

## WEEKLY UPDATES – (11<sup>th</sup>-17<sup>th</sup> Sept)

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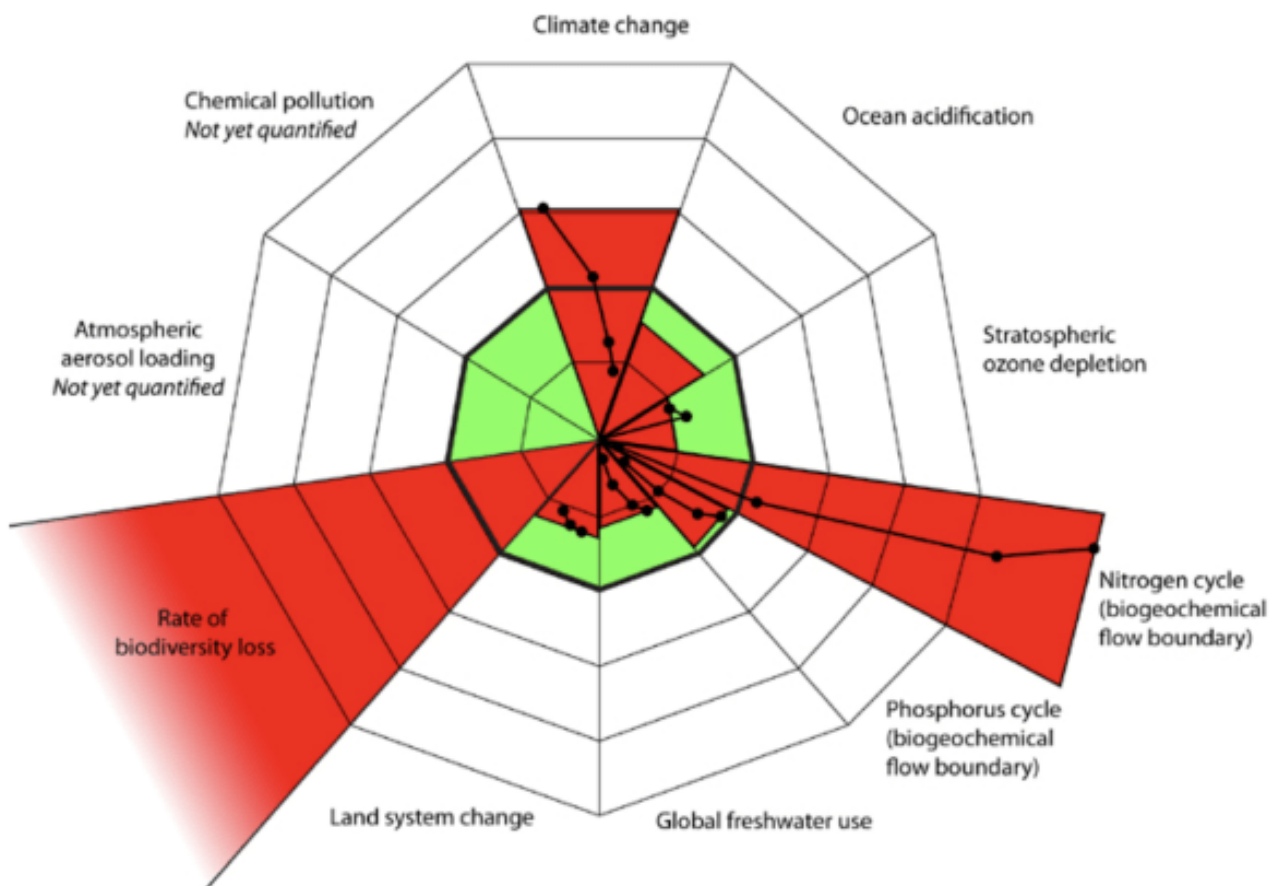
## ENVIRONMENT

### Earth Outside Its Safe Operating Space For Humanity On Most Key Measurements

**Context:** Earth is exceeding its “safe operating space for humanity” in six of nine key measurements of its health, and two of the remaining three are headed in the wrong direction, a new study said.

- Earth’s climate, biodiversity, land, freshwater, nutrient pollution and “novel” chemicals (human-made compounds like microplastics and nuclear waste) are all out of whack, a group of international scientists said.
  - **Example:** Water went from barely safe to the out-of-bounds category because of worsening river run-off and better measurements and understanding of the problem.
- Only the acidity of the oceans, the health of the air and the ozone layer are within the boundaries considered safe, and both ocean and air pollution are heading in the wrong direction, the study said.

In 2009, Mr. Rockstrom and other researchers created nine different broad boundary areas and used scientific measurements to judge Earth’s health as a whole.



