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A. POLITY & GOVERNANCE

1. Supreme Court upholds Section 6A of Citizenship Act as valid law

1. **In the 1980s**, Assam faced significant **unrest over illegal immigration**, mainly from Bangladesh.
2. This **migration began before the Bangladesh Liberation War in 1971** and **continued after,** causing social and economic challenges in the region.
3. The **All-Assam Students Union (AASU) became a key voice against this immigration**, demanding government action **to protect the culture and identity of the Assamese people.**

Key Factors Leading to the Accord:

1. The AASU organized widespread **protests, strikes, and civil disobedience** against illegal immigrants.
2. This **movement gained strong public support**, reflecting concerns about jobs, **resources, and cultural identity**.
3. The protests led to **violent incidents,** forcing the government to intervene.
4. The **Indian National Congress, led by Prime Minister Rajiv Gandhi,** recognized the need to find a solution to stabilize the situation in Assam.
5. Rajiv Gandhi's government understood the **urgency of addressing these issues to maintain peace** in the northeastern region.
6. **Negotiations: In 1985, discussions began between the government and representatives of AASU** and the All Assam Gana Sangram Parishad **(AAGSP)**, another student-led group.
7. The goal was **to reach an agreement on the status of illegal immigrants** and how to protect the rights of Assamese citizens.

Signing of the Assam Accord:

1. The **Assam Accord was signed on August 15, 1985**, during a **ceremony on India's Independence Day.**
2. The **accord defined some aspects of citizenship** based on dates of migration:

   a. **Before January 1, 1966:** All Indians who migrated to Assam were **declared Indian citizens.**

   b. **Between January 1, 1966, and March 25, 1971:** Citizenship **can be granted to the people** after **10 years of residence in Assam.**

   c. **After March 25, 1971:** All these people were declared **illegal migrants** and were **liable to detection and deportation.**

What is Section 6A?

1. The **Citizenship Act, 1955, saw Section 6A introduced through the Citizenship (Amendment) Act, of 1985.**
2. It follows the **Assam Accord, signed on August 15, 1985**, and **mainly addresses the citizenship of those who migrated from Bangladesh** to Assam in a rare and disturbed phase following the **Bangladesh Liberation War and demographic distortions.**

When	December 1985
Purpose	To address the citizenship status of people who migrated from Bangladesh to Assam after the **Bangladesh Liberation War**
How it works	Grants citizenship to some migrants, and provides legal processes for others
Who it applies to	**All persons** of Indian origin (PIO) who **entered Assam before** January 1, **1966** and have been Ordinary Resident of India **(ORI)** will be **deemed** Indian **citizens**. **A.** Those who came **after** 1 January, **1966** but **before** March 25, **1971**, and have been Ordinary Resident of India **(ORI)** will get citizenship at the **expiry** of **10 years** from their **detection** as a **foreigner**. **B.** During this interim period, they will **not** have the **right to vote** but can **get an Indian passport**.

Legal Challenge to Section 6A:

1. **2012 Petition:** The **Assam Sanmilita Mahasangha**, a civil society group, **filed a writ petition challenging the constitutional validity of Section 6A.**

2. Mahasangha **argues that the cut-off year for Assam should be 1951 instead of 1971),**

3. The **case was referred to a Constitution Bench in 2014**, to examine whether **Section 6A** is **constitutional though it prescribes a different cut-off date for Assam (1971) from the one prescribed in the Constitution for the rest of the country (1948).**

Arguments against section 6A:

1. The petition argued that the Section **6A is in violation of Article 6 of indigenous citizens** and **created an unequal citizenship framework.**

> 1. **Article 6 of the constitution speaks about** the **Citizenship of those individuals** who **migrated from Pakistan to India at the time of partition between India and Pakistan. There was a cutoff date of the partition which was 19 July 1948**.
>
> 2. Article 6 say that a citizen migrated from pakistan to the the territory of India will deems to be the citizen of India; **if a person complies the below two conditions:**
>
>   a. If the person himself or his parents or his grandparents whether paternal or maternal are born in India as per the **government of India act,1935.**
>
>   b. **If the person migrated before 19th July,1948, OR**
>
>   c. If the person fulfils the above condition on or **before 19th July 1948 by** applying **within 6 months before the commencement of Indian constitution that is on 26th Jan 1950.**

2. The **petitioner also claimed** that the **cut-off date provided in Section 6A is discriminatory** and **violates the right to equality (Article 14** of the Constitution) as **it provides a different standard for citizenship for immigrants entering Assam than the rest of India — which is July 1948.**

Impact on Indigenous People:

1. The Assam Sanmilita Mahasangha **(ASM)** and other **petitioners argued that Section 6A** undermines the **rights of indigenous Assamese people.**

2. The **petition states that applying Section 6A** uniquely to Assam has **altered the demographic composition**, potentially reducing Assamese people to a minority in their own state.

3. This demographic change is claimed to **threaten the economic, political, and cultural well-being of the indigenous population**, impacting their **rights under Article 29, which protects cultural rights.**

4. Concerns were raised that the **inclusion of migrants in electoral rolls** could dilute the political power of **indigenous Assamese citizens, impacting their rights under Articles 325 and 326.**

Arguments in Defence of Section 6A:

1. The **Centre defends Section 6A by citing Article 11** of the Constitution, **which grants Parliament the authority to legislate on citizenship matters**.

2. They argue that **Parliament can create specific laws for certain regions based on particular needs or historical contexts** without **breaching equality rights.**

3. **Fear of Statelessness :** Respondents, **including NGOs like Citizens for Justice and Peace,** warn that **striking down Section 6A could render many current residents stateless after having enjoyed citizenship rights** for decades.

Supreme Court's Section 6A Verdict and Its Implications for Assam:

1. **On October 17 2024,** In a landmark verdict, the **Supreme Court upheld the constitutional validity of Section 6A of the Citizenship Act, 1955,** which **granted citizenship to immigrants who entered Assam before March 24, 1971.**

2. The decision emerged from a **long legal battle over the status of migrants from Bangladesh and the rights of indigenous Assamese** citizens.

Supreme Court Ruling and Its Implications:

Majority Opinion:

1. **Constitutional Validity: Chief Justice** D.Y. Chandrachud, along with Justices Surya Kant, M.M. Sundresh, and Manoj Misra, **upheld Section 6A, stating it does not violate Articles 6** of the Constitution.

2. **Legislative Objective:** The Chief Justice emphasized that the **provision aims to balance humanitarian needs with the impact of migration** on Assam's economic and cultural landscape.

3. **Rationale for Cut-off Date:** The **March 25, 1971, cut-off is justified as it aligns with the onset of significant historical events (Operation Searchlight)** that **caused mass migrations during the Bangladesh Liberation War**.

Key Points from the Majority Ruling:

1. The **court said that the cut-off date is reasonable**, considering Assam's unique demographic challenges.

2. **Section 6A does not contravene other constitutional principles,** including rights related to equality (**Article 14),** fraternity, and cultural protection (**Article 29).**

3. The court acknowledged that the **implementation of immigration laws needs rigorous enforcement** and judicial oversight.

Dissenting Opinion:

1. **Justice J.B. Pardiwala dissented, deeming Section 6A unconstitutional** and **suggesting it dilutes the rights of indigenous Assamese** citizens and undermines fundamental principles of the Constitution.

National Register of Citizens (NRC):

1. The **NRC in Assam was conducted in accordance with Section 6A**.

2. The ruling strengthens the legal foundation of the NRC, which previously **excluded approximately 1.9 million people from a population of 33 million.**

"Do you know about the concerns regarding the New Citizenship Act?"

1. The **Assam Accord said that anyone who came to Assam from Bangladesh after March 25, 1971,** would be deported back to their countries, no matter their religion.

2. But the **new amendment Act 2019 inserted new Section 6B of the Citizenship Act, 1955 through the CAA, 2019**.

3. **allows 6 specified religious minorities (Hindus, Sikhs, Buddhists, Jains, Parsis, Christians) from Afghanistan, Bangladesh, and Pakistan** who **came before December 31, 2014,** to stay and become Indian citizens.

