



G20 Summit 2023

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भारत 2023 INDIA

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE



Invitee Countries

- Bangladesh, Egypt, Mauritius, Netherlands, Nigeria, Oman, Singapore, Spain and UAE

India's Cultural Showcase

- Bharat Mandapam (inspired from Anubhav Mandapam)
- Bronze statue of Lord Nataraja (Chola style)
- Konark Chakra of Odisha's Sun Temple and Image of Nalanda University (used as iconic backdrops)
- Thanjavur Paintings and Dhokra art
- Brass statue of Lord Buddha sitting under Bodhi tree
- Diverse musical heritage (Hindustani, Folk, Carnatic, Devotional)

G20 Leaders' New Delhi Declaration

100% consensus on the Declaration

- Overcoming major differences on Russia-Ukraine war
 - ◆ Call for full implementation of Black Sea Grain Initiative
- Action Plan against Fugitive Economic Offenders
- Countering terrorism and money laundering
- Globally fair, sustainable, and modern international tax system
- Accelerating Progress on SDGs
- Multilateral Institutions (UNSC, Multilateral Development Banks etc)
- Digital Public Infrastructure (crypto, AI etc)
- Gender equality and women empowerment
- G20 Deccan High-Level Principles on Food Security and Nutrition 2023
- Global Biofuel Alliance formally launched

Other Major Outcomes

India- Middle East- Europe Economic Corridor

- Shipping & railway connectivity corridor (India, UAE, Saudi, EU, France, Italy, Germany and US) - part of Partnership for Global Infrastructure Investment

G20 now G21

- Permanent membership of African Union in G20 (in line with India as the 'Voice of the Global South')

Global Biofuel Alliance

- Led by India, Brazil and US
- Other Initiating Members - Argentina, Bangladesh, Italy, Mauritius, S. Africa and UAE (Canada and Singapore - observers)
- 19 countries and 12 int'l orgs agreed to join

Climate

- G20 High-Level Principles on Lifestyles for Sustainable Development
- Pledge to 3x RE capacity globally by 2030
- UK committed USD 2 bn to Green Climate Fund



Drishiti IAS

Read More: [G20 Infographic](#), [G20 Map](#), [Important Institutions - G20](#)

18th G20 Summit in New Delhi

For Prelims: [African Union](#), Global Biofuels Alliance, Financial Inclusion Document, World Bank, India - Middle East - Europe Economic Corridor, GE F-414 Jet Engine, India-Mercosur preferential trade agreement, [G20](#)

For Mains: Significance of G20 in India's Foreign Policy, Groupings & Agreements Involving India and/or Affecting India's Interests

Source: [IE](#)

Why in News?

The **18th G20 Summit** was held in **New Delhi, India** on September 9th and 10th, 2023. The summit was the **first time India hosted the G20 Leaders' Summit**.

- The theme of the summit was "**Vasudhaiva Kutumbakam**", which means "**The world is one family**".
- G20 Leaders' New Delhi Declaration achieved unanimous consensus, addressing diverse global issues, from Russia-Ukraine tensions to sustainable development, food security, and launching the Global Biofuel Alliance.

What are the Major Outcomes of G20 Summit 2023?

- **Admittance of the African Union (G20 now G21):**
 - The G20 leaders agreed to **admit the African Union as a permanent member** of the G20, which is a major step towards increasing the representation of developing countries in the forum.
 - **The 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.
- **Global Biofuels Alliance (GBA):**
 - **About:**
 - GBA is an **India-led initiative** that aims to develop an alliance of governments, international organizations, and industry to **promote the adoption of biofuels**.
 - The initiative seeks to position biofuels as a key component of the **energy transition and contribute to job creation and economic growth**.
 - It will help accelerate India's existing biofuels programs such as [PM-JIVANYojna](#), [SATAT](#), and [GOBARDhan scheme](#).
 - As per IEA, there will be 3.5-5x biofuels growth potential by 2050 due to **Net Zero targets**, creating a huge opportunity for India.
 - **Formation and Founding Members:**
 - The alliance was launched with nine initiating members: **India, the US, Brazil, Argentina, Bangladesh, Italy, Mauritius, South Africa, and the United Arab Emirates**.
 - GBA Members constitute major producers and consumers of biofuels. **USA (52%), Brazil (30%) and India (3%)**, contribute about 85% share in production and about 81% in consumption of ethanol.
 - 19 countries and 12 international organizations have already agreed to join.
 - **G20 Invited Countries supporting GBA:**
 - Bangladesh, Singapore, Mauritius, UAE
 - **Non-G20 supporting GBA:**
 - Iceland, Kenya, Guyana, Paraguay, Seychelles, Sri Lanka, Uganda, and Finland
 - **International Organizations:**

- World Bank, Asian Development Bank, World Economic Forum, World LPG Organization, UN-Energy for All, UNIDO, Biofutures Platform, International Civil Aviation Organization, International Energy Agency, International Energy Forum, International Renewable Energy Agency, World Biogas Association.

▪ **India - Middle East - Europe Economic Corridor (IMEC):**

- A Memorandum of Understanding (MoU) was signed between the Governments of India, the US, Saudi Arabia, the European Union, the UAE, France, Germany and Italy to establish the IMEC.
- IMEC is part of a broader initiative called the [Partnership for Global Infrastructure Investment \(PGII\)](#).
 - The PGII was initially introduced during the [G7 summit in the UK in June 2021](#).
 - PGII aims to **finance infrastructure projects in developing countries** through a combination of public and private investments.
- IMEC is a significant infrastructure **project connecting India, the Middle East, and Europe**.
- The project aims to **establish a network of transport corridors, including railways and sea lanes**.
- IMEC is seen as a response to [China's Belt and Road Initiative \(BRI\)](#), providing an alternative infrastructure network.

▪ **G20 Global Partnership for Financial Inclusion Document:**

- The G20 Global Partnership for **Financial Inclusion** document prepared by the **World Bank** has lauded the transformative [impact of India's Digital Public Infrastructure \(DPI\)](#) over the past decade under the Central Government.
- The document emphasizes the following initiatives that played a greater role in shaping the DPI landscape:
 - **Rapid Financial Inclusion:**
 - India's DPI approach achieved **47 years' worth of financial inclusion progress in just 6 years**.
 - [Jan Dhan-Aadhar-Mobile \(JAM\)](#) Trinity boosted the financial inclusion rate from **25% in 2008 to over 80% within 6 years**.
 - Regulatory frameworks, national policies, and **Aadhaar-based verification complemented DPIs**.
 - [Pradhan Mantri Jan Dhan Yojna \(PMJDY\) Success:](#)
 - PMJDY accounts **tripled from 147.2 million (March 2015) to 462 million (June 2022)**.
 - **Women own 56% of these accounts, exceeding 260 million**.
 - PMJDY drove savings among low-income women, attracting over 12 million customers by April 2023.
 - **Government to Person (G2P) Payments:**
 - India's digital G2P architecture facilitated **USD 361 billion transfers to beneficiaries from 53 ministries via 312 schemes**.
 - Achieved total savings of **USD 33 billion by March 2022, equivalent to 1.14% of GDP**.
 - [Unified Payments Interface \(UPI\) Dominance:](#)
 - May 2023 witnessed over **9.41 billion UPI transactions, valued at Rs 14.89 trillion**.
 - UPI transactions in FY 2022-23 neared **50% of India's nominal GDP**.
 - **Private Sector Efficiency:**
 - DPI streamlined private organizations' operations, reducing complexity, costs, and time.
 - Some NBFCs achieved 8% higher SME lending conversion rates, 65% savings in depreciation costs, and 66% cost reduction in fraud detection.
 - **Banks' customer onboarding costs in India dropped from USD 23 to USD 0.1 with DPI use**.
 - **Lower Compliance Costs for KYC:**
 - Reduced compliance costs from USD 0.12 to USD 0.06, making lower-income clients more attractive.
 - **Cross-Border Payments:**

- UPI-PayNow linkage enables faster and cheaper cross-border payments with Singapore.
- **Account Aggregator Framework:**
 - Enabled 1.13 billion accounts for data sharing with 13.46 million consents raised.
- **Data Empowerment and Protection Architecture (DEPA):**
 - Provides individuals control over their data, fostering innovation and competition.