Key Areas	Limit	Implication of Crossing the limit
<b>Climate Change</b>	CO <sub>2</sub> concentration in the atmosphere <350 ppm and/or a maximum change of +1 W m <sup>-2</sup> in radiative forcing	<ul style="list-style-type: none"> <li>• Loss of polar ice sheets. Regional climate disruptions.</li> <li>• Loss of glacial freshwater supplies.</li> <li>• Weakening of carbon sinks.</li> </ul>
<b>Ocean Acidification</b>	Mean surface seawater saturation state with respect to aragonite ≥ 80% of pre-industrial levels	<ul style="list-style-type: none"> <li>• Conversion of coral reefs to algal-dominated systems.</li> <li>• Regional elimination of some aragonite- and high- magnesium calcite-forming marine biota.</li> <li>• Slow variable affecting marine carbon sink.</li> </ul>
<b>Stratospheric Ozone Depletion</b>	<5% reduction in O <sub>3</sub> concentration from pre-industrial level of 290 Dobson Units	<ul style="list-style-type: none"> <li>• Severe and irreversible UV- B radiation affects human health and ecosystems.</li> </ul>
<b>Biogeo-Chemical Flows: interference with P and N cycles</b>	Limit industrial and agricultural fixation of N <sub>2</sub> to 35 Tg N yr <sup>-1</sup> Annual P inflow to oceans not to exceed 10 times the natural background weathering of P	<ul style="list-style-type: none"> <li>• P: avoid a major oceanic anoxic event (including regional), with impacts on marine ecosystems.</li> <li>• N: slow variable affecting overall resilience of ecosystems via acidification of terrestrial ecosystems and eutrophication of coastal and freshwater systems.</li> </ul>
<b>Global Freshwater Use</b>	<4000 km <sup>3</sup> yr <sup>-1</sup> of consumptive use of runoff resources	<ul style="list-style-type: none"> <li>• Could affect regional climate patterns (e.g., monsoon behavior).</li> <li>• Primarily slow variable affecting moisture feedback, biomass production, carbon uptake by terrestrial systems and reducing biodiversity.</li> </ul>
<b>Land System Change</b>	<15% of the ice-free land surface under cropland	<ul style="list-style-type: none"> <li>• Trigger of irreversible and widespread conversion of biomes to undesired states.</li> <li>• Primarily acts as a slow variable affecting carbon storage and resilience via changes in biodiversity and landscape heterogeneity</li> </ul>

<b>Rate of Biodiversity Loss</b>	Annual rate of <10 extinctions per million species	<ul style="list-style-type: none"> <li>• Slow variable affecting ecosystem functioning at continental and ocean basin scales.</li> <li>• Impact on many other boundaries—C storage, freshwater, N and P cycles, land systems.</li> <li>• Massive loss of biodiversity unacceptable for ethical reasons.</li> </ul>
<b>Chemical Pollution</b>	To be determined	<ul style="list-style-type: none"> <li>• Thresholds leading to unacceptable impacts on human health and ecosystem functioning possible but largely unknown.</li> <li>• May act as a slow variable undermining resilience and increase risk of crossing other thresholds.</li> </ul>
<b>Atmospheric Aerosol Loading</b>	To be determined	<ul style="list-style-type: none"> <li>• Disruption of monsoon systems. Human-health effects.</li> <li>• Interacts with climate change and freshwater boundaries.</li> </ul>

## AGRICULTURE

### Deficit Monsoon Affects Coffee Production

**Context:** India’s coffee crop witnessed a 20% drop in yield so far this year due to deficit rainfall.

- “The blossom showers were delayed. In Karnataka... we got only 50% of the expected rains.
- There is already a 20-25% drop in yield. If there are rains now, we will get the remaining 70-75% yield,” Mr. Jagadeesha added.

Indian coffee has fetched good prices lately owing to supply disruptions from Brazil, the world’s largest coffee producer, he said.

#### Coffee Cultivation

In May 2023, the Statista site stated that India is the sixth largest producer of coffee in the world, after Brazil (largest producer of coffee), Vietnam, Colombia, Indonesia, Ethiopia and Honduras.

**Coffee Plantation Practices in India:**  
Predominantly grown under thick natural shade. Ecologically sensitive regions of the Western and Eastern Ghats.

**Biodiversity Hotspots:**  
Coffee plantations located in these regions are recognized as biodiversity hotspots. Contribute significantly to India's unique biodiversity

**Export and Domestic Consumption:**  
Approximately 65% to 70% of the coffee produced in India is exported and remaining coffee is consumed domestically.

**Climate Conditions:**  
Hot and humid climate, Temperature 15°C to 28°C, and Rainfall 150 to 250 cm.

**Harmful Conditions:** Frost, Snowfall, High temperatures above 30°C, and Strong sunlight.

**Ideal Soil Conditions:** Well-drained loamy soils, Presence of humus and minerals (iron, calcium), Fertile volcanic red earth, and Deep sandy loam soils.

**Less Suitable Soil Conditions:** Heavy clay soils, Sandy soils.

**Coffee Plantation Locations in India:** Karnataka, Kerala, Tamil Nadu, Andhra Pradesh (Araku Valley), Odisha, Manipur, Mizoram, and Other northeastern states.

**Major Coffee Producer:** Karnataka accounts for approximately 70% of India's total coffee production.

## POLITY

### Section 69 Of The Proposed Bharatiya Nyaya Sanhita (BNS), 2023

**Context:** Section 69 of the proposed Bharatiya Nyaya Sanhita (BNS), 2023, identifies 'sexual intercourse on false promise of marriage' as an offence.

