsunamis and volcanic eruptions.
- Mount Fuji**, or **Fuji-san**, is the **tallest and largest active volcano in Japan**.
- Japan is known for minerals such as **coal, limestone, sulfur, lead, zinc** and **copper**.

Membership:

Japan is a member of several major international organizations, including the **United Nations (UN)**, the **Group of Seven (G7)**, the **Group of Twenty (G20)**, the **World Trade Organization (WTO)**, the **International Monetary Fund (IMF)**, the **World Bank** and the **Asia-Pacific Economic Cooperation (APEC)**.



POINTS TO PONDER

- Where is the Uttar Pradesh government setting up a bioplastic park to combat plastic pollution? – **Lakhimpur Kheri**
- Which organization recently released the 'Migration and Development Brief' report? – **World Bank**
- Who has been awarded the 'PEN Pinter Prize 2024'? – **Arundhati Roy**
- Which country announced plans to implement the world's first carbon tax on livestock emissions starting in 2030? – **Denmark**
- Pallikaranai Marshland, recently in the news, is located in which state? – **Tamil Nadu**

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