What are the Other Key Highlights of G20 Summit 2023?

- **Tripling the Global Renewable Energy Capacity By 2030:**
 - G20 countries promised to work towards **tripling the global [renewable energy](#) capacity by 2030.**
 - If met, this single step could avoid **carbon dioxide emissions by seven billion tonnes between now and 2030**, according to an assessment by the [International Energy Agency \(IEA\)](#).
 - Aligns with **global efforts to [limit global warming to 1.5 degrees Celsius](#).**
 - Represents a significant shift away from **[fossil fuels](#) towards cleaner energy alternatives.**
 - The declaration acknowledges that current climate action is insufficient and highlights the need for trillions of dollars in financial resources to achieve the **objectives of the [Paris Agreement](#).**
 - Expanding renewable energy capacity on this scale could avoid about 7 billion tonnes of CO2 emissions between 2023 and 2030.
- **Commitment to Global Food Security and Nutrition:**
 - The G20 leaders recognize the importance of **addressing rising commodity prices, including food and energy prices**, which contribute to **cost-of-living pressures**.
 - They aim to **eliminate hunger and [malnutrition](#)**, acknowledging that global challenges like **poverty, [climate change](#), pandemics, and conflicts** disproportionately affect vulnerable populations, particularly women and children.
 - The G20 declaration highlights the human suffering and impacts of the war in **Ukraine on global food and energy security**, supply chains, inflation, and economic stability.
 - G20 leaders called for the full, timely **implementation of the [Black Sea grain initiative](#).**
 - The agriculture working group during the G20 Presidency reached a historic consensus on two aspects: **Deccan G20 High-level principles on Food Security and Nutrition and the Millet initiative called MAHARISHI.**
 - The seven principles under the high-level principles on food security and nutrition include **humanitarian assistance, increasing food production and food security net programs, climate-smart approaches, inclusivity of agriculture food systems, one health approach, digitalization of the agriculture sector, and scaling responsible public and private investment in agriculture.**
 - MAHARISHI (Millets And OtHer Ancient Grains International ReSearch Initiative) aims at advancing research collaborations and generating awareness about millets and other ancient grains during International Years of Millets 2023 and after.
 - The G20 committed to promoting transparent, fair, and rule-based trade in agriculture, food, and fertilizer. They pledged not to impose export restrictions, reduce market distortions, and align with WTO rules.
 - The G20 leaders emphasize the importance of strengthening the **Agricultural Market Information System (AMIS) and the Group on Earth Observations Global Agricultural Monitoring (GEOGLAM)** for greater transparency.
 - This includes expanding AMIS to include vegetable oils and enhancing collaboration with early warning systems to avoid food price volatility.
- **Note:**
 - AMIS is an inter-agency platform to **enhance food market transparency and policy response for food security.**
 - It was launched in **2011 by the G20 Ministers of Agriculture** following the

global food price hikes in 2007/08 and 2010.

- GEOGLAM enhances **market transparency and food security by providing timely agricultural information worldwide.**
- The GEOGLAM policy mandate initially came from the Group of Twenty (G20) Agriculture Ministers during the French G20 Presidency in 2011.

▪ **Small Arms and Terrorist Safe Havens:**

- The 2023 New Delhi Declaration builds upon previous G20 declarations, especially the **2015 Turkiye declaration**, which strongly denounced terrorism. Unlike the **2022 G20 Bali Leaders Declaration**, which primarily focused on the financing of terrorism and the strengthening of the [Financial Action Task Force \(FATF\)](#), the New Delhi Declaration **encompasses a wider range of concerns.**
- The G20 leaders, in the **New Delhi Declaration**, **clearly condemn terrorism in all its forms and manifestations.**
- The declaration supports the FATF's efforts to enhance global asset recovery networks and recover criminal proceeds.

▪ **Healthcare Resilience and Research:**

- The G20 New Delhi Leaders' Declaration places significant emphasis on healthcare and prioritizes the need to build a **resilient healthcare system.**
- It commits to strengthening the global health architecture to create more **resilient, equitable, sustainable, and inclusive health systems.** The [World Health Organization \(WHO\)](#) is at the core of this effort.
- The goal is to enhance primary healthcare, the health workforce, and essential health services to levels better than **pre-pandemic within the next two to three years.**
- In addition to addressing ongoing epidemics like tuberculosis and AIDS, the G20 recognizes the **importance of research on long Covid.**
- India's G20 presidency also pushed for the integration of evidence-based [traditional medicine practices](#) **with modern medicine.**
- There is an emphasis on adopting a [one-health approach](#), which tracks **diseases in animals, plants, and humans within the same mechanism**, with a particular focus on tackling antimicrobial resistance.

▪ **Finance Track Agreements:**

- India's G-20 presidency has laid the foundation for a **coordinated and comprehensive policy and regulatory framework for [cryptocurrencies.](#)**
- The emergence of global consensus on **crypto asset regulation was emphasized.**
- G-20 leaders have recognized the pressing need for **more robust and effective [Multilateral Development Banks \(MDBs\)](#)** to address the high developmental demands globally.
- The **India Stack model of digital public infrastructure** for financial inclusion is acknowledged as a promising approach.
- The G-20 leaders' New Delhi Declaration underscores the **monitoring of risks associated with the rapid developments in the crypto-asset ecosystem.**

▪ **India-Mercosur Preferential Trade Agreement (PTA):**

- India and Brazil agreed to work together for the expansion of **India-Mercosur PTA** to promote economic ties.
 - Mercosur is a trading bloc in **Latin America, comprising Brazil, Argentina, Uruguay and Paraguay.**
- The India-Mercosur PTA came into effect on **June 1, 2009, aimed to eliminate customs duties on a limited number of goods agreed between India and the Mercosur bloc.**

▪ **Climate Financing Commitment:**

- The declaration emphasizes a **substantial increase in climate financing, calling for a "quantum jump" from billions of dollars to trillions of dollars.**
- It underscores the need for significant financial resources, including USD. 5.8-5.9 trillion in the pre-2030 period for developing countries and USD 4 trillion per year for [clean energy technologies by 2030](#) to achieve [net-zero emissions by 2050.](#)