- If a man promises to marry a woman but never intends to, and still has 'consensual' sex with her, it will amount to a criminal offence under Section 69 of the proposed Bharatiya Nyaya Sanhita (BNS), 2023.
- The Bill, which seeks to replace the Indian Penal Code (IPC), 1860, identifies 'sexual intercourse on false promise of marriage' as an offence.
- At present, the offence is not carved out separately in the IPC, but courts have dealt with similar cases through other provisions within the criminal law framework.

#### THE GIST

- Section 69 of the proposed Bharatiya Nyaya Sanhita (BNS), 2023, identifies 'sexual intercourse on false promise of marriage' as an offence.
- Section 69 creates two violations: one by deceitful means, and one by a 'false promise to marry.' Deceitful means will include the "false promise of employment or promotion, inducement or marrying after suppressing identity." The false promise to marry will be attracted only when a man makes a promise to marry a woman, with the intention of breaking it, for the purpose of getting her consent and sexually exploiting her.
- In 2016, a quarter of the total rape cases registered in Delhi pertained to sex under 'false promise of marriage', as per Delhi Police data. The National Crime Records Bureau in the same year recorded 10,068 similar cases of rape by "known persons on a promise to marry the victim"

#### What does Section 69 say?

Chapter 5 of the Bill, titled "Offences against woman and children" describes 'sexual intercourse by employing deceitful means etc.'

- Section 69 creates two violations: one by deceitful means, and one by a 'false promise to marry.'
  - Deceitful means will include the "false promise of employment or promotion, inducement or marrying after suppressing identity."

- The false promise to marry will be attracted only when a man makes a promise to marry a woman, with the intention of breaking it, for the purpose of getting her consent and sexually exploiting her.
- Both offences will attract a penalty of up to ten years of imprisonment.

While introducing the Bills, Home Minister Amit Shah said, “crime against women and many social problems faced by them have been addressed in this Bill. For the first time, intercourse with women under the false promise of marriage, employment, promotion and false identity will amount to a crime.”

### How has the IPC dealt with cases of ‘false promise to marry’?

Previously, these cases were dealt with through a joint reading of Sections 375 and 90 of the IPC.

- **Section 375**, which defines rape, further defines consent as “an unequivocal voluntary agreement when the woman by words, gestures or any form of verbal or non-verbal communication, communicates a willingness to participate in the specific sexual act.”
  - Explanation 2 of Section 375 also lists seven types of consent which would amount to rape if violated; these include if a man has sexual intercourse with a woman “without her consent,” or consent taken through fear of death, hurt or intoxication.
  - In 2021, the Supreme Court reiterated that under Section 375, a woman’s consent “must involve an active and reasoned deliberation towards the proposed act”.
- **Section 90** says consent, given under “fear of injury” or “misconception of fact,” cannot be considered as consent.
  - Cases of false promise to marry are dealt with under the latter, where a ‘misconception’ is used to assess the validity of consent.
- Legal scholars have questioned the use of Section 90 to interpret consent, given that Section 375 already lays out a definition.

In 2016, a quarter of the total rape cases registered in Delhi pertained to sex under ‘false promise of marriage’, as per Delhi Police data. The National Crime Records Bureau in the same year recorded 10,068 similar cases of rape by “known persons on a promise to marry the victim” (the number was 7,655 in 2015).

- Researchers explained that these cases happen in one of two ways — when rape is committed, and the promise of marriage is used to silence the victim, or where the promise is made to ‘convince’ the person into entering a sexual relationship.
- Activists note that such cases play out mostly among socially disadvantaged women, given that legal remedy cannot be easily sought.

### Difference between ‘false promise’ and ‘breach of promise’?

The law has distinguished between a ‘false promise’ and a ‘breach of promise’ on the basis of proving if the man intended to marry at the time of engaging in sex. Courts have previously recognised the ambiguity in determining consent and intention in such cases.

- The SC observed that a false promise is “given on the understanding by its maker that it will be broken,” but a breach of promise is “made in good faith but subsequently not fulfilled.”
- Put simply, if a man can prove he intended to marry the woman before he entered into a sexual relationship, but later is unable to do so due to whatever reason, it is not legally punishable.

- The Supreme Court in 2022 held that consensual sex on a ‘genuine’ promise of marriage does not constitute rape.

### How is intention to marry proved?

Cases of ‘false promise of marriage’ look at two central issues — how consent is obtained (through deceitful means, or by misconception), and whether the man ever intended to marry the woman.

Activists argue that ‘circumstances’ are shorthand for social norms that uphold the status quo, reinforcing gender roles, patriarchy and caste lines.

- Moreover, Section 69 in the BNS codifies the offence instead of creating a new one. Thus, in its present form, the Bill doesn’t dissolve the confused distinction between ‘false promise’ and ‘breach of promise,’ and overlooks the inherent limitations in criminal law which feminist and anti-caste activists have pointed out.