4. The **NRC was made to find out who came legally to Assam.**

5. Now, **people worry that the new act would allow 6 specified religious minorities to get Indian citizenship,** which might not be fair and change what the NRC was meant to do.

6. **Around 20 million people from Bangladesh are living in Assam without permission.**

7. They have changed the population balance and are using a lot of the state's resources and affecting its economy.

8. India has several other **refugees** that include **Tamils** from **Sri Lanka** and **Hindu Rohingya** from **Myanmar**. They are not covered under the Act.

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2. Aadhaar cannot be used as proof of date of birth: Supreme Court

1. In October 2024, the Supreme Court of India reversed a decision made by the Punjab and Haryana High Court, which had allowed an Aadhaar card to be used to prove a person's age when calculating compensation for a road accident victim.

2. The ruling says that **age must be established using official documents such as a school leaving certificate.**

   a. In its judgement, the SC referred to **Section 94 of the Juvenile Justice (Care and Protection**

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of Children) Act, 2015, stating that the date of birth recorded in a school leaving certificate is the appropriate basis for age determination.

Background of the Case:

1. A Supreme Court bench comprising **Justices Sanjay Karol and Ujjal Bhuyan** was tasked with determining the compensation to be given to the family of a man named Sika Ram who died following a motorcycle accident.

2. In April 2015, the Motor Accident Claims Tribunal (MACT) in Rohtak, Haryana, directed the insurance company to pay compensation of Rs 19,35,400.

   a. Compensation in cases of death under the Motor Vehicles Act, 1988 (MVA), is determined by certain **factors including the income and age of the deceased, as well as the number of dependants**.

   b. The **age is used to determine the multiplier**, a numerical value that reflects future financial contributions from the deceased to the dependants, based on what would have been their potential earning capacity and life expectancy.

3. On appeal, the Punjab & Haryana **High Court reduced the compensation** to Rs. 9,22,336 **noting that the deceased was 47 years old** according to his **Aadhaar card** when he died, meaning a multiplier of 13 under the MVA.

4. The victim's family appealed to the Supreme Court, **arguing that he was actually 45** at the time of the accident according to his **School Leaving Certificate**, and the multiplier should be 14 instead.

What is Aadhaar?

1. Aadhaar is a **12-digit unique identification number** issued by the **Unique Identification Authority of India (UIDAI)** to residents of India.

2. It serves as proof of identity and is linked to biometric and demographic information.

3. It was launched in **2009**, aims to provide a reliable identity for everyone and is now required for various government services and used by private companies.

4. As of April 2022, over **1.33 billion Aadhaar cards** have been issued, covering **99.9%** of adults in India.

Significant Provisions of the Aadhaar Act 2016

1. Every resident can obtain an Aadhaar number by providing demographic and biometric data.

   - UIDAI now offers **NRIs as well as other resident foreigners the option to avail an Aadhaar card**

2. Establishes UIDAI as a **statutory body to issue Aadhaar numbers.**

3. Each Aadhaar number is unique and **cannot be reassigned.**

Significance of Aadhaar

Aadhaar offers several benefits, including:

1. **Access to Government Services**: It Serves as **proof of identity for benefits like subsidies and pensions.**

2. **Reducing Fraud**: It Helps to eliminate fake identities, reducing corruption in welfare programs.

3. **Financial Inclusion**: It Facilitates opening bank accounts and obtaining SIM cards.

4. **Identity Verification**: It Simplifies the verification process for various documents like PAN and voter ID.

5. **Efficient KYC**: It Streamlines Know Your Customer processes for banks and other institutions.

Various Applications of Aadhaar

Aadhaar is used in numerous government schemes, such as:

1. **Public Distribution System (PDS)**: For ration authentication.

2. **Aadhaar-enabled Payment System (AEPS)**: For financial transactions.

3. **Direct Benefit Transfer (DBT)**: For government payments directly to bank accounts.

4. **Jan Dhan Yojana**: For opening bank accounts.

5. **Pensions**: To verify and distribute pension payments.

6. **Passports**: As proof of identity for applications.

7. **Linking with Vo**ter ID: To enhance the integrity of electoral processes.

3. Supreme Court Recalls 2022 Verdict on Benami Transactions (Prohibition) Act

1. **In October 2024,** a Special Bench of the Supreme Court of India reversed its earlier decision from August 2022 that ruled **certain part** of the Benami Transactions (Prohibition) Act, 1988, as unconstitutional.
   a. The case is now set for a **new examination by a different bench after a petition from the Central Government.**

2. The August 2022 judgment struck down **Sections 3(2) and 5 of the Benami Transactions Act,** saying they were **unconstitutional and unfair.**

3. **New Decision**: The Supreme Court said that the **constitutionality of the unamended Act was not properly considered before,** allowing the case to be heard again by a new bench.

What are Benami Transactions and the Relevant Laws?

1. **Definition of Benami Transactions:** "Benami" means "without a name," referring to transactions where the asset does not have a real owner or has a fake owner. This can involve both movable (like vehicles) and immovable (like land) assets.

2. **Benami Transactions (Prohibition) Act, 1988:** This Act aimed to stop such transactions, mainly to combat issues like money laundering and tax evasion.
   a. It mentions that the legal right to claim ownership of any benami property is completely removed.

Benami Transactions (Prohibition) Amendment Act, 2016

1. It amended and renamed the **Benami Transactions (Prohibition) Act, 1988** as the **Prohibition of Benami Property Transactions Act, 1988**.

2. **Appellate Tribunal:** An **Appellate Tribunal** was established to hear appeals against orders passed by the **Adjudicating Authority**. Appeals against the Tribunal's decisions can be made to the **High Court**.
   a. The special court must conclude trials related to benami transactions within **six months** from the filing of the complaint.

3. **Authorities under the Act:** The Act designates **four authorities** for inquiries and investigations:
   a. **Initiating Officer:** Issues notices if a person is suspected to be a **benamidar** (holder of benami property). He can hold the property for **90 days**, with approval from the **Approving Authority** and refers the case to the **Adjudicating Authority** if the property is to be retained.
   b. **Approving Authority:** Grants permission for provisional actions taken by the Initiating Officer.
   c. **Adjudicating Authority:** Examines all evidence and decides whether the property qualifies as benami.
   d. **Administrator:** Manages and handles confiscated benami properties as per prescribed conditions.

4. **Key Provisions:** Authorities are empowered to **provisionally attach benami properties**, which can later be confiscated. The Adjudicating Authority issues final orders based on the evidence provided.

5. **Retrospective Application**: The amendments allowed for actions against benami transactions that occurred from 1988 onwards.

6. **Penalties**: **Section 3(2)** introduced penalties, including up t**o 3 years in prison** for entering into benami transactions during the period from September 5, 1988 to October 25, 2016.
   a. This meant a person could be jailed for a transaction that took place many years before the law changed.
   b. **Confiscation Powers**: Section 5 allowed the government to confiscate any property involved in a benami transaction.

2016 Amendments and Retrospective Application

1. The **2016 amendments were intended to apply to past transactions.**

2. This was **challenged in court,** leading to a December 2019 ruling by the Calcutta High Court that said the amendments could not be applied to earlier cases.

What was the Supreme Court's 2022 Judgment?

1. The Supreme Court supported the Calcutta High Court's decision**,** stating that **the 2016 amendments could not be applied retrospectively.**

2. It found **Sections 3(2) and 5 of the Act unconstitutional**:

a. **Section 3(2)**: Punished people for benami transactions from September 1988 to October 2016, **violating Article 20(1) of the Constitution, which bans retroactive punishment.**

· **Article 20(1)** prohibits the imposition of retrospective punishment, which means that **no one can be punished for an act that was not an offense at the time it was committed.**

b. **Section 5**: Allowed broad confiscation powers without enough safeguards, which could lead to abuse by authorities.