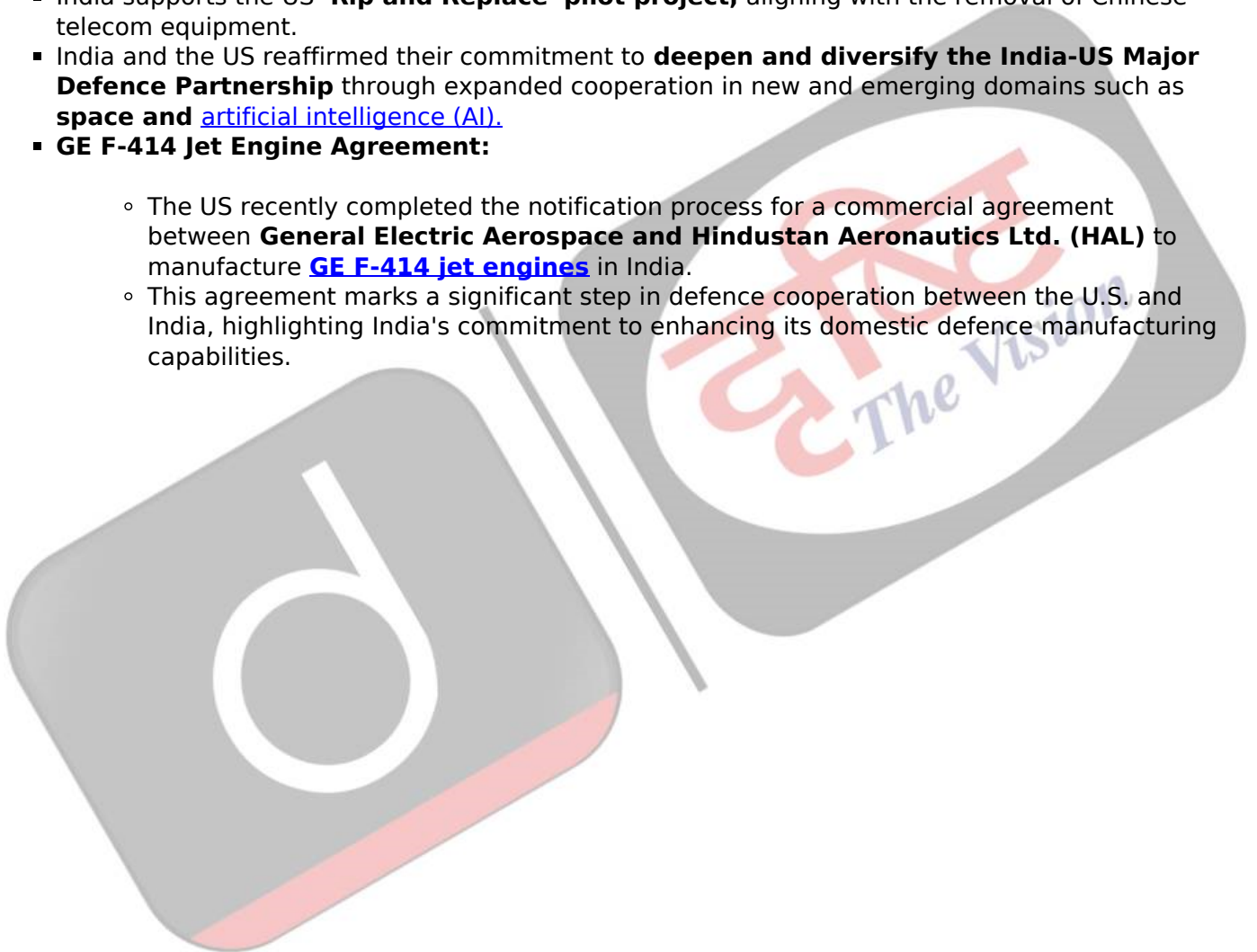
▪ **India's Cultural Showcase:**

- **Bharat Mandapam** (inspired from **Anubhav Mandapam**).

- Bronze statue of [Lord Nataraja \(Chola style\)](#).
- [Konark Chakra of Odisha's Sun Temple](#) and Image of [Nalanda University](#) (used as iconic backdrops).
- [Thanjavur Paintings](#) and [Dhokra art](#).
- Brass statue of **Lord Buddha** sitting under Bodhi tree.
- Diverse **musical heritage** ([Hindustani](#), **Folk**, [Carnatic](#), Devotional).
- **Transition of G20 Presidency:**
 - Prime Minister of India handed over the customary gavel of the **G20 chair to Brazilian President Luiz Inacio Lula da Silva**, who will officially take over the presidency on December 1, 2023.

What are the Latest India-US Collaboration at G20 Summit 2023?

- India and the United States are strengthening their technology partnership, focusing on **resilient semiconductor supply chains, and telecom infrastructure**.
- India supports the US '**Rip and Replace**' **pilot project**, aligning with the removal of Chinese telecom equipment.
- India and the US reaffirmed their commitment to **deepen and diversify the India-US Major Defence Partnership** through expanded cooperation in new and emerging domains such as **space and artificial intelligence (AI)**.
- **GE F-414 Jet Engine Agreement:**
 - The US recently completed the notification process for a commercial agreement between **General Electric Aerospace and Hindustan Aeronautics Ltd. (HAL)** to manufacture [GE F-414 jet engines](#) in India.
 - This agreement marks a significant step in defence cooperation between the U.S. and India, highlighting India's commitment to enhancing its domestic defence manufacturing capabilities.



G-20 (The Group of Twenty)

About

- In 1999, following the **Asian Financial Crisis** of the **1990s**, **G20** was established as a Forum for **Finance Ministers and Central Bank Governors**.
- Raised to the **Summit level in 2008** to address the global financial and economic crisis of 2008.

Aims

- Secure global financial stability by involving world's largest advanced and emerging economies.

Structure and Functioning of G20

- The **G20 Presidency** rotates annually
- No permanent **Secretariat** or **Headquarters**
- **19 countries** are divided into **5 groups**
- The presidency rotates between each group

Troika

- It is a working association between the **current presidency**, **past presidency** and **next presidency**.

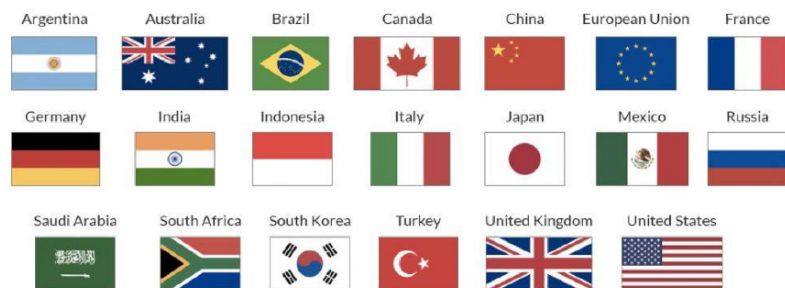
Challenges

- No Enforcement mechanism
- No legal binding
- Polarization of Interests:
 - Russia Ukraine Conflict
 - China's strategic rise
 - NATO's expansion

G20 India 2023

- India assumed the **18th G20 Presidency from December 1, 2022** for a **one-year period**.
- **Theme:**
 - **"Vasudhaiva Kutumbakam"** a Sanskrit word which Stands for **"One Earth - One Family. One Future"**.
 - This is taken from the ancient Sanskrit text of the **'Maha Upanishad'**.

G20 COUNTRIES



UPSC Civil Services Examination Previous Year's Questions (PYQs)

Prelims:

Q. In which one of the following groups are all the four countries members of G20? (2020)

- (a) Argentina, Mexico, South Africa and Turkey
- (b) Australia, Canada, Malaysia and New Zealand
- (c) Brazil, Iran, Saudi Arabia and Vietnam
- (d) Indonesia, Japan, Singapore and South Korea

Ans: (a)

Drop in India's Reservoir Water Levels

For Prelims: [Central Water Commission \(CWC\)](#), [El Niño](#), [Indian Ocean Dipole \(IOD\)](#),

For Mains: Significance of India's reservoirs, Consequences of reduced water availability, How El Niño, IOD, and IOD influence India's monsoon patterns and rainfall.

Source: [IE](#)

Why in News?

India, a country heavily reliant on [monsoon rains](#), faced a significant challenge in **August 2023 with an unprecedented rainfall deficit**.

- As a result, the **water levels in the nation's crucial reservoirs** have experienced a **sharp decline**, raising concerns about water supply for households, industries, and power generation.
- August is typically a month when India's reservoirs see their water storage levels increase significantly. However, **August 2023 was an exception, as it marked the driest August in over 120 years**. Instead of the **expected 255 mm of rainfall**, the country received **only about 162 mm, resulting in a 36% rainfall deficiency**.

How Dry are India's Reservoirs?