## Post Office Bill (2023)

**Context:** The new Post Office Bill (2023) introduced in the Rajya Sabha, is to replace the Indian Post Office Act (1898) in the light of the changing role of post offices where its “network has become a vehicle for delivery of a variety of citizen centric services”.

### Key Highlights

- While the 1898 Act had focused only on mail services, the new Bill authorises the Director General of Postal Services to make regulations related to activities necessary for providing various such other services as the central government may prescribe, and to fix charges of them.
  - This provision is important as parliamentary approval will not be a prerequisite for revision of charges for any service offered by post offices, including traditional mail services.
  - This aspect in the new Bill gives the postal department the requisite flexibility in deciding the prices of its services in a fiercely competitive industry and help in responding quickly to market demands.
- Also, various initiatives of India Post to dispense citizen-centric services will now be based on a strong legal framework.
- The new Bill authorises the central government which “may, by notification, empower any officer to cause any item in course of transmission by the Post Office to be intercepted, opened or detained in the interest of the security of the State, friendly relations with foreign states, public order, emergency, or public safety or upon the occurrence of any contravention of any of the provisions of this Act...”.
  - Even in the existing Act (1898), there was provision for the Postal Department to open and destroy any postal article containing “explosive dangerous, filthy, noxious or deleterious substance” (Section 19, 19A, 23(3)(a) refer).
  - The provision contained in the new Bill is more generic in nature and will arrest possibilities of smuggling and unlawful transmission of drugs and other contraband goods through postal parcels. There is no similar legislation for courier firms.

- India Post has a share of less than 15% of the market in the courier/ express/parcels (CEP) industry, and so the effectiveness of the provision to intercept, open or detain any item in the course of postal transmission on the grounds of national security and public service has its limitations.
- The new Bill provides the central government “standards for addressing on the items, address identifiers and usage of post codes”.
  - This provision will have a far-reaching impact as the physical address may be replaced by a digital code using geo-spatial coordinates to identify a specific premise.
  - Digital addressing, though a futuristic concept, may ease the process of sorting and facilitate accurate delivery of mails and parcels.
  - This provision may even facilitate the delivery of parcels by drone, as is being experimented in some countries. However, there is a long way to go.
- The most important aspect of the Bill is to drop the hitherto existing provision in clause 4 of the 1898 Act: “Central Government shall have the exclusive privilege of conveying by post, from one place to another, all letters ... and shall also have the exclusive privilege of performing all the incidental services of receiving, collecting, sending, despatching and delivering all letters....”
  - This provision lost its relevance ever since couriers were allowed to operate in India since the 1980s.
  - This happened because the definition of ‘letter’ was not spelt out anywhere in the Act or in subsequent Indian Post Office Rules, 1933.
  - There is a huge grey area overlapping the concepts of ‘letter’ and ‘document’.
  - In the eyes of law, what the couriers hitherto delivered were ‘documents’ and ‘parcels’, not the ‘letters’.
  - Once the new Bill becomes an Act, all these legal debates as to what constituted a letter and what did not, will die down automatically.

## ECONOMY

### Gresham’s law

**Context:** What happens when governments fix currency exchange rates? The law, named after English financier Thomas Gresham, came into play most recently during the economic crisis in Sri Lanka last year, during which the Central Bank of Sri Lanka fixed the exchange rate between the Sri Lankan rupee and the U.S. dollar.

### Gresham’s Law

Gresham’s law refers to the dictum that “bad money drives out good.”

- Gresham’s law comes into play when the exchange rate between two moneys or currencies is fixed by the government at a certain ratio that is different from the market exchange rate.
- Such price fixing causes the undervalued currency — that is, the currency whose price is fixed at a level below the market rate — to go out of circulation.
- The overvalued currency, on the other hand, remains in circulation but it does not find enough buyers.



- It applies not just to paper currencies but also to commodity currencies and other goods.
- In fact, whenever the price of any commodity — whether it is used as money or not — is fixed arbitrarily such that it becomes undervalued when compared to the market exchange rate, this causes the commodity to disappear from the formal market.
- The only way to get hold of an undervalued commodity in such cases would be through the black market.
- Sometimes, countries can even witness the outflow of certain goods through their borders when they are forcibly undervalued by governments.

It should be noted that the market exchange rate is essentially an equilibrium price at which the supply of a currency is equal to the demand for the currency.

- Also, the supply of a currency in the market rises as its price rises and falls as its price falls; while, on the other hand, the demand for a currency falls as its price rises and rises as its price falls.
- So, when the price of a currency is fixed by the government at a level below the market exchange rate, the currency's supply drops while demand for the currency rises.
- Thus a price cap can lead to a currency shortage with demand for the currency outpacing supply.

Gresham's law can be seen at play whenever a government fixes the exchange rate (or price) of a commodity money (such as gold and silver coins) far below than the market price of the commodity backing them.

- In such cases, people who hold the commodity money would stop offering the money at the price fixed by the government.
- They may even melt such commodity money to derive pure gold and silver that they can sell at the market price, which is higher than the rate fixed by the government.

Gresham's law, however, holds true only when the exchange rate between currencies is fixed under law by the government and the law is implemented effectively by authorities.