3. **Government's Review Petition:** After the 2022 ruling, the Central Government filed a review petition

a. Govt. argued that the **judgment disrupted decades of legal practice regarding benami transactions** and went beyond the **original question of applying the 2016 amendments.**

Key Highlights of the Recent Supreme Court Judgment

1. **Constitutionality of Unamended Act**: The Court clarified that the **constitutionality of the unamended Benami Transactions Act was not in question** during the earlier hearings.

a. The main issue was whether the 2016 amendments were meant to apply only in the future.

2. **Fresh Adjudication Ordered**: The Supreme Court **accepted the review petition and set aside the 2022 ruling.** A new bench will **now re-examine the constitutionality of the benami law provisions.**

3. **Emphasis on Active Legal Dispute**: The Court highlighted that a constitutional challenge requires a proper hearing with a live dispute among the parties involved.

Conclusion

The Supreme Court's decision to reverse its 2022 verdict is an important development in the legal issues surrounding benami transactions in India. This new hearing allows for a thorough examination of the law's provisions, especially regarding their constitutionality and the application of past transactions. As the case progresses, it may change how the Benami Transactions (Prohibition) Act is enforced and its effectiveness in tackling financial misconduct.

4. Original parent document not necessary to transfer property

1. In **October 2024, the Madras High Court ruled** that **Sub Registrars cannot refuse to register a property transfer document just because the original parent document is missing or** a **police non-traceable certificate is not provided if the document is lost.**

2. This **ruling is important for upholding property rights under Article 300A** of the Indian Constitution.

a. The **right to own property is protected** under **Article 300A**, which says that **no one can be deprived of their property except by law**.

b. This **right is considered stronger than fundamental rights**, meaning property rights **cannot be limited without reasonable compensation.**

3. The main law governing property transfers is the **Transfer of Property Act of 1882**.

4. The principle of **caveat emptor** (**let the buyer beware**) means that **buyers must check** that the **property is free from any debts or claims.**

What was the case?

1. This **ruling came from a writ appeal by P. Pappu**, **whose request to register a release deed for transferring her rights over ancestral property** to her brother.

2. But It was **denied by the Sub Registrar in Rasipuram, Namakkal district.**

3. Pappu had **provided a certified copy of the parent document** from the **same Sub Registrar's office,** which the **court found sufficient for registration.**

Court's Findings on Registration Rules:

1. The **Division Bench, made up of Justices R. Subramanian** and R. **Sakthivel**, said that the **Registration Act of 1908** provides **limited reasons for refusing registration**.

2. These **do not include the lack of the original parent document.**

3. They **criticized Rule 55-A of the Tamil Nadu Registration Rules**, which **seems to allow Sub Registrars to deny registration without proper reasons.**

Issues with Non-Traceable Certificates:

1. The court said that **Rule 55-A offers an option to submit a non-traceable certificate if the original document is lost**; however, **getting this certificate can be expensive and difficult for ordinary people.**

2. The judges said that the **process to obtain a non-traceable certificate often involves high fees and complicated steps**, leading some individuals to get certificates from neighboring states.

Court's Observations:

1. The judges emphasized that a **certified copy could be checked against the original records** in the Sub Registrar's office, making the **requirement for a non-traceable certificate unnecessary and a waste of time**.

2. They warned that **forcing people to obtain non-traceable certificates for lost documents could lead to dishonest dealings** in property transactions.

What is Right to Property under Article 300A ?

1. The **Right to Property in India has changed significantly over the years due to social, economic, and political shifts.**

2. Initially, it was a **fundamental right under Articles 31 and 19(1)(f)** of the Constitution when it **came into effect in 1950.**

3. **After the 44th Amendment in 1978, Article 300A was added,** changing the **right to a constitutional right from the fundamental rights and removing the earlier provisions.**

4. Article 300A states, **"No person shall be deprived of his property save by authority of law."**

5. The government cannot take away a person's property without a valid law.

6. The Right to Property is now a **constitutional right. This means it has legal protection,** but individuals **cannot go to the Supreme Court under Article 32** for issues related to it.

7. In the case of **Jilubhai Nanbhai Khachar vs. State of Gujarat** (1994), the Supreme Court confirmed that the **right under Article 300A is not a fundamental right.**

5. Supreme Court upholds States' power to regulate industrial alcohol

1. In October 2024, the Supreme Court (SC) delivered a significant ruling, upholding the power of states to regulate industrial alcohol.

2. This decision was made in the case of State of U.P. vs. M/S. Lalta Prasad Vaish, which was heard by a 9-judge Bench.

What is the background of the dispute?

1. The court was presented with a **key interpretative question**: whether the **term "intoxicating liquor"** can be defined to also include "industrial alcohol".

2. The **issue arose from two "overlapping" entries** in the **7th Schedule** of the Constitution, which lays down the division of lawmaking powers between the Centre and the states.
    a. **Entry 8 of List II (State List)** gives states the power to regulate "the production, manufacture, possession, transport, purchase and sale of intoxicating liquors".
    b. On the other hand, **Entry 52 of List I (Union List)** allows the Centre to regulate industries as a whole to the extent "declared by Parliament by law to be expedient in public interest".

3. **Centre's argument:** As alcohol and other products of fermentation industries that deal with **non-potable (non-drinkable) alcohol** are included in the industries (Development and Regulation) Act, 1951 — a law passed by Parliament — the Centre argued that it "occupied the field" when it comes to industrial alcohol, and that states could not regulate the subject.
    *   Currently, the Union regulates industrial alcohol under the industries (Development and Regulation) Act, of 1951.

4. **States' argument:** States argued that industrial alcohol can be misused to produce consumable alcohol illegally, which required them to enact legislation to regulate the subject.

Industrial Alcohol Vs Potable Alcohol

Aspect	Industrial Alcohol (Denatured Alcohol)	Potable Alcohol
Definition	Alcohol which is chemically altered to make it unfit for human consumption. It typically refers to isopropyl alcohol (isopropanol).	Alcohol which is purified and produced for safe human consumption
Purpose	Used as a raw material in various industrial processes	Used in the production of alcoholic beverages
Applications	Solvents, cleaning agents, cosmetics, pharmaceuticals, fuels (e.g., bioethanol)	Beverages like beer, wine, and spirits
Intended Use	Not intended for human consumption	Specifically intended for human consumption
Toxicity	Contains additives to make it toxic if ingested	Safe for consumption when regulated
Regulation Authority	Primarily regulated by Central authorities under industrial laws	Regulated by State authorities under Entry 8 of the State List
Taxation	Subject to levies and taxes as an industrial product	Subject to state excise duties and taxes as a consumable product
Examples	Denatured spirits, bioethanol, industrial solvents	Beer, wine, whiskey,

What was the Supreme Court's decision and its Impact

1. After careful consideration, the SC ruled that the term "intoxicating liquor" in Entry 8 of List II (State List) of the 7th Schedule of the Constitution **will include industrial alcohol.**

2. This decision had a **significant impact**, as it **set aside** the Supreme Court's 1990 **seven-judge judgment** in the Synthetics & Chemicals Ltd. v. State of U.P. case, which had previously stated that "intoxicating liquor" refers only to **potable alcohol** and that states cannot tax **industrial alcohol.**

What was the basis and outcome for the majority ruling?

1. The majority ruling in the current case noted that the **earlier 7-Judge bench** "did not determine the meaning of the expressions 'intoxicating' or 'liquors' or 'intoxicating liquors' independently."

2. The outcome of this case was an 8:1 ruling in **favor of the states**, affirming their power to tax both alcoholic beverages and industrial alcohol.

What is the 7th Schedule ?

1. **Article 246 of Indian Constitution defines the distribution of powers between the Union government and the State governments.**

2. It prevents overlapping or **conflicting legislation between state and centre.**

3. It consists 3 Lists:

   a. **Union List:** Contains subjects on which only the Parliament can legislate. Examples include defense, foreign affairs, and atomic energy.

   b. **State List:** Contains subjects on which only the State Legislatures can legislate. Examples include police, public health, and agriculture.

   c. **Concurrent List:** Contains subjects on which both the Parliament and the State Legislatures can legislate. In case of a conflict, the Union law prevails.

      i. Examples include education, marriage, and bankruptcy.