- According to the [Central Water Commission \(CWC\)](#), the live storage in the **150 reservoirs was 113.417 billion cubic meters (BCM) as of 31st August, 2023**, which was **63% of their total live storage capacity**.
 - This was about **23% less than the storage during the same period in 2022 and about 10% less than the average of the last 10 years**.
- The water levels in the reservoirs varied across different regions and river basins. The southern region, which had a **rainfall deficiency of 60% in August**, had the **lowest storage level of 49% of its combined capacity**.
- The eastern region, which received normal rainfall, had the **highest storage level of 82% of its combined capacity**.
- Some of the **river basins that had highly deficient or deficient** water levels were:
 - **Highly Deficient:**
 - [Pennar](#) basin in Karnataka and Andhra Pradesh

- **Mahanadi basin** in Chhattisgarh and Odisha
- **Deficient:**
 - **Subarnarekha, Brahmani and Vaitarni** basins in Jharkhand, West Bengal and Odisha
 - **Kaveri** basin in Karnataka and Tamil Nadu
 - **Mahi** basin in western India
 - **Krishna** basin in Maharashtra, Karnataka and Telangana
- Water storage in the reservoirs of the eastern, western, central and southern regions, except the northern region is less than last year (2022).

Note:

- A **20% reduction in a river basin is close to normal**, according to the CWC.
- A basin is categorized as **deficient** if the reduction is **greater than 20% and less than or equal to 60%**.
- A reduction of over 60% is called **highly deficient**.

What Are the Consequences of this Water Scarcity?

- **Agriculture:**
 - The reservoirs provide irrigation water for crops, especially **during the rabi season**. The reduced water availability can affect crop production and farmers' incomes.
- **Power:**
 - The reservoirs also supply water for hydropower generation, which accounts for over **12% of India's total electricity generation**.
 - The dry August led to an **unexpected increase in power demand**, primarily for irrigation purposes.
 - Power generation reached a record high in August, necessitating additional electricity production by coal-fired power plants due to the precarious water levels in the reservoirs.
- **Environment:**
 - The reservoirs also **support biodiversity and ecosystem services**, such as **flood control, groundwater recharge, fisheries and recreation**. The lower water levels can affect these functions and cause ecological damage.
- **Impact on Water Supply:**
 - India's annual rainfall primarily occurs during the **southwest monsoon season**, making these reservoirs vital for water supply year-round. This scarcity in water storage threatens households.

What are the Causes for the Rainfall Deficit?

- **El Niño:**
 - **El Niño** is a climatic phenomenon that occurs when the **sea surface temperature in the central and eastern Pacific Ocean rises above normal**.
 - It affects the global weather patterns and reduces rainfall in India during the monsoon season.
 - According to the **India Meteorological Department (IMD)**, El Niño was present during August 2023 and was expected to continue till September.
 - The IMD has forecasted that rainfall in **September will likely not be more than 10% deficient**.
 - However, the looming threat of El Niño in the **equatorial Pacific Ocean**, which is still gaining strength, poses a significant risk to India's water resources.
- **Indian Ocean Dipole (IOD):**
 - The **Indian Ocean Dipole (IOD)** is defined by the **difference in sea surface temperature between two areas (or poles, hence a dipole)** - a western pole in the

Arabian Sea (western Indian Ocean) and an eastern pole in the eastern Indian Ocean south of Indonesia.

- The IOD affects the climate of Australia and other countries that surround the Indian Ocean Basin, and is a significant contributor to rainfall variability in this region.
 - According to IMD, IOD was expected to turn favourable for the monsoon rainfall this year, but did not have much impact.

Way Forward

- Promote **efficient water management practices** in agriculture, including the adoption of drip irrigation and rainwater harvesting techniques.
 - Encourage **crop diversification and the cultivation of drought-resistant crops** to reduce the reliance on water-intensive farming.
- Water innovation initiatives, such as **desalination, wastewater treatment, smart water technologies, and climate-resilient agriculture**, can help enhance water supply and efficiency and cope with water challenges and uncertainties.
- Invest in **renewable energy** sources like solar and wind power to reduce the dependency on hydropower generation, especially during dry periods.
- **Raise awareness** among the public about responsible water usage and the importance of conservation.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to 'Indian Ocean Dipole (IOD)' sometimes mentioned in the news while forecasting Indian monsoon, which of the following statements is/are correct? (2017)

1. IOD phenomenon is characterised by a difference in sea surface temperature between tropical Western Indian Ocean and tropical Eastern Pacific Ocean.
2. An IOD phenomenon can influence an El Nino's impact on the monsoon.

Select the correct answer using the code given below:

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

Ans: (b)

Mains

Q: How far do you agree that the behaviour of the Indian monsoon has been changing due to humanizing landscape? Discuss. (2015)

Q. 'Climate change' is a global problem. How India will be affected by climate change? How Himalayan and coastal states of India will be affected by climate change? (2017).

New Education Policy in West Bengal

For Prelims: New Education Policy in West Bengal, [National Education Policy 2020](#), [Concurrent](#)

Subject, Regional Autonomy, **PARAKH (Performance Assessment, Review, and Analysis of Knowledge for Holistic Development)**.

For Mains: New Education Policy in West Bengal, Concerns Raised by states about NEP 2020.

Source: IE

Why in News?

Recently, the West Bengal government has announced its own **State Education Policy for 2023**, declining some of the aspects of the **NEP (National Education Policy) 2020**.

- Many states such as Kerala, Karnataka, and Tamil Nadu have also **declined to adopt the NEP 2020 in its entirety**.

What are the Key Highlights of the West Bengal Education Policy?

- **Continuation of 5+4+2+2 Pattern:**
 - The state will maintain the **existing 5+4+2+2 pattern** for school education.
 - This structure begins with one year of pre-primary education, followed by four years of primary education (up to class 4), four years of upper primary education (class V to VIII), two years of secondary education, and finally, two years of higher secondary education.
 - The NEP suggests transitioning to a 5+3+3+4 school system, where Class 9-12 is considered a continuum offering students subject choices, is declined by the state government.
- **Three-Language Formula:**
 - The policy recommends the introduction of a **three-language formula for students in classes V to VIII**.
 - The first language, referred to as the "mother tongue," will be the medium of instruction.
 - For example, in Nepali-medium schools, **Nepali will be the medium of instruction**, Santhali in Santhali-medium school, and similarly for other languages and mediums.
 - The second language can be English or any language other than the first language, depending on the student's choice.
 - The third language can be any language chosen by the student, different from the first and second languages.
- **Introduction of 'Bangla' as a Subject:**
 - Bangla will be introduced as a subject from **Class I to Class XII for students** in schools with languages **other than Bangla** as the medium of instruction.
 - However, it is not recommended as a first language.
- **Semester System at Higher Secondary Level:**
 - In higher secondary education (Class XI and XII), it has introduced a semester system to **facilitate a smoother transition from school to university**.
 - Semester examinations may include a combination of multiple-choice questions (MCQs) and descriptive questions.

Why has West Bengal Developed its Own Education Policy Instead of Implementing NEP 2020?

- **Autonomy and Regional Needs:**
 - One of the primary reasons is the **desire for autonomy in shaping the education system** according to the unique needs and priorities of West Bengal.
 - Education is a **Concurrent Subject** in India, which means both the central and state governments can legislate on it. States often seek to customize educational policies to align with their cultural, linguistic, and socio-economic contexts.

- **Rural Disadvantage:**
 - The proposal for a common entrance test for **undergraduate courses, as suggested by NEP 2020**, raised worries in Bengal.
 - The state government fears this **could put rural students at a disadvantage** and prefers a decentralized admission approach to ensure fairness for all.
- **Historical and Cultural Factors:**
 - West Bengal has a rich cultural and linguistic diversity, with Bengali being the predominant language.
 - The state has felt that it is important to **preserve and promote the Bengali language** and culture through its education policy.
 - This could lead to **variations from the NEP**, which seeks to implement a uniform policy across the country.
 - Another point of contention is the NEP's encouragement of private-sector participation in education.
 - Bengal remains cautious about this, advocating for a **stronger role of the public sector to ensure equal and accessible** education opportunities.
- **Consideration of Alternatives:**
 - The West Bengal government has indicated its intention to analyze educational initiatives in states like Maharashtra and Kerala to propose an alternative approach.
 - This signals a **willingness to explore different models** and adapt best practices from other states.