- In the absence of any government decree fixing the exchange rate between currencies, it is good money that eventually drives bad money out of the market and not the other way round.
- When the exchange rate between currencies is not fixed and people have the choice to freely choose between currencies, people gradually stop using currencies that they consider to be of poor quality and adopt currencies that are found to be of better quality.
- This phenomenon wherein "good money drives out bad" is called **Thiers' law** (named after French politician Adolphe Thiers) and it is seen as a complement to Gresham's law.
- The rise of private cryptocurrencies in recent years has been cited by many analysts as an example of good money issued by private money producers driving out bad money issued by governments.

## INTERNATIONAL RELATIONS

### AU Leaders Welcome Admission Into G-20

**Context:** African leaders welcomed the unanimous decision by the G-20 countries to admit the African Union (AU) as its 21st member.

- “Honoured to welcome the African Union as a permanent member of the G-20 Family. This will strengthen the G-20 and also strengthen the voice of the Global South,” Prime Minister Narendra Modi said.
- It is a major step towards increasing the representation of developing countries in the forum.

### Impact of AU's Inclusion in G20

- The AU's membership in the G20 offers an opportunity to reshape global trade, finance, and investment and would provide a greater voice to the Global South within the G20.
- It allows African interests and perspectives to be heard and recognized within the G20.

### African Union (AU)

- The African Union (AU) stands as an intergovernmental organization comprising 55 member states located on the African continent.
- The headquarters of the AU's secretariat, known as the African Union Commission, is situated in Addis Ababa.
- Its official launch was on July 9, 2002, marking it as the successor to the Organisation of African Unity (OAU), which was initially established in 1963.
  - The AU's precursor, the OAU, was founded with the aim of fostering unity among African nations and addressing common issues through collective action.
  - However, its primary focus lay in supporting the liberation of colonized countries on the African continent.
  - To achieve this goal, the OAU provided diplomatic backing and logistical assistance to liberation movements across Africa.
  - While the OAU played a pivotal role in helping numerous African nations gain independence from their European colonizers, it struggled to promote political and economic integration among its member countries.
  - Consequently, reforms were initiated in the mid-1990s, ultimately leading to the establishment of the AU.

### Objectives of the AU

The AU places a strong emphasis on advancing unity and solidarity among African countries and their populations.

Its overarching objective is to expedite the process of political and socio-economic integration across the African continent.

Additionally, the AU addresses the multifaceted social, economic, and political challenges that African nations have been grappling with.

Among its key objectives are the promotion of peace, stability, and security across the region, as well as the protection and promotion of human rights.

## Russian Companies To Cease Offering Discounts On Fertiliser Supplies

**Context:** Russian companies have ceased offering fertiliser such as di-ammonium phosphate (DAP) to India at discounted prices due to tightening global supplies after becoming the biggest suppliers to the country last year, three industry sources told Reuters.

- The move in August by Russian companies to offer fertilisers at market prices could increase India's import costs and subsidy burden amid a rally in global prices, as top exporter, China, tries to curtail overseas sales.
- "There are no discounts," said a New Delhi-based senior industry official involved in the negotiations with overseas suppliers. "Russian companies are offering fertilisers at the market prices," the official said.

India's fertiliser imports from Russia more than tripled to a record 4.35 million tons in the 2022-23 financial year as suppliers gave discounts to the global market price for DAP, urea and NPK fertilisers.

### Gained market share

- Russia's aggressive selling last year eroded the Indian market share of other fertiliser exporters including China, Egypt, Jordan, and the United Arab Emirates (UAE).
- "Russian companies were offering DAP at discounts of as high as \$80 (per ton). However, now they are not offering discounts of even \$5," said another Indian company official.
- The current price of Russian DAP is approximately \$570 per ton on a cost and freight (CFR) basis for Indian buyers, which is the same price offered to other Asian buyers, said a Russian industry official.
- Global fertiliser prices have been surging over the past two months, making it challenging for Indian companies to accumulate stocks for the upcoming winter season when demand for DAP rises for the wheat crop, said an official from a Mumbai-based fertiliser company.
- In July, global suppliers were offering urea at approximately \$300 per ton on a CFR basis, but are now quoting \$400 per ton, he said. DAP prices were about \$440 per ton in July, he added.

## GOVERNANCE

### Ayushman Bhav Health Scheme

**Context:** With the Ayushman Bhav campaign, which will be inaugurated by President Droupadi Murmu virtually from the Rashtrapati Bhavan, the Union Health Ministry aims to provide healthcare services to every village and town in the country.

#### Key Highlights

- The campaign, initiated by the Health Ministry, is aimed at providing a comprehensive nationwide healthcare initiative to saturate coverage of healthcare services, reaching every village and town.
- The Ministry will also launch **Ayushman Apke Dwar 3.0 programme**, which will allow eligible beneficiaries enrolled under the PM-JAY scheme to download their health card on their own.
- "This historic launch of the campaign and the portal marked a significant leap towards achieving **Universal Health Coverage (UHC)** and ensuring healthcare for all as it strives to further consolidate the accessibility and affordability of healthcare services particularly for the underserved," the President said.