The **42nd Amendment Act of 1976 moved five subjects from the State List to the Concurrent List i**n the Constitution of India: **Education**, **Forests**, **Weights and measures**, **Protection of wild animals and birds** and **Administration of justice** (including the constitution and organization of all courts except the Supreme Court and the high courts).

6. Supreme Court's Warning Against Unnecessary Prosecutions

1. **In October 2024,** the **Supreme Court of India** highlighted the need to avoid "**unnecessary prosecutions**" in cases of **abetment of suicide** linked to **workplace issues**.

2. This decision came from a case involving **Rajeev Jain**, a salesman who died by suicide after alleged **harassment** from his senior officers.

What is Abetment of Suicide?

1. **Abetment**: Under **Section 107 of the Indian Penal Code (IPC)**, which is the same as **Section 45 of the Bharatiya Nyaya Sanhita, 2023 (BNS)**, abetment means encouraging or helping someone to commit an act, including **suicide**.

2. **Punishment**: Under **Section 306 IPC (Section 108 BNS)**, punishment can be up to **10 years imprisonment** along with a fine.

3. **Conviction Rates**: According to the **National Crime Records Bureau's** annual **Crime in India report**, the conviction rate in abetment of suicide (**Section 306 IPC**) cases was **17.5%** in 2022, with previous rates being **22.6%**, **21.8%**, **16.5%**, and **15.6%** in 2021, 2020, 2019, and 2018 respectively.

Incident Details:

1. Rajeev Jain was r**eportedly pressured to accept his company's Voluntary Retirement Scheme (VRS)** by senior officers.

2. After **he and other employees refused**, they faced **threats**, including intimidation from outside individuals.

3. **On November 3, 2006, during a meeting,** Jain was told he would be **demoted** if he did not accept the VRS. Witnesses said that jain appeared very **upset** and cried during the meeting.

4. **Later that evening,** Jain **apparently hanged himself.**

5. His brother Rajnish accused the senior officers of abetting the suicide.

6. The Allahabad High Court **refused a plea by the officers to quash the case,** holding that there was a **"direct link"** between the meeting where the deceased was **"humiliated and tortured"**, and the suicide.

Supreme Court's Ruling: Key Observations

On October 3, the Supreme Court dismissed the charges against the accused (senior officers).

1. Supreme Court stated that in **abetment of suicide** cases, there must be clear **encouragement** from the accused.

2. **Types of Relationships**: The Court **divided cases into two categories based on the relationship between the deceased and the accused:**

   a. **Emotional ties**: In these cases, proving abetment may be easier, as conflicts can lead to serious emotional distress.

   b. **Professional relationships**: In **employer-employee** situations, the law has rules, and prosecutions should only move forward **if there's clear evidence of intent to cause suicide.**

Conclusion on the Case

1. The **Court decided that further legal action against Jain's senior officers would misuse the legal process**, as there was not enough evidence showing they intended to cause his suicide.

2. The ruling stressed that not all **harsh workplace interactions** should lead to **criminal charges**.

Judicial Precedents: Relevant Cases

1. **M Mohan v. The State (2011)**: The Supreme Court set a high standard for proving **abetment of suicide**, requiring clear actions from the accused that led the victim to feel they had no choice but to commit suicide.

2. **Karnataka High Court (July 2023)**: The court did not dismiss charges against three individuals accused of harassing an employee from the **LGBT community**. The judges noted that harming someone's self-esteem could lead to **abetment of suicide**.

3. **Ude Singh v. State of Haryana (2019)**: The Supreme Court reinforced that proving abetment depends on the specific details of each case, stating that actions causing the victim to see no option other than suicide may fit under **Section 306 IPC**.

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Implications of the Ruling

1. **Legal Clarity**: The Supreme Court's ruling gives clear guidelines for prosecuting **abetment of suicide** cases, especially in workplaces.

2. **Focus on Intent**: The emphasis on **intent** suggests a shift towards ensuring that prosecutions are based on strong evidence rather than just accusations, which may help prevent misuse of abetment charges.

Conclusion:

The **Supreme Court's warning against unnecessary prosecutions** in abetment of suicide cases is an important reminder of the need for clear **evidence** and **intent** in legal proceedings. This ruling aims to ensure that real cases of **workplace harassment** are handled properly while preventing wrongful accusations. As workplace dynamics change, this **legal framework** will need regular review to protect both employees and employers.

7. Living in Pollution-Free Environment is Fundamental right: SC

1. In October 2024, the Supreme Court expressed serious concerns about the ongoing issue of stubble burning in Punjab and Haryana.

2. The court condemned the **selective enforcement of penalties, stating that it violates citizens' fundamental right under Article 21** of the Indian Constitution **to live in a pollution-free environment.**

Key Observations by the Supreme Court:

1. Court said that **every person has the right to live in a clean environment (Article 21)** and that the **government must protect this right.**

2. The court pointed out that **authorities have not done enough to enforce existing environmental laws**, allowing violations to continue.

3. Court emphasized that **both central and state governments must come up with plans to protect citizens' rights to live** with dignity in a clean environment.

Legal Framework and Enforcement Issues:

1. **Environment (Protection) Act, 1986:**

   a. The **court referred to Section 15 of this Act,** which talks about **penalties** for harming the environment, **including up to five years in prison and fines of ₹1 lakh.**

   b. The **court mentioned that there is no proper system in place for collecting these fines,** questioning how seriously the **Commission for Air Quality Management (CAQM) takes its role.**

2. The court found a big gap between the **number of stubble-burning cases reported and the actual penalties enforced:**

   a. **Punjab reported 1,084 cases** but **collected fines from only 473 people.**

   b. Haryana **recorded 490 cases with only 32 First Information Reports (FIRs) filed.**

Court Directives:

1. The **Union government was asked to consider Punjab's request for more funds** to help fight stubble burning.

2. The court ordered the **Union government and the state governments of Delhi, Haryana, Uttar Pradesh, and Rajasthan** to submit reports in **2 weeks** about how they are handling pollution issues.

Right to Environment in the Indian Constitution:

1. **Right to Life Under Article 21:**

   a. In the case of **Subhash Kumar v. State of Bihar (1991)**, the Supreme Court ruled that **Article 21 includes the right to a healthy environment.**

   b. This was reaffirmed in **Virender Gaur v. State of Haryana (1994)**.

2. **Directive Principles of State Policy:**

   a. **Article 48A** mandates the **State to protect and improve the environment and safeguard forests and wildlife.**

   b. In **Sher Singh vs. State of Himachal Pradesh (2014)**, the **National Green Tribunal affirmed that the State has a constitutional duty to protect the environment.**

   c. Additionally, in **M.C. Mehta vs. Union of India (2002)**, the court said that **Articles 39(e), 47, and 48A together create an obligation for the State to secure public health** and environmental protection.

3. **Fundamental Duties:**

   a. **Article 51A(g)** establishes a **fundamental duty for citizens to protect** and preserve the environment.

Why Farmers Opt for Stubble Burning ?

1. **After harvesting rice and wheat**, farmers **often burn leftover straw to prepare the field for the next crop**.

2. This method is seen as **quick and inexpensive compared to other ways to manage crop waste.**

3. Rising farming costs discourage farmers from investing in equipment for **proper crop residue management.**

4. Machines like the **Happy Seeder, which helps manage stubble**, are often too expensive for many farmers.

5. Stubble burning occurs widely in **Punjab, Haryana, Uttar Pradesh, Rajasthan, and the National Capital Region (NCR) of Delhi,** as well as in other states like **Bihar, Odisha, and West Bengal.**

Impact of Stubble Burning

1. **Environmental Pollution:**

   a. **Agricultural fires significantly contribute to air pollution** in northern India during October and November, **causing smog and poor air quality.**

   b. There is a noticeable increase in harmful particulate matter (**PM 2.5 and PM 10**) during this time.

2. **Soil Health:**

   a. Burning crop residues removes **essential nutrients from the soil and decreases organic carbon content,** harming soil quality.