What is NEP 2020?

- **About:**
 - The NEP 2020 aims at making “India a global knowledge superpower”. It is only the 3rd major revamp of the framework of education in India since independence.
 - The two earlier education policies were brought in 1968 and 1986.
- **Salient Features:**
 - Ensuring Universal Access at All Levels of schooling from pre-primary school to Grade 12.
 - Ensuring quality early childhood care and education for all children between 3-6 years.
 - New Curricular and Pedagogical Structure (5+3+3+4) corresponds to the age groups of 3-8, 8-11, 11-14, and 14-18 years respectively.
 - It covers four stages of schooling: Foundational Stage (5 years), Preparatory Stage (3 years), Middle Stage (3 years), and Secondary Stage (4 years).
 - No hard separations between arts and sciences, between curricular and extra-curricular activities, between vocational and academic streams;
 - Emphasis on promoting multilingualism and Indian languages
 - Setting up of a new National Assessment Centre, **[PARAKH \(Performance Assessment, Review, and Analysis of Knowledge for Holistic Development\)](#)**
 - A separate Gender Inclusion fund and Special Education Zones for disadvantaged regions and groups.

What are the Issues With NEP 2020?

- **Size and Diversity:**
 - India's education sector is **enormous and diverse, making it challenging to implement uniform policies** across the country.
 - The country's vast population, multiple languages, and varying socio-economic conditions necessitate localized approaches to education, which the NEP's one-size-fits-all approach may not adequately address.
- **Capacity Limitation:**
 - The NEP 2020 proposes significant transformations in the education sector, from the school level to higher education.
 - However, many **states and regulatory bodies lack the internal capacities** and resources needed to implement such wide-ranging changes effectively.

- **Language and Curriculum:**
 - Adapting curriculum materials to be taught in the mother tongue is a key feature of the NEP 2020.
 - However, India's linguistic diversity, with 22 official languages and numerous dialects, **poses a significant challenge.**
 - States are concerned about the practicality of implementing this aspect and ensuring quality education in multiple languages.
- **Digital Divide:**
 - The NEP emphasizes the use of technology in education, including e-learning and digitization.
 - However, India faces a **digital divide where a substantial portion of the population lacks access** to smartphones and computers.
 - This divide could lead to unequal access to educational resources and opportunities, disadvantaged marginalized communities.
- **Limited Resources:**
 - The NEP calls for a substantial increase in the allocation of resources for education, targeting 6% of the GDP.
 - Achieving this level of funding may be **difficult given the competing demands on government finances**, such as healthcare, infrastructure, and social welfare programs. States may struggle to allocate sufficient resources to meet NEP objectives.
- **Local Autonomy:**
 - Some states are concerned about the NEP's perceived centralization of education policy and decision-making.
 - They believe that it infringes on their **autonomy to design and implement education policies** that align with their specific needs and priorities.

Way Forward

- Encourage meaningful consultation with all stakeholders, including state governments, educators, parents, and students. Seek feedback and input to address concerns and make necessary adjustments to the NEP.
- Recognize and respect the diversity of India's education landscape. Allow states flexibility in implementing policies to cater to their specific linguistic, cultural, and socio-economic contexts. Adapt the NEP's provisions to be more regionally relevant.
- Invest in building the capacity of education ministries, regulatory bodies, and educators to effectively implement the NEP. Provide training and resources to equip them for the challenges of transforming the education system.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Which of the following provisions of the Constitution does India have a bearing on Education? (2012)

1. Directive Principles of State Policy
2. Rural and Urban Local Bodies
3. Fifth Schedule
4. Sixth Schedule
5. Seventh Schedule

Select the correct answer using the codes given below:

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

Ans- (d)

Mains

Q. National Education Policy 2020 is in conformity with the Sustainable Development Goal-4 (2030). It intends to restructure and reorient education system in India. Critically examine the statement. **(2020)**

E-Waste Management in India

For Prelims: [Indian Cellular and Electronics Association](#), [Circular Economy](#), [E-waste management](#), [Extended producer's responsibility](#), E-Waste (Management) Rules, 2022.

For Mains: Status of E-Waste Management in India.

Source: TH

Why in News?

The [Indian Cellular and Electronics Association \(ICEA\)](#) has released a comprehensive report titled 'Pathways to [Circular Economy](#) in the Indian Electronics Sector.'

- This report highlights the urgent need to **rethink [e-waste management](#) and explore opportunities to harness its potential.**
- The report suggests that this transformation could unlock an additional **USD 7 billion market opportunity.**

What are the Major Highlights of the Report?

- **The E-Waste Landscape in India:**
 - According to the ICEA report, **e-waste management in India is predominantly informal**, with approximately **90% of e-waste collection and 70% of recycling being managed by a competitive informal sector.**
 - The informal sector excels at salvaging older electronic devices for spare parts and profitably carrying out repairs.
 - Industrial hubs like Moradabad specialize in **processing [printed circuit boards \(PCBs\)](#) to extract valuable materials like gold and silver.**
- **Circular Economy Principles:**
 - The report emphasizes the **need to shift the outlook on e-waste management towards establishing a circular economy.**
 - China serves as an example, **targeting to use 35% of secondary raw materials in the manufacturing of new products by 2030**, reflecting a circular economy approach.
 - **Proposed Strategies for a Circular Economy in E-Waste:** The ICEA report outlines several key strategies to usher in a circular economy for e-waste in India:
 - **[Public-Private Partnerships \(PPP\)](#):** Collaboration between **government bodies and private enterprises** is essential to distribute the costs of setting up a reverse supply chain.
 - This complex endeavor involves collecting devices from users, erasing personal data, and channeling them for further processing and recycling.
 - **Auditable Database:** The creation of a **transparent and auditable database of materials** collected through the reverse supply chain process can enhance

accountability and traceability.

- **Geographical Clusters:** Establishing **geographical clusters where discarded devices are gathered and dismantled** can optimize the recycling process, making it more efficient and cost-effective.
- **Incentivizing 'High-Yield' Recycling Centers:** Encouraging the development of high-yield recycling facilities can help **maximize the value extraction from electronic products**, including rare earth metals in semiconductors.
- **Promoting Repair and Product Longevity:** Policy recommendations include **encouraging repair and making products last longer**.
 - This could involve supporting a **user's right to repair**, reducing the environmental burden of electronic waste.

Note: In a circular economy, **discarded electronics can be given a new life**, either as **standalone devices or by reintroducing their components** and precious metals into new hardware.

- It views all materials produced on Earth as valuable resources rather than waste.

What is the Status of E-Waste Management in India?

▪ About E-Waste:

- **Electronic waste (e-waste)**, is a generic term used to describe all types of **old, end-of-life or discarded electrical and electronic equipment**, such as household appliances, office information and communications equipment etc.
 - E-waste contains numerous toxic chemicals including metals such as **lead, cadmium, mercury, and nickel**.
- India currently ranks **third among the largest generators of e-waste globally**, behind only China and the US.
 - The volume of e-waste in India has witnessed a significant surge to **1.6 million tonnes in 2021-22**.
 - The **65 cities in India generate more than 60% of the total generated e-waste**, whereas 10 states generate 70% of the total e-waste.