- The **multi-ministerial approach** adopted by the Ayushman Bhav campaign is to achieve the ambitious goal of **delivering healthcare services to the last mile of India**.
- Underscoring the **philosophy of antyodaya**, which means good health for all and leaving no one behind, Ms. Murmu praised the **involvement and support of local governance** in this endeavour and stated that gram panchayats who successfully achieved their goals would be declared as **Ayushman gram panchayats**.
- Highlighting the role of the government and its commitment to achieve the set sustainable development goals in due time, Ms. Murmu also commended the **Seva Pakhwada initiative**, which will run from September 17 to October 2, and which strives to ensure that every individual receives essential health services.
- The President also applauded the goals of Ayushman Bhav to further facilitate access of Ayushman cards, generate ABHA IDs, and raise awareness of health schemes and disease conditions, such as non-communicable diseases, tuberculosis, and sickle cell disease.

## How Does Ayushman Bhava Transform India's Healthcare Landscape?

### Universal Health Coverage (UHC) Goal

- The campaign adopts a collaborative, multi-ministerial approach.
- Ayushman Bhava aligns with the motto of "Sabka Saath Sabka Vikas" (Together with All, Development for All).
- This philosophy underscores inclusivity, leaving no one behind in healthcare access.

### Three Key Components of Ayushman Bhava

- Ayushman - Apke Dwar (AAD) 3.0: AAD 3.0 will enable eligible beneficiaries to create Ayushman cards for himself/herself/any of the family members.
- This streamlines healthcare access and benefits.

### Ayushman Melas at HWCs and CHCs

- Health Melas and Medical Camps are established weekly at Health and Wellness Centres (HWCs) and Community Health Clinics (CHCs).
- They prioritize the delivery of super-specialty healthcare services, including non-communicable disease screenings, tele-consultations, free medicines, and diagnostics.

### Ayushman Sabhas

- Ayushman Sabha is a community-level assembly, led by the Village Health and Sanitation Committee (VHSNC) in rural areas or the Ward Committee/Municipal Advisory Committee (MAS) in urban wards.
- Its primary mission is to ensure comprehensive health coverage and optimal healthcare service delivery.

### Ayushman Gram Panchayats

- Gram Panchayats that successfully meet their healthcare objectives will attain the status of Ayushman Gram Panchayats.
- This encourages local participation and dedication.

## DEFENSE

### Delivery Of First C-295 Transport Aircraft

**Context:** Marking a major revamp of its transport fleet, the Indian Air Force received the first C-295MW transport aircraft from Airbus. The 56 C-295 aircraft will replace the ageing Avro aircraft.

- Under the contract, 16 aircraft will come in fly-away condition from Seville while 40 will be manufactured by Airbus jointly with Tata Advanced Systems Ltd. (TASL).
- Work is under way to set up the final assembly line (FAL) at Vadodara in Gujarat and the first aircraft manufactured in India will be delivered in September 2026.
- Indigenous radar warning receiver and missile approach warning systems made by Bharat Electronics Ltd. (BEL) and counter measure dispensing system made by Bharat Dynamics Ltd. (BDL) have been certified and installed on the first aircraft.

#### Improved relations

- In September 2021, the Defence Ministry signed a ₹22,000-crore deal with Airbus and Space S.A., Spain for procurement of 56 C-295MW transport aircraft to replace the Avro aircraft in service with the IAF.
- The first 16 C295s of the 56 aircraft on order will be assembled at the San Pablo Sur site in Seville, Spain, with the second aircraft due to be delivered in May 2024 and the next 14 rolled out at a rate of one per month until August 2025, Airbus said.
- C-295 aircraft deal is valued at around \$2.5 billion, and it will significantly impact bilateral relations as well as economic ties between India and Spain.

#### Significance of Acquisition

The acquisition of the aircraft is significant for two reasons:

- First, it will replace the legacy Avro fleet of the IAF, which was acquired in the 1960s, and thus provide a fillip to the IAF's air transport duties in carrying troops and material to different parts of the country.
  - The IAF also operates the C-130J Super Hercules planes in the medium category and the giant C-17 Globemaster III for medium and heavier loads, which it had acquired from the United States.
- Secondly, the acquisition sets into motion India's first-ever 'Make in India' Aerospace programme in the private sector, under which the aircraft will be manufactured. So far, the state-owned Hindustan Aeronautics Limited (HAL) has had a monopoly over the manufacture of military aircraft in India.
  - This will boost India's aerospace sector with 15,000 high-skilled jobs and 10,000 indirect jobs in the next 10 years.

#### Multi-pronged features

- The C-295, with a carrying capacity of nine tonnes, can carry up to 71 troops or 50 paratroopers, air-drop cargo, be used for medical evacuation and take off and land on short and unpaved runways, according to Airbus.
- Adding to its flexibility is the capability of being equipped for the air-to-air refueling of fixed-wing aircraft and helicopters.
- It is a Medium Tactical Transport Aircraft. Beyond its use as a tactical transporter, the C-295 is capable of performing a wide variety of missions effectively. These included parachute and cargo dropping, electronic signals intelligence (ELINT), medical evacuation (MEDEVAC), and maritime patrol.