Central Government Initiatives:

1. A scheme for **promoting agricultural machinery for managing** crop residue has been approved, providing **farmers with 50% of the cost for machinery.**

2. The central government has **allocated ₹3,062 crore to Punjab, Delhi, and NCR states from 2018 to 2023** for effective stubble management.

3. Farmers are encouraged to profit from leftover biomass.

Pusa Decomposer:

1. Developed by the Indian Agricultural Research Institute **(IARI)**.

2. This **bio-enzyme helps decompose crop residue within 20-25 days,** turning it into manure and improving soil health.

8. Delhi HC allows 60-year-old couple to use their deceased son's Sperm for Surrogacy

In October 2024, the Delhi High Court allowed a couple in their 60s to access their deceased son's sperm, enabling posthumous (after death) assisted reproduction.

What is the Case?

1. The 30-year-old man, who passed away from cancer in 2020, had **cryopreserved** his sperm due to the impact of cancer treatments such as radiation and chemotherapy can affect sperm count and quality.

   • **Cryopreservation** is the process of freezing biological material, such as cells, tissues, or organs, to preserve it for future use. The material is cooled and stored at very low temperatures, which stops cell metabolism and prevents damage.

2. His parents approached the court after the hospital, which stored the sperm, refused to release it due to the **absence of guidelines for cases without a surviving spouse**.

3. The parents sought court intervention, expressing their wish to carry on their son's legacy and raise a grandchild. They assured the court of their and their daughters' full responsibility for any child born through surrogacy using the sperm.

What the Law says?

1. **Assisted Reproductive Technology (ART) Act, 2021:** It **regulates all fertility and artificial insemination procedures**.

   a. The **ART Rules, 2022** outline procedures for **posthumous sperm retrieval** but only for cases where the **deceased is married**, and the **person seeking retrieval is the surviving partner**.

2. **Ministry of Health and Family Welfare (MoHFW)** opposed the parents' request, stating that the legislation does not apply to **"postmortem grandparenthood."**

3. **Surrogacy Regulation Act** applies only to intending couples or women with medical needs for surrogacy, and does not cover grandparents as "intending grandparents".

International Practices

Many countries allow **posthumous reproduction**, but require **explicit consent**:

1. **Uruguay:** Allows it with **written consent** valid for one year.
2. **Belgium:** Permits it after a **six-month waiting period** post-death, but the request must be made within **two years**.
3. **Victoria and Australia:** Permits it with **written or oral consent** in the presence of two witnesses and **approval from a patient review panel**. It also requires **counselling for the parent**.
4. **Canada and the UK:** Both require **written consent**.
5. **Israel:** Permits only the deceased's **female partner** to use sperm, though exceptions have occurred, such as when the parents of a 19-year-old soldier killed in combat were allowed to use their son's sperm posthumously.
   a. A daughter was born from the deceased son's sperm.

What did the Court rule on this case?

1. **Application of the ART Act**: The Court ruled that the **ART Act and its rules** do not apply, as they were **not in force** when the petitioners' son died.
   a. Therefore, there was **no prohibition** on releasing the gamete (sperm) to a person other than the spouse.
2. **Gametes as Property**: The Court agreed that **gametes or semen samples** can be treated as **property**, since it is **part of the individual's biological material** just like **"the human corpse or its organs"**.
3. **Parental Entitlement**: Referring to the **Hindu Succession Act**, the Court stated that **parents are Class-1 legal heirs** in the absence of a spouse or children, making them entitled to the **release of the sample**.
4. **Prohibition on Posthumous Reproduction**: The Court noted that there is **no legal prohibition on posthumous reproduction** in the absence of a spouse, and thus found **no reason to impose restrictions**.

Precedent and Concerns

1. **Court Ruling Precedent:** The Delhi High Court ruling sets a precedent **allowing individuals**, **other than a spouse**, **to claim frozen eggs or sperm** of a deceased person.
   a. However, the Court emphasized that such transfers are not automatic and must consider **informed consent** and the **welfare of the future child**.
2. **Case-by-Case Basis:** Each case needs to be judged on its own facts, without a general rule.
3. **Ethical Concerns:** Posthumous reproduction raises ethical issues, including assumption of consent by the deceased and the fact that the child will lack one genetic parent.
4. **Complexity of Family Structure:** Claims for posthumous reproduction introduce complexities in family dynamics, particularly posthumous grandparenthood, which challenges traditional family structures.
   a. These desires often arise from patriarchal values, focusing on continuing the patrilineal lineage.

Assisted Reproductive Technology Regulations in India

What is Assisted Reproductive Technology (ART)?
ART encompasses all techniques that handle sperm or eggs outside the human body to achieve pregnancy. This includes procedures like in-vitro fertilization (IVF), where fertilization occurs in a laboratory setting, and the use of donated gametes (sperm or eggs). It also covers gestational surrogacy, where a woman carries a pregnancy without being genetically related to the child.

Key Provisions of the Assisted Reproductive Technology (Regulation) Act, 2021 and Rules, 2022
India's ART regulations are governed by the Assisted Reproductive Technology (Regulation) Act of 2021 and the Assisted Reproductive Technology (Regulation) Rules of 2022. These regulations aim to ensure ethical and safe practices in ART. **key provisions:**

1. **Registration of ART Clinics and Banks:** All clinics and banks providing ART services must be registered with the National Registry of Banks and Clinics of India. This registry maintains a centralized database for transparency and monitoring. Registration is valid for five years and can be renewed. Non-compliance can lead to suspension or cancellation of registration.

2. **Eligibility Criteria for Gamete Donation:**
   a. **Sperm Donors:** Men between 21 and 55 years old can donate sperm.
   b. **Egg Donors:** Women between 23 and 35 years old can donate eggs. They must be married and have at least one living child who is at least three years old.

3. **Rights of the Child and Donors:** A child born through ART is legally the child of the commissioning couple(s). The donor has no parental rights over the child.

4. **Consent and Insurance:** Informed consent from both the commissioning couple(s) and the donor is mandatory. The couple(s) must provide insurance coverage for the egg donor to protect against any health complications or loss of life.

5. **Regulation and Oversight:** The National and State Boards established under the Surrogacy Act, 2021, are responsible for regulating ART services and ensuring adherence to the law.

6. **Prohibitions and Penalties:** The Act prohibits practices such as:
   a. Abandoning or exploiting children born through ART
   b. Trading embryos for any reason
   c. Transferring embryos into males or animals
   d. Sex-selective ART (choosing the sex of the child)

Penalties for these offences include imprisonment (ranging from 5 to 12 years) and fines (ranging from Rs. 10 lakh to Rs. 25 lakh).

Previous Year UPSC Prelims Question

In the context of hereditary diseases, consider the following statements: *(UPSC Prelims 2021)*

1. Passing on mitochondrial diseases from parent to child can be prevented by mitochondrial replacement therapy either before or after in vitro fertilization of egg.

2. A child inherits mitochondrial diseases entirely from mother and not from father.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Answer: (c) Both 1 and 2

Practice Question

Consider the following statements about In Vitro Fertilization (IVF):

1. The name in vitro fertilization refers to the fact that the egg is fertilized by the sperm in the laboratory and not in the woman's reproductive tract.

2. Fertility therapies are collectively called Assisted Reproductive Technologies (ART).

Which of the above statements are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Answer: (c) Both 1 and 2

9. Lady Justice is no longer blindfolded

1. In October 2024**,** Supreme Court of India unveiled the *'new lady justice'* statue in the Supreme Court premises that replaced the *'original lady justice'*.

2. Unlike the old statue, which **featured a blindfold and a sword,** this new **6-foot-tall** statue in the judges' library is of a **saree-clad woman** with no blindfold, **holding scales** and, **instead of the sword, a copy of the Constitution** of India.
   - D.Y. Chandrachud **(then Chief Justice of India)** said that it **represents the idea that "law is not blind; it sees everyone equally."**

3. The new take on the statue, which has been **designed by Vinod Goswami**, comes in the wake of legal reforms such as the new criminal codes, and the stated aim of "decolonising" the legal framework in India.