▪ E-Waste Management in India:

- In India, the management of electronic waste was addressed within the framework of the **Environment and Forests Hazardous Wastes (Management and Handling) Regulations of 2008**.
- In 2011, a significant notice pertaining to the **E-waste (Management and Handling) Regulations of 2010**, governed by the **Environment (Protection) Act of 1986**, was issued.
 - **Extended producer's responsibility (EPR)** was its main feature.
- **E-waste (Management) Rules, 2016** was enacted in 2017, with over **21 products (Schedule-I)** included under the purview of the rule. It included **Compact Fluorescent Lamp (CFL) and other mercury containing lamps**, as well as other such equipment.
- In 2018, the 2016 rules underwent an amendment that broadened their scope to emphasize the promotion of **authorization and product stewardship**.
 - **Product stewardship** is a concept and approach that emphasizes the responsibility of **producers, manufacturers, and other stakeholders** for the entire life cycle of a product, from its creation to its disposal or recycling
- Government of India notified **E-Waste (Management) Rules, 2022** with a major aim to **digitize the e-waste management process** and enhance visibility.
 - It also restricts the use of **hazardous substances (such as lead, mercury, and cadmium)** in **manufacturing electrical and electronic equipment** that have an adverse impact on human health and the environment.

How can India Work Towards Reducing and Recycling E-Waste More Effectively?

- **Formalizing E-waste Collection:** There is a need to create a **comprehensive regulatory framework for e-waste collection**, incorporating **mandatory registration and licensing of collection centers** and recyclers to formalize and standardize the process.
- **E-Waste Tax Credits for Manufacturers:** Implementing a tax credit system that provides incentives to electronics manufacturers for designing products with **extended lifespans and repairability features**.
 - This approach aims to **promote eco-friendly design practices while discouraging planned obsolescence**.
- **E-Waste ATMs:** Installing E-Waste ATMs in public places, where individuals can deposit old electronic devices, and in return, **receive small financial incentives or vouchers for public transportation or essential goods**.
 - These ATMs could also **feature educational displays to raise awareness about e-waste recycling**.
- **E-Waste Tracking and Certification:** Establishing a [blockchain-based system](#) to track the **entire lifecycle of electronic devices**.
 - Each device could have a digital certificate that records its manufacturing, ownership, and disposal history.
 - This would make it **easier to trace and hold responsible parties accountable** for improper disposal.
- **E-Waste Art and Awareness:** Promoting awareness through **art installations made from e-waste**. Encouraging artists to create sculptures or exhibits in public spaces to visually depict the magnitude of the e-waste problem and raise awareness about proper disposal.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. What are the impediments in disposing of the huge quantities of discarded solid waste which are continuously being generated? How do we safely remove the toxic wastes that have been accumulating in our habitable environment? **(2018)**

Delhi High Court Orders on Service Charge

For Prelims: Federation of Hotel and Restaurant Association of India, Delhi High Court, [Central Consumer Protection Authority](#).

For Mains: Delhi High Court Orders on Service Charge, Issues with the Service Charge.

[Source: IE](#)

Why in News?

Recently, the **Delhi High Court** has issued an interim order directing members of the **Federation of Hotel and Restaurant Association of India (FHRAI)** to replace the term 'Service Charge' with 'staff contribution' while adding that the amount charged should not **exceed 10% of the total bill**.

What is the Case About?

- **Background:**
 - The order was passed on pleas **filed by the National Restaurant Association of India (NRAI)** and the FHRAI, challenging the July, 2022, guidelines issued by the [Central](#)

Consumer Protection Authority (CCPA).

- The **CCPA** guidelines stipulated that service charges should not be collected from consumers under any other name, and they should be **optional and voluntary**.
- Alternatively, they could request that the eatery remove the service charge from the bill.
 - A complaint against unfair trade practices could also be **lodged electronically with the Consumer Commission through the eDaakhil portal** for speedy redressal or otherwise.
- **The guidelines also prohibited** the addition of service charges to the bill automatically, without informing consumers.
- These guidelines were introduced in **response to consumer grievances**, as many restaurants and hotels were imposing service charges without clearly stating that payment was voluntary.
- The guidelines were issued by the **CCPA under Section 18(2)(1) of the Consumer Protection Act, 2019**.

Note: Under Section 18(2)(1) of the Act, CCPA has issued **guidelines to prevent unfair trade practices and protection of consumer** interest with regard to levy of service charge in hotels and restaurants

- **Court's Initial Stay:**
 - In July 2022, the Delhi High Court had stayed the **CCPA guidelines, subject to the condition** that associations ensure the clear display of service charge on menus or elsewhere, along with informing customers of their obligation to pay it.
 - This stay was initially extended.
- **Evolving Court Directions:**
 - In April, 2023, the court clarified that the interim order **should not mislead consumers**. The court also suggested exploring alternative terminology for "service charge" to prevent confusion.
 - The court ordered **petitioners to provide information** on what percentage of their members mandatorily imposed service charges and if there were objections to renaming it.
- **Court's Recent Decision:**
 - The FHRAI indicated its **willingness to rename "service charge"** to "staff contribution." However, the NRAI opposed this change, citing past decisions and the fact that a significant percentage of its members imposed service charges.
 - The court noted the lack of uniformity within the FHRAI's membership regarding the imposition of service charges.
 - Consequently, the court directed FHRAI members to adopt the term 'staff contribution' and cap it at 10% of the total bill amount.
- **Relationship with 2017 Guidelines:**
 - The 2022 service charge guidelines **were intended to complement**, not replace, the 2017 guidelines issued by the Central Government. These 2017 guidelines had prohibited the levy of service charges by hotels and restaurants without the express consent of customers, addressing concerns about unfair trade practices.
 - In conclusion, the **Delhi High Court's recent decision to rename 'service charge' to 'staff contribution' with a 10% cap** represents a significant development in the ongoing legal battle between industry associations and consumer protection authorities.
 - This case highlights the **importance of transparency and consumer choice** in restaurant billing practices, aligning with India's consumer protection regulations.

Note:

- The FHRAI, is the Apex Body of the four Regional Associations representing the Hospitality Industry.
- National Restaurant Association of India (NRAI) is the voice of the Indian Restaurant Industry. Founded in 1982, NRAI aspires **to promote and strengthen the Indian Food Service Sector**.

What is a Service Charge?

▪ About:

- Service charge is a fee that is **sometimes added to a bill or invoice by businesses**, particularly in the hospitality industry such as restaurants, hotels, and banquet halls.
- It is intended to cover the cost of the service provided by the staff, including waiters, servers, and other service personnel.
- It also may be called a customer service fee or maintenance fee.
 - Restaurants and hotels generally levy a service charge of 10% on the food bill.

▪ Issues:

- **Lack of Transparency:** One of the primary issues with service charges is the lack of transparency. Customers are **often not informed about the inclusion of service charges** until they receive the bill. This lack of upfront information can lead to confusion and dissatisfaction.
- **Mandatory Nature:** In many cases, service charges are mandatory, meaning customers are required to pay them regardless of the quality of service they receive. This mandatory aspect can be **problematic, especially if the service falls short of expectations**.
- **Quality of Service:** Since service charges are guaranteed additional income for staff, there may be **less incentive for service personnel to provide exceptional service**. This can lead to complacency and a decrease in the overall quality of service.
- **Compulsion:** Customers may **feel compelled or pressured to pay the service charge**, even if they are dissatisfied with the service. This compulsion can result in customer discomfort and dissatisfaction.

What is CCPA?

- It was established under the [Consumer Protection Act \(CPA\) of 2019](#).
- It is empowered to **regulate abuses of consumer rights, unfair trade practices**, and false or misleading marketing that are detrimental to the public's interest.
- It has authority under **Section 18 of the CPA, 2019** to safeguard, promote, and, most importantly, defend consumers' rights and prevent violations of their rights under the Act.
- Further, enhances consumer rights and makes sure that no person engages in unfair trade practices, it is also empowered to issue guidelines to enforce the rights of the consumers.

Legal Insight: [Staff Contribution and Not Service Charge](#)

<https://www.drishtijudiciary.com/>

European Honeybees as Biomonitoring Agents for AMR

For Prelims: European honeybees, Behaviour of Honeybee, IUCN Red List

For Mains: Antimicrobial Resistance and its Impacts

[Source: DTE](#)

Why in News?