- Powered by two Pratt & Whitney turboprop engines, the aircraft can cruise at altitudes up to 30,000 ft and can quickly take off from and land at unpaved, soft, and sandy/grassy airstrips, the Airbus website states.

## HEALTH

### IISc Develops Novel Approach To Detect, Kill Cancer Cells

**Context:** Indian Institute of Science (IISc) scientists have developed a new approach to potentially detect and kill cancer cells, especially those which form a solid tumour mass.

- The scientists have created hybrid nanoparticles made of gold and copper sulphide, which can kill cancer cells using heat, and enable their detection using sound waves.

#### Key Highlights

Early detection and treatment are key in the battle against cancer.

- Copper sulphide nanoparticles have previously received attention for their application in cancer diagnosis, while gold nanoparticles, which can be chemically modified to target cancer cells, have shown anticancer effects.
- These particles have photothermal, oxidative stress, and photoacoustic properties.
- When light is shined on these hybrid nanoparticles, they absorb the light and generate heat, which can kill cancer cells.
- These nanoparticles also produce singlet oxygen atoms that are toxic for the cells.
- The researchers said that the nanoparticles can also help diagnose certain cancers.
- Existing methods such as standalone CT and MRI scans require trained radiology professionals to decipher the images.
  - The photoacoustic property of the nanoparticles allows them to absorb light and generate ultrasound waves, which can be used to detect cancer cells with high contrast once the particles reach them.
  - The ultrasound waves generated from the particles allow for a more accurate image resolution as sound waves scatter less when they pass through tissues compared to light.
  - Scans created from the generated ultrasound waves can also provide better clarity and can be used to measure the oxygen saturation in the tumour, boosting their detection.
  - You can integrate this with existing systems of detection or treatment.
    - For example, the nanoparticles can be triggered to produce heat by shining a

Previously developed nanoparticles have limited applications because of their large size.

- The IISc team used a novel reduction method to deposit tiny seeds of gold onto the copper sulphide surface.
- The resulting hybrid nanoparticles – less than 8 nm in size – can potentially travel inside tissues easily and reach tumours.
- The researchers believe that the nanoparticles' small size would also allow them to leave the human body naturally without accumulating, although extensive studies have to be carried out to determine if they are safe to use inside the human body.
- In the current study, the researchers tested their nanoparticles on lung cancer and cervical cancer cell lines in the lab. They now plan to take the results forward for clinical development.

light on them using an endoscope that is typically used for cancer screening.

## SCIENCE

### Picoflare Jets

**Context:** Researchers studying the findings of the Solar Orbiter Aircraft, a joint mission by the European Space Agency and the U.S. space agency NASA, recently announced that they had detected small jets of charged particles that were being expelled in intermittent fashion from the outer regions of the sun's outer atmosphere.

- They were emerging at a supersonic speed, and the expulsions lasted for 20-100 seconds at a time.

### Picoflare Jets

According to the researchers, these 'picoflare jets' could be a source of the solar wind, which have important effects on the solar system at large as well as on the earth's magnetic field.

- A solar wind is a high-speed stream of charged particles from the sun, but their exact origin remains unclear.

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'Picoflare jets' could be a source of the solar wind, a high-speed stream of charged particles from the sun, but their exact origin remains unclear

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Scientists only know that coronal holes are source regions for the solar wind. Coronal holes are transient parts of the sun's corona, or the outermost portion of its atmosphere, where the atmosphere is relative less dense and cooler, and from where the sun's magnetic field extends into space.

### About the Research

- The team used the Extreme Ultraviolet Imager of the Solar Orbiter Spacecraft to observe a coronal hole.
- The spacecraft took pictures of picoflare jets in March 2022, when it moved past the sun's south pole.
- These high-resolution images revealed dark streaks that were visible for 20-100 seconds before vanishing.
- Each streak was a few hundred kilometres long and emitted as much energy as 3,000-4,000 households in the U.S. consume over a whole year.
- The researchers observed the relatively small picoflare jets within emissions from the coronal hole that they were observing.
- While they lasted only a few dozen seconds, the researchers calculated that they contained enough energy to power a nontrivial fraction of the solar wind.

'Pico' is an order of magnitude that denotes  $10^{-12}$ , or one trillionth of a unit. The researchers name these jets from the sun thus because they carried approximately one-trillionth as much energy as the largest flares that the sun is believed to be able to produce, according to the researchers.

The discovery is notable because while strong gusts of the solar wind produce beautiful aurorae over the high latitudes of different planets, they also set off a cascade of effects that disrupt the earth’s magnetic field and damaging electronics in satellites in space and in circuits on the ground.

## IMPORTANT DAYS

### World Suicide Prevention Day

**Context:** September 10 marked the observance of World Suicide Prevention Day, an initiative which began in 2003 to shed light on the critical issue, diminish societal stigma, and heighten awareness. The theme since 2021, ‘Creating Hope Through Action,’ aims to inspire hope and bolster preventive measures.