Changing Meaning of Lady Justice

1. **Historical Roots:**
   a. The image of **Lady Justice can be traced back to Greek and Roman mythology.**

b. Themis: In Greek mythology, **Themis is the goddess of justice, wisdom, and good counsel**, often depicted with **scales and a sword.**

c. The first Roman emperor Augustus (27 BCE-14 CE) introduced the worship of Justice in the form of a goddess known as Justitia (or Iustitia). Justitia, like Themis, did not wear a blindfold.

2. **The Blindfold Origin:**

a. The **concept of a blindfolded Lady Justice appears to have originated from a woodcut published in 1494 by lawyer Sebastian Brant**.

b. This image, titled **"The Fool Blindfolding Justice,"** critiqued the idea of **blind justice rather than celebrating it.**

c. By the early 17th century, the blindfold began to symbolize impartiality and was commonly associated with justice.

Lady Justice in India:

1. **Colonial Influence:**

a. The **British Raj introduced the iconography of Lady Justice to India,** which **continues to be a part of the country's legal system.**

b. The **Calcutta High Court features carvings of Lady Justice**, with some depictions blindfolded and others not.

c. Similarly, the **Bombay High Court has a statue of Lady Justice without a blindfold.**

Major Changes to Lady Justice

1. The **blindfold is gone**, symbolizing that the **law is aware and does not ignore anyone.**

2. **This change moves away from the old idea that justice should be blind.**

3. **Replacement of Sword:**

a. The **sword has been replaced with the Indian Constitution,** focusing on justice **through laws rather than punishment.**

b. This highlights the importance of **constitutional values in delivering justice.**

4. **Cultural Adaptation:** The **statue now wears a saree, representing Indian culture,** and is placed in the Supreme Court library.

5. **Retained Elements:** The **scales remain unchanged, symbolizing balance and fairness in justice.**

Purpose of Changes:

1. The **changes aim to break free from British symbols**, creating a unique Indian identity in the legal system.

2. Emphasizing that the **law is aware of everyone helps shift the focus from strict punishment to fairness.**

3. The **new statue reflects current views on justice** and the evolution of India's legal system.

4. The **focus is now on the Constitution, showing that justice is based on legal principles.**

5. Incorporating Indian elements shows pride in the country's cultural identity.

Constitutional Values and Modern Indian Identity

1. **Justice is now based on the Constitution,** promoting fairness and equality.

2. The new statue supports creating a legal framework that is distinctly Indian.

3. Justice should be aware and fair, encouraging transparency in legal decisions.

4. Emphasizes equal treatment and fairness in legal proceedings, blending modern and Indian values.

10. Click-to-Cancel Rule: Easier to Cancel Subscriptions and Memberships

What is it?

1. In October 2024, the **U.S. Federal Trade Commission (FTC) is introducing a new "click-to-cancel" rule.**

- The **rule aims to prevent consumers from being stuck with unwanted subscriptions.**

2. This rule makes it easier for **consumers to cancel subscriptions and memberships.**

3. Companies will face penalties **if they complicate the cancellation process.**

What does the new rule say?

According to the FTC, **companies must make it as easy to cancel a subscription as it was to sign up for it.**

Notably, cancellations must be available through the **same method (online, phone, etc.) that people used to sign up, and it should not be too hard to do.**

Some guidelines are as follows:

1. Companies **can't force people to talk to a live or virtual representative** to cancel if they didn't have to do that to sign up.
2. Companies **can't charge extra for cancelling over the phone and must answer calls** or return messages during regular business hours.
3. **For memberships that were originally offered in person,** companies must provide options to cancel online or over the phone.

To whom will the rule be applicable to? How?

1. This rule will apply to **"almost all negative option programs"** across different platforms.
2. This includes **free trials, automatic renewals, and other similar offers.**
   - The FTC defines **"negative option"** programs as situations where a company assumes a customer wants a service unless they specifically say otherwise.
     - For example, **if someone agrees to a one-week trial but forgets to cancel, they may end up being charged for a full membership.**

The final rule will create a legal framework to stop sellers from:

1. **Misleading customers about important facts when marketing services.**
2. Not clearly explaining the terms before collecting a customer's payment information.
3. Failing **to get clear permission from a customer before charging the**m.
4. Not providing an easy way to cancel and stop charges.

Why was this rule created?

1. This **rule is part of the FTC's update of its 1973 Negative Option Rule.**
2. The goal is to address **unfair practices related to subscriptions and recurring payments, especially in our digital economy.**

3. The FTC receives many complaints about these practices every year, and the number of complaints has been increasing.
4. **A study in 2022 found that 42% of consumers** forgot they were paying for services they **weren't using**, and many **underestimated their monthly subscription costs.**
5. The FTC has taken action against **companies like Adobe and Amazon for making cancellations difficult.**

Is there a similar rule in India?

No, India does not currently have a similar regulation.

11. Govt. Integrates 12 schemes on eShram portal

1. **In October 2024, eShram portal successfully** integrated **12 welfare schemes** from **various Central Ministries and Departments**, enhancing its capacity to support unorganised workers in India.
   - The **eShram-One Stop Solution** portal under **Ministry of Labour & Employment**, initiated by the **Central Government** on **August 26, 2021**, is designed to create a centralized database for unorganised workers in India.
2. The eShram portal now consolidates **12 different government schemes**, making it easier for unorganised workers to access multiple benefits in one place. These include:
   i. One Nation One Ration Card (ONORC)
   ii. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
   iii. National Social Assistance Programme (NSAP)
   iv. National Career Service (NCS)
   v. Pradhan Mantri Shram Yogi Maandhan (PM-SYM)
   vi. Pradhan Mantri Jan Arogya Yojana (PM-JAY)
   vii. Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY)
   viii. Pradhan Mantri Suraksha Bima Yojana (PMSBY)
   ix. Atal Pension Yojana (APY)

x. Ayushman Bharat Digital Mission (ABDM)

xi. Pradhan Mantri Garib Kalyan Yojana (PMGKY)

xii. Pradhan Mantri Awas Yojana (PMAY)

3. These schemes cover a **wide range of benefits**, including:

   i. Food security: ONORC

   ii. Employment: MGNREGA, NCS

   iii. Social assistance: NSAP

   iv. Pension: PM-SYM, APY

   v. Health insurance: PM-JAY, PMJJBY, PMSBY, ABDM

   vi. Financial assistance: PMGKY

   vii. Housing: PMAY

4. The government is encouraging **States and Union Territories** to include their own schemes, broadening the benefits available on the platform.

5. The main goal is to provide a **Universal Account Number (UAN)** to unorganized workers, facilitating straightforward access to various welfare programs.

12. First time ITU's WTSA hosted in India

In October 2024, International Telecommunications Union-World Telecommunication Standardization Assembly (ITU-WTSA) 2024 held in New Delhi.

a. WTSA is the governing conference for the standardization work of the ITU, **organized every four years.**

b. It is for the **first time that the ITU-WTSA is being hosted in India and the Asia-Pacific.**

India's Telecom Sector:

1. It is the **2nd-largest telecommunications market in the world**, with over one billion subscribers. The sector is a key part of India's digital economy with a 6.5% contribution to the country's GDP.

2. The telecom sector is expected to grow at a compound annual growth rate (CAGR) of 9.4% from 2020 to 2025.

3. India's **initiative** for providing safer and better telecom services:

a. Telecommunication Act 2023

b. Digital Personal Data Protection Act 2023

c. National Cyber Security Strategy

d. Bharat 6G Alliance

e. BharatNet Project

About International Telegraph Union (ITU)

1. **Genesis**: In **1865,** the **first International Telegraph Convention** signed in Paris established **International Telegraph Union** (the first incarnation of ITU).

2. **Role:**

   a. UN's **specialized agency for digital technology**

   b. **Harnessing innovation and connecting everyone** to ensure a better future for all

3. **Members**: 193 Member States (including India)

4. **Headquarters:** Geneva (Switzerland)

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13. 150th Anniversary of Universal Postal Union

The **Department of Posts** has released **commemorative stamps** marking the 150th anniversary of the **Universal Postal Union (UPU)** on **World Post Day (9th October)**.

1. UPU is a **United Nations specialised agency** and the **postal sector's primary forum** for international cooperation.

2. UPU was established on **9th October 1874**, in **Berne, Switzerland** and **India joined UPU in 1876.**

3. UPU has played a crucial role in **standardising international postal regulations**, facilitating seamless mail exchange.

4. UPU is **headquartered in Berne** and is the **2nd oldest** international organisation worldwide after **International Telegraph Union (formed in 1865).**

5. **Year 2024** also marks **170 years** of establishment of **India Post** which was founded in **1854** during the tenure of **Lord Dalhousie.**

6. **Postal Service in India:**

   a. **1852:** Issuance of **"Scinde Dawk,"** India's first postage stamp.

   b. **1854:** Establishment of **India's first post office in Bombay.**

B. INTERNATIONAL RELATIONS

1. India and China agree to de-escalate border tensions

1. In October, 2024, India and China reached a landmark agreement to resume patrolling at key friction points along the Line of Actual Control (LAC) in eastern Ladakh, signaling a significant step towards de-escalating tensions that had persisted for over four years.
   • India confirmed that an agreement had been reached regarding the resumption of patrolling arrangements along the LAC, **leading to disengagement and the resolution of issues that had surfaced since 2020.**

2. This **came after a prolonged period of heightened tensions following the Galwan Valley clashes in June 2020,** which marked the **first fatal confrontation between the two nations since 1975.**

A step forward — A look at progression of the standoff between India and China at the Line of Actual Control (LAC)

What was The Galwan Valley Clash ?

In 2020, Indian and Chinese troops engaged in confrontations at various locations along the Line of Actual Control (LAC), including **Pangong Tso, Galwan Nalah, Demchok in Ladakh, and Naku La in Sikkim**, a high-altitude mountain pass.

Key Incident:

1. The most significant clash occurred **on the night of June 15, 2020, in Galwan Valley, resulting in violent confrontations between Indian forces and the People's Liberation Army (PLA).**

2. Following the clash, **both India and China significantly increased troop deployments in the region**, bringing in heavy weaponry.

3. **Since then, multiple rounds of Corps Commander-level talks were held to address the standoff and resolve the tensions in Eastern Ladakh.**

Friction Points

Seven key friction points in Eastern Ladakh saw ongoing confrontations following the Galwan clash in 2020: **PP 14 (Galwan)**, **PP 15 (Hot Springs)**, **PP 17A (Gogra)**, **North and South Banks of Pangong Tso**, **Depsang Plains (notably where Chinese troops restricted Indian access)** and **Charding Nulla**h

Implications of the Agreement

1. The agreement was hailed as a major breakthrough, particularly if **it included contentious areas like Depsang Plains and Demchok**.

2. Analysts suggested that **if China showed flexibility in these areas, it could potentially lead to a resolution of territorial disputes.**

3. Indian External Affairs Minister S. Jaishankar confirmed, **"We reached an agreement on patrolling. We can say that the disengagement process with China has been completed."**

4. He emphasized that India would resume patrols similar to those conducted in 2020.

Remaining Uncertainties:

1. Despite the **positive developments, several aspects of the agreement remained unclear,** particularly regarding the nature of the patrolling arrangements.

2. There was **uncertainty as to whether the agreement would restore the status quo that existed before 2020 or retain the newly established buffer zones at friction points.**

3. In simple terms, while there were positive changes, some details of the patrolling arrangements remained ambiguous, and **it was unclear whether the border situation would return to its pre-2020 state or maintain the current buffer zones.**

Conclusion

The agreement on patrolling arrangements along the LAC marked a potentially pivotal moment in India-China relations after years of heightened tensions. As diplomatic engagements continued, the focus shifted to whether this breakthrough could pave the way for a lasting resolution of border issues and foster improved bilateral ties moving forward.

Do you Know about Line of Actual Control?

1. The Line of Actual Control **(LAC) is the demarcation that separates Indian-controlled territory from Chinese-controlled territory.** India considers the LAC to be **3,488 km long**, while the Chinese consider it to be only around 2,000 km. It is **divided into three sectors**: the **eastern sector** which spans Arunachal Pradesh and Sikkim, the **middle sector** in Uttarakhand and Himachal Pradesh, and the **western sector** in Ladakh.

2. The alignment of the LAC in the eastern sector is along the **1914 McMahon Line**, and there are minor disputes about the positions on the ground as per the principle of the high Himalayan watershed. This pertains to India's international boundary as well, but for certain areas such as Longju and Asaphila. The line in the middle sector is the least controversial but for the precise alignment to be followed in the Barahoti plains.

2. 23rd Meeting of HoG of the SCO held in Islamabad

1. On 15-16 October, 2024, the **23rd Meeting of the Shanghai Cooperation Organisation (SCO) Council of Heads of Government** (HoG) was held in **Islamabad, Pakistan**.

2. External Affairs Minister, Dr. S. Jaishankar represented India at the meeting.

3. This summit focused on strengthening multilateral cooperation among the SCO member states, addressing pressing global challenges such as **combating terrorism**, **enhancing economic collaboration**, and **tackling climate change**.

4. The meeting was a continuation of the SCO's longstanding efforts to promote peace, stability, and prosperity in the region.

5. India once again strongly **reiterated its opposition to China's Belt and Road Initiative (BRI)**, making it the **only country in the SCO not to support** the controversial connectivity project.

Belt and Road Initiative (BRI)

1. In 2023, China's ambitious infrastructure funding project, the **Belt and Road Initiative (BRI) marked a decade** since it was first outlined by President Xi Jinping.

2. President Xi Jinping announced the Silk Road Economic 'Belt' during his visits to Kazakhstan in 2013. The 'Belt' plan was to revitalise a series of trading and infrastructure routes between Asia and Europe. Connectivity through Central Asia was a key element of the initiative.

3. Subsequently, President Xi announced a sea trade infrastructure called the 'Road'. This maritime 'Road' would connect China with Southeast Asia, Europe, and Africa. The major focus has been to build ports, bridges, industry corridors, and other infrastructure throughout Southeast Asia and the Indian Ocean.

4. For some time, together these initiatives were referred to as the One Belt One Road Initiative (OBOR). Since 2015, it has been mostly referred to as the BRI.

5. India's position on the BRI has remained relatively consistent since 2013. From the beginning, India had reservations about the BRI – mainly due to sovereignty-related issues, as the China-Pakistan Economic Corridor (CPEC) goes through the Pakistan-occupied Kashmir (PoK), and geopolitical implications of projects in the Indian Ocean.

Key Highlights of the Meeting

At the **23rd Meeting of the SCO Council of Heads of Government**, the focus was on **global challenges** and how the SCO can collaborate to address them:

1. **Geopolitical Conflicts**: India acknowledged the **ongoing geopolitical tensions** around the world and their impact on global stability.

2. **Economic Volatility**: India discussed the challenges posed by **financial volatility**, **rising debt levels**, and the disruption of **global supply chains**.

3. **Climate Change**: Emphasizing the importance of **climate action**, India urged SCO members to cooperate on sustainable development, particularly in light of extreme weather events and their impact on agriculture.

India also called for a renewed commitment to the **SCO Charter**, stressing the need for **cooperation** and **mutual respect**. He advocated for a **reformed multilateral system**, with a more **inclusive and representative global governance structure**, including the **reform of the UN Security Council**.

India and the SCO:

1. India became a full member of the SCO in **2017**, after being granted observer status in **2005**.

2. Since joining, India has emphasized the importance of **countering terrorism**, **radicalism**, and **extremism**, areas that are central to the SCO's core agenda.

3. India has also contributed to discussions on regional **connectivity**, **economic growth**, and **sustainable development**.

4. The Central Asian countries of Kazakhstan, Uzbekistan, Tajikistan, and Kyrgyzstan are very important for India.

- The region is part of India's extended neighbourhood, and India has strong civilisational and cultural links with the region that go back to the **time of Emperor Ashoka**. The SCO provides a platform where India can interact with all these countries at multiple levels of government.

5. India has very important interests in this region — for security, energy, and connectivity needs, and for trade and investment.
   a. India **imports 85% of its energy** requirements, and **Turkmenistan** has the **world's 4th -largest** reserves of natural gas.
   b. **Kazakhstan** is the world's largest **producer of uranium ore.**
   c. India also holds **military exercises** with Kazakhstan, Uzbekistan, Kyrgyzstan, and Tajikistan.

6. India's **External Affairs Minister**, **Dr. S. Jaishankar**, delivered a national statement at the **2024 SCO Summit** in which he highlighted India's global initiatives, including the **International Solar Alliance**, **Coalition for Disaster Resilient Infrastructure**, and **Mission LiFE** (Lifestyle for Environment).

Do you know?

The Tourism Ministers' Meeting (TMM) of the SCO was hosted by India in Kashi (Varanasi) last year. Varanasi has been declared as the **first tourism and cultural capital of SCO**. China has now assumed the rotating presidency of the SCO for 2024-2025 from Kazakhstan.

Challenges Facing the SCO:

While the SCO has made significant progress in fostering cooperation, several challenges remain:

1. **Tensions between India, China, and Pakistan**: Both India and China have unresolved border disputes, and tensions between India and Pakistan remain high due to cross-border terrorism.
2. **Geopolitical Rivalries**: The SCO is not immune to the broader geopolitical rivalries, particularly between major powers like China and Russia.
3. **Regional Instability**: Conflicts in Afghanistan and Central Asia continue to pose security risks to the region.

Despite these challenges, the SCO remains committed to promoting peace and stability through dialogue and cooperation.

What is the Shanghai Cooperation Organisation (SCO)?

1. The **Shanghai Cooperation Organisation (SCO)** is a regional intergovernmental organization founded in 2001.
2. It aims to address issues related to **regional security**, **economic development**, and **cultural exchange**.
3. **Initially formed to combat terrorism, extremism, and separatism**, the SCO has evolved into a significant platform for cooperation among its members, which now include some of the world's largest countries like **China**, **Russia**, **India**.
4. The SCO serves as a forum for its member countries to discuss and coordinate policies on various topics, ranging from **regional security** to **trade** and **environmental protection**.

Historical Background of the SCO:

1. The SCO's origins can be traced back to **1996**, when the **Shanghai Five** group was formed by **China**, **Russia**, **Kazakhstan**, **Kyrgyzstan**, and **Tajikistan**.
2. The primary aim was to foster security and military trust in the region following the dissolution of the Soviet Union. Two important treaties were signed during this time:
   a. **Treaty on Deepening Military Trust in Border Regions** (1996)
   b. **Treaty on Reduction of Military Forces in Border Regions** (1997)
3. These treaties set the stage for greater regional cooperation.
4. In **June 2001**, the Shanghai Five evolved into the **Shanghai Cooperation Organisation (SCO)** when **Uzbekistan** joined the group **as 6th member**. The SCO expanded its focus to not only security issues but also to **political**, **economic**, and **cultural** cooperation.

SCO Membership

As of 2024, consists of **10 member countries**- India, Iran, Kazakhstan, China, Kyrgyzstan, Pakistan, Russia, Tajikistan, Uzbekistan, and Belarus. **India and Pakistan** became full members in 2017, Iran joined last year, and Belarus this year. Afghanistan and Mongolia hold Observer Status.

Governance Structure of the SCO

The SCO operates through several key bodies:

1. **Council of Heads of State (CHS)**: This is the supreme decision-making body, where the heads of state of member countries meet annually to discuss strategic issues.
2. **Council of Heads of Government (CHG)**: This body, composed of the prime ministers of member states, focuses on economic cooperation, trade, and other policy matters. The 2024 meeting was convened by this body.
3. **Regional Anti-Terrorist Structure (RATS)**: Based in **Tashkent**, RATS coordinates counter-terrorism efforts among member states.

The organisation has **two permanent bodies**: the Secretariat in Beijing, China and the Regional Anti-Terrorist Structure (RATS) in Tashkent.

RATS assists members in the preparation and staging of counter-terrorism exercises, analyses key intelligence information coming in from the member states, and shares information on terrorist movements and drug trafficking.

3. 16th BRICS Summit in Russia

1. In October 2024, Russia hosted **16th BRICS summit** in **Kazan** (one of Russia's largest and wealthiest cities).
2. The **theme** of the event was: **"Strengthening Multilateralism for Fair Global Development and Security."**
3. It was the **1st BRICS summit after its expansion.**
4. In this summit **13 nations have been added as partner countries** of BRICS: **Algeria, Belarus, Bolivia, Cuba, Indonesia, Kazakhstan, Malaysia, Nigeria, Thailand, Turkey, Uganda, Uzbekistan**, and **Vietnam**.
   a. For the **first time, a NATO member, Turkey,** attended the summit, and applied to join BRICS.

About BRICS

1. **Jim O'Neill**, an economist, coined the term **BRIC in a 2001**. He predicted that Brazil, Russia, India, and China (BRIC) could dominate the global economy by 2050.
2. The BRIC grouping **began informally in 2006** during a meeting at the **G8 Outreach Summit in St. Petersburg**, **Russia**. It was **formally established** at the **1st BRIC Foreign Ministers' Meeting** in **New York in 2006**.
3. The 1st BRIC summit took place in Russia, in 2009. **South Africa joined BRIC in 2010**, transforming BRIC into **BRICS** and strengthening the group's representation of emerging economies.
4. **Fortaleza Declaration** at the **6th BRICS Summit (2014)** led to the creation of the **New Development Bank (NDB)**.
5. **Ufa Declaration** at the **7th BRICS Summit (2015)** focused on global governance, security, and economic cooperation.
6. **13th BRICS Summit (2021)** was held virtually under India's chairmanship, marking India's 3rd time hosting.
7. **Membership Expansion of BRICS:** BRICS expanded in 2024 with **Egypt**, **Ethiopia**, **the UAE**, and **Iran** joining, broadening its global influence and development agenda.

Significance of Membership Changes

1. **Regional Influence**: The inclusion of Egypt, Ethiopia, the UAE, and Iran significantly enhances BRICS' regional power and cooperation across various sectors.
2. **Economic Representation**: BRICS countries are home to roughly **3.3 billion people** — over **40% of the global population** and estimated **37.3% of global gross domestic product** based on purchasing power parity (as per WEF).
3. **Oil-Producer Influence**: The membership of oil-rich countries like the UAE strengthens **BRICS' ability to influence global energy markets**. BRICS could control nearly **half of oil production worldwide** and account for nearly **35% of total oil consumption.**

4. **Consensus-Based Decision-Making**: The diverse new members highlight the necessity for consensus-based decision-making, a core value of BRICS.

India-China Bilateral Meeting

1. On the sidelines of the BRICS summit, India's Prime Minister welcomed the recent agreement with China, focusing on **"complete disengagement and resolution"** of the **2020 border issues**.
   a. This marked the **1st bilateral meeting between the two since 2020**.
2. The meeting aimed to improve relations after border incidents in 2020 had worsened bilateral ties.

India-China Border Agreement

1. **Agreement Significance**: The deal is particularly important given China's earlier reluctance to discuss areas like the **Depsang Plains** and **Charding Nullah** during disengagement talks.
2. Both India and China agreed to **allow troops to patrol up to old Patrolling Points (PPs)** along the **Line of Actual Control (LAC) in the Depsang Plains and Demchok regions**.

Agenda of the 16th BRICS Summit

1. **Discontent with Western-led Global Governance**: The primary concern uniting BRICS nations is their growing dissatisfaction with Western-dominated global governance, especially in the economic sector.
2. **Impact of Sanctions on Russia**: This discontent grew stronger after Western sanctions were imposed on Russia following its 2022 invasion of Ukraine. These sanctions led many Global South nations to worry that the West could use global financial tools