A recent study has revealed an unconventional yet efficient method for **monitoring the proliferation of antimicrobial resistance (AMR) in urban areas**: the utilization of **European honeybees** as biomonitoring agents.

What are the Major Highlights of the Research?

- **European honeybees** serve as a unique **environmental proxy**, effectively "**crowdsourcing**" **data as they interact with contaminants** in various urban elements such as soil, dust, air, water, and pollen during their foraging activities.
 - **Their short lifespan, around 4 weeks**, allows them to provide real-time data on the state of the environment concerning antimicrobial resistance.
- Researchers have shed light on the significance of these bees in assessing pollution that may pose risks to human health. They analyzed the **gut bacteria of 144 bees and identified Class 1 integrons (intl1)** as a universal marker for **tracking AMR**.
 - Surprisingly, around **52% of the bees carried intl1 in urban areas**.
 - **Integron** is a mobile DNA element that can capture and carry genes, particularly those responsible for antibiotic resistance.
- Furthermore, the **researchers examined eight bees from each of the 18 hives** owned by citizen-scientist beekeepers in Greater Sydney, Australia.
 - 80% of these bees across all hives **tested positive for one or more AMR targets**.
 - Higher concentrations were observed near bodies of water like dams and lakes.

What are European Honeybees?



- **About:**
 - European honeybees (***Apis mellifera***) commonly referred to as the **Western honey bee**, possess two pairs of wings and usually display **black or brown coloring with distinctive yellow stripes on its abdomen**.
 - They prefer to **nest in a cavity such as a hollow tree or house wall**.
 - They are assessed as "**Data Deficient**" on the [IUCN Red List](#).
- **Distribution:**
 - The species lives predominantly in managed bee colonies **throughout Europe**, although there are potentially feral and **wild bee colonies found in a wide range of habitats**.
 - Generally, the species can be found to **inhabit temperate forests, grasslands and even semi-deserts**.

What is the Social Structure and Behaviour of Honeybee?

- **Social Structure:**
 - Among them, **queen bees, the fertile females**, develop into the largest individuals.
 - **Drones, which are the males**, have a medium build and notably larger eyes compared to females.
 - **Worker bees, smaller sterile females**, are equipped with **barbed stingers and possess unique hind legs utilized as pollen baskets**.
- **Behavior:**
 - **Communication:** They communicate through a complex system of dance called "**waggle dance**" to relay information about food sources and hive conditions.
 - **Hive Construction:** Bees construct intricate **hexagonal honeycomb structures** made of beeswax to store honey, [pollen](#), and raise brood.
 - **Pollination:** While foraging for nectar and pollen, honeybees unintentionally **pollinate many plant species, aiding in plant reproduction**.

What is Antimicrobial Resistance?

ANTIMICROBIAL RESISTANCE



Drishti IAS

The ability of microorganisms to resist the effects of antimicrobial drugs

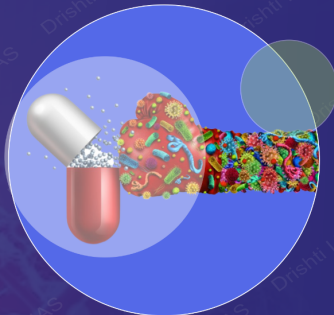
CAUSES OF ↑ AMR

- Poor infection control/sanitation
- Antibiotic overuse
- Genetic mutations of microbe
- Lack of investment in R&D of new antimicrobial drugs

Microbes that develop AMR are called 'Superbugs'

RECOGNITION BY WHO

- Identified AMR as **one of the top 10 threats** to global health
- Launched **GLASS** (Global Antimicrobial Resistance and Use Surveillance System) in 2015



IMPACTS OF AMR

- ↑ Risk of spreading infections
- Makes infections harder to treat; prolonged illness
- ↑ Healthcare costs

INDIA'S INITIATIVES AGAINST AMR

- Surveillance of AMR in microbes causing **TB, Vector Borne diseases, AIDS etc.**
- **National Action Plan on AMR (2017)** with One Health approach
- **Antibiotic Stewardship Program** by ICMR

New Delhi metallo-β-lactamase-1 (NDM-1) is a bacterial enzyme, emerged from India, that renders all current β-lactam antibiotics inactive

EXAMPLE

- Carbapenem antibiotics stop responding due to AMR in *K. pneumoniae*
- AMR Mycobacterium tuberculosis causing Rifampicin-Resistant TB (RR-TB)
- Drug-resistant HIV (HIVDR) making antiretroviral (ARV) drugs ineffective

Note: A [United Nations Environment Programme](#) report in February 2023 warned that the unchecked rise of AMR could lead to up to **10 million deaths annually by 2050**.

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Q. Which of the following organisms perform a waggle dance for others of their kin to indicate the direction and the distance to a source of their food? (2023)

- (a) Butterflies
- (b) Dragonflies
- (c) Honey Bees
- (d) Wasps

Ans: (c)

Q. Consider the following kinds of organisms: (2012)

1. Bat

2. Bee
3. Bird

Which of the above is/are pollinating agent/agents?

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

Ans: (d)

Q. Which of the following are the reasons for the occurrence of multi-drug resistance in microbial pathogens in India? (2019)

1. Genetic predisposition of some people
2. Taking incorrect doses of antibiotics to cure diseases
3. Using antibiotics in livestock farming
4. Multiple chronic diseases in some people

Select the correct answer using the code given below.

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

Ans: (b)

Mains

Q. Can overuse and free availability of antibiotics without Doctor's prescription, be contributors to the emergence of drug-resistant diseases in India? What are the available mechanisms for monitoring and control? Critically discuss the various issues involved. **(2014)**

String of Pearls Supernova

Source: HT

Why in News?

The [**James Webb Space Telescope \(JWST\)**](#) captured an image of **SN1987A**, a [**supernova**](#) that **exploded decades ago**, offering new insights into its history and evolution.

What is SN1987A Supernova?

▪ **About:**

- SN1987A exploded in **1987**, becoming the **nearest and brightest supernova** visible from earth in nearly four centuries.
 - SN1987A is situated **170,000 light-years away** from Earth in the **Large Magellanic Cloud**.
- Now, the JWST is revealing intricate details of this cosmic event that have remained hidden

until now.

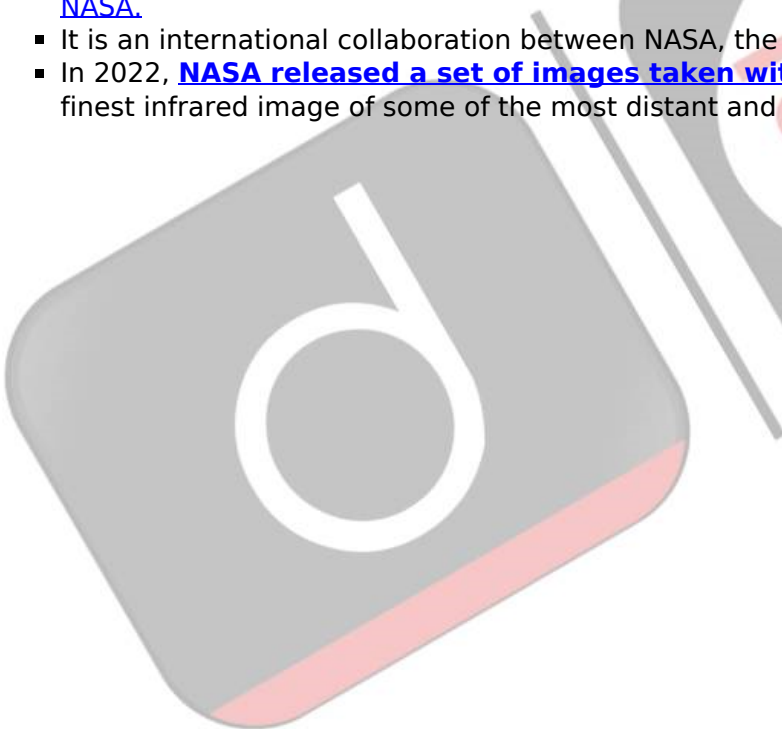
- **Alias 'String of Pearls':**
 - SN1987A is often referred to as a "**string of pearls**" as it showcases a series of luminous rings composed of gases and dust expelled by the dying star in its various phases of collapse and explosion.
 - This string of pearls comprises material ejected about 20,000 years before the supernova event, offering insights into the star's history and evolution.
- **Unusual Facts about SN1987A:**
 - The star exploded when it was a **blue supergiant** (contrary to the theories as per which **only red supergiant stars could explode**).
 - **Emission of molecular hydrogen** in the ring was not necessarily expected (also it couldn't have been revealed without JWST).