- In India, the day calls for attention once again to the frequently overlooked problem of suicide among housewives.
- Ever since India began categorising suicide data by occupation, housewives have consistently ranked among the top two groups. This trend held true for 2021, the most recent year for which data are available.
- A significant share of married women, especially among poor households, face abuse, control, and limited freedom from spouses. Housewives make up over 50% of India’s female suicides.

### Key Highlights

The number of women who died by suicide in India reached a peak of 45,026 in 2021. More than half of them were housewives (Table 1).

- The share of housewives in total female suicides has remained above the 50% mark for several years now.
- The share of housewives in overall suicides too has remained around the 15% mark for many years.
- Notably, as shown in Table 2, over 30% of all suicides (men and women) were due to issues relating to family or marriage.

## Domestic distress

The tables are based on data collated from the National Crime Records Bureau's 'Accidental Deaths and Suicides in India' report and the National Family Health Survey (2019-21)

**Table 1**

The share of housewives in total female suicides has remained above the 50% mark for several years now

Year	Female suicides	% of housewives
2021	45,026	51.5%
2020	44,498	50.3%
2019	41,493	51.5%
2018	42,391	54.1%
2017	40,852	52.5%
2016	41,997	51.3%
2015	42,088	53.0%
2014	42,521	47.4%

**Table 2**

Over 30% of all suicides (men and women) were due to issues relating to family or marriage

Year	% of suicides with family problems/ marriage as reason
2021	38%
2020	38.6%
2019	37.9%
2018	36.6%
2017	35.6%
2016	34.5%
2015	32.4%

### Suicide prevention helplines

Suicides are preventable. Those in distress or having suicidal tendencies can contact I Call at 022-25521111 (Monday to Saturday, 8 a.m. to 10 p.m.). Scan for State-specific hotlines:





- In general, across years, economically better States in the south featured on top of the list of suicide rates.
- In 2021, among the major States, Kerala, Tamil Nadu, Telangana, and Karnataka featured at the top of this list.
- In 2016, Peter Mayer noted in the Economic and Political Weekly that a similar trend held even if the suicide rates of housewives alone were considered. His paper suggests that shifting expectations around social roles, particularly post-marriage, could be a contributing factor.
- In the south, where female literacy rates are comparatively high and women have greater access to mass media, there tends to be a clash between modern perspectives and traditional societal norms.
- In contrast, the push back against traditional expectations is less pronounced in the north, partly due to lower levels of exposure among women.

The National Family Health Survey (2019-21) highlights the challenging circumstances faced by married women, including limited mobility, restricted financial autonomy, and marital control, as well as physical, sexual, and emotional abuse in the hands of their spouses.

- It also shows that many women seldom seek external assistance and endure the attack on their freedoms in silence.
- Additionally, the data show that women in the lowest income bracket experience greater levels of violence and less freedom compared to those from wealthier households.

**Table 3** shows the share of married women aged 18-49 whose husbands had demonstrated specific types of controlling behaviour, across wealth quintiles, in 2019-21.

- At least one in four married women in the poorest 20% of households said her husband did not allow her to meet her female friends, insisted on knowing where she was all the time, exhibited jealousy or anger if she talked to other men, and did not trust her with money.
- The shares were relatively low in richer households.

**Table 3**

The share of married women aged 18-49 whose husbands had demonstrated specific types of controlling behaviour, across wealth quintiles, in 2019-21

Wealth quintiles	Is jealous or angry if she talks to other men	Frequently accuses her of being unfaithful	Does not permit her to meet her female friends	Tries to limit her contact with her family	Insists on knowing where she is at all times	Does not trust her with any money
Lowest	35%	14.4%	25.7%	20.1%	26.2%	28.6%
Second	30.5%	12.6%	22.3%	17.1%	22.1%	24.9%
Middle	24.9%	11.4%	19.2%	15.4%	18.8%	20.2%
Fourth	21.9%	9.3%	17.8%	13.9%	16.6%	16.7%
Highest	18.2%	5.4%	13.9%	10.8%	12.4%	12.9%

**Table 4** shows that 35% of married women in the poorest 20% of households had faced physical or emotional or sexual violence, and less than half of them had sought help (mostly from friends and family and rarely from authorities).

- The share of those who experienced violence was much lower in richer households. Also, many in richer households who did experience violence sought help.

**Table 4**

Thirty-five percent of married women in poorest households had faced some form of abuse

Quintile	Physical or sexual or emotional violence	Have sought help from any source
Lowest	35%	13.6%
Second	32%	12.2%
Middle	27.8%	15.3%
Fourth	21.9%	13.7%
Highest	15.9%	18.3%

**Table 5** shows that less than 40% of married women in the poorest quintile said that they can visit places such as markets alone. A slightly higher share of them said that they had money which they could decide how to use.

**Table 5 |** Less than 40% of married women in the poorest quintile said that they can visit places such as markets alone

Quintile	Share who have money that they can decide how to use	Share who can go alone to market and health facility and places outside village/community
Lowest	46.1%	39.6%
Second	47.3%	39.8%
Middle	49.5%	39.9%
Fourth	51.5%	42%
Highest	61.5%	49.9%