Note:

- The **Magellanic Clouds** are two **irregular, satellite galaxies** that orbit the Milky Way.
 - One is the Large Magellanic Cloud (LMC) and another is the Small Magellanic Cloud (SMC).
- While the Magellanic Clouds are **visible to the unaided eye in the Southern Hemisphere**, they cannot be observed from most northern latitudes.
- They serve as excellent laboratories for the **study of very active stellar formation and evolution**.

What is JWST?

- Considered a successor of the [Hubble Telescope](#), it is the most powerful infrared telescope of [NASA](#).
- It is an international collaboration between NASA, the European and Canadian Space Agencies.
- In 2022, [NASA released a set of images taken with the JWST](#) which were the deepest and finest infrared image of some of the most distant and oldest galaxies ever discovered.



OBJECTS IN SPACE

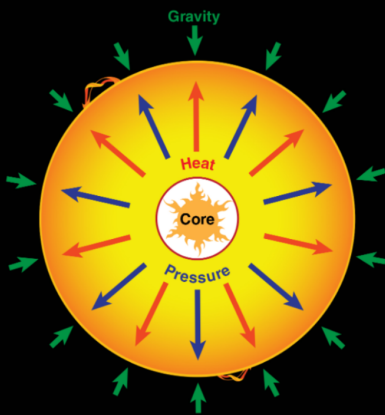
QUASAR

- Short for "quasi-stellar radio source"
- Extremely bright objects powered by supermassive black holes releasing enormous energy
- Believably, the most distant objects yet detected in Universe

SUPERNOVA

- Extremely powerful explosion; happens when a star at least 5x the mass of Sun dies
- The massive star collapses when it runs out of fuel and its pressure drops and the gravity exerted is more
- Can be so bright they outshine their entire galaxies for a few days or months

What holds a star together?



Supernova of a star 10x the Sun's size creates a stellar-mass black hole as its core

NEBULA

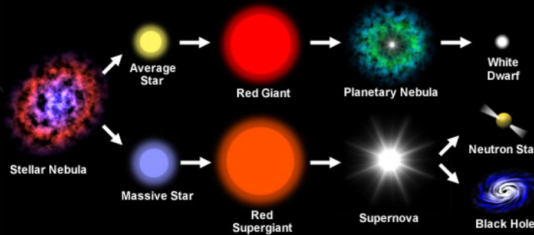
- A giant cloud of dust and gas (mostly hydrogen, helium) in space
- Forms when a star dies (supernova) or when new stars are forming
- Closest known nebula to Earth - Helix Nebula (remnant of a dying star ~700 LYs away from Earth)

NEUTRON STAR

- Formed when the core of a star collapses, crushing together every proton and electron into a neutron
 - If the star is not massive enough to produce a black hole, the neutrons stop the collapse, and a neutron star is formed
- Can be found scattered throughout the galaxy

A "kilonova" is a powerful event that happens when two neutron stars merge

Life Cycle of a Star



PULSAR

- A rotating neutron star having pulses of radiation at very regular intervals
- Most neutron stars are pulsars
- Produces strong magnetic fields and strong beams of light

MAGNETAR

- Another type of neutron star
- Magnetic field of a neutron star - 10^{12} times that of Earth's
 - Magnetic field of a Magnetar - 1000x that of neutron star's

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Q. Consider the following pairs : (2023)

	Objects in space	Description
1.	Cepheids	Giant clouds of dust and gas in space
2.	Nebulae	Stars which brighten and dim periodically
3.	Pulsars	Neutron stars that are formed when massive stars run out of fuel and collapse

How many of the above pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) All three

(d) None

Ans: (d)

Rapid Fire Current Affairs

Crown Shyness



Crown shyness is a phenomenon common in [temperate deciduous forests](#), where the **tops of some trees do not touch each other**, creating gaps of sky between them.

- It is observed in many species of trees, such as **black mangrove, camphor, and Japanese larch.**
- Scientists have different hypotheses to explain why crown shyness happens, such as **reducing competition for light, preventing disease transmission, or avoiding physical damage from wind.**
- Crown shyness creates intricate patterns and enhances **light penetration in the forest.**

21st Edition of India-France Bilateral Naval Exercise 'VARUNA'

The **Phase II of Varuna-23**, the bilateral naval exercise between the **Indian and French Navies**, took place in the **Arabian Sea.**

- This exercise involved **guided missile frigates, tankers, Maritime Patrol Aircraft,** and integral helicopters from both sides.
- Varuna, which began in **1993 and was officially named in 2001**, has evolved over the years into a symbol of the strong strategic relationship between [India and France.](#)

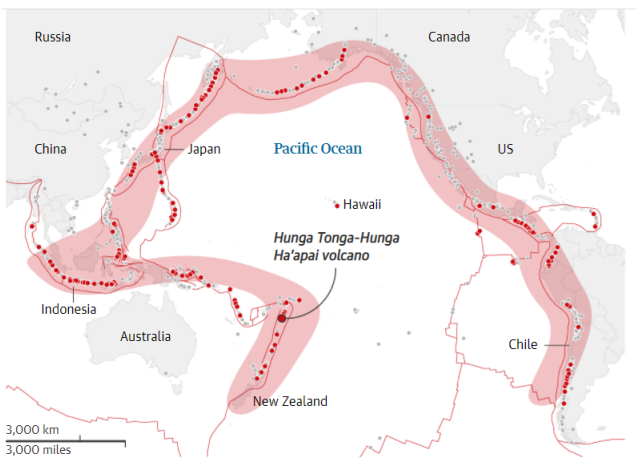
Read more: [India France Relations](#)

Ustad Ali Zaki Hader



- Renowned Rudra Veena exponent, **Ustad Ali Zaki Hader**, a disciple of **Ustad Asad Ali Khan**, was the last exponent of the **Khandarbani style of the Jaipur Beenkar gharana of Dhrupad**.
 - The Khandarbani style of the Jaipur Beenkar gharana of Dhrupad is a **musical tradition that originated in the 18th century by Shahaji Saheb**.
- Rudra Veena is a **traditional stringed instrument that originates from North India**. Crafted from materials like teak wood, metal, pumpkin, and bamboo, it has a distinctive appearance with **two large gourd resonators placed beneath a tubular wooden body**.

Hunga Tonga-Hunga Ha'apai Volcano



- A recent study reveals that during the **Hunga Tonga-Hunga Ha'apai volcano eruption in January 2022**, ejected rock and ash rapidly collapsed into the ocean, **forming a high-speed and destructive underwater debris flow**.
- The Hunga Tonga-Hunga Ha'apai volcano is a **submarine volcano** in the South Pacific Ocean. It's located 40 miles north of Tongatapu, **Tonga's** main island.
 - The volcano formed in 2015 when a moderate eruption fused two uninhabited islands into one.
 - The volcano is part of the **Kermadec-Tonga subduction zone**, where the Pacific Plate is pushed under the Indo-Australian Plate, forming a long chain of volcanoes and islands.

Read more: [Volcanic Eruption in Tonga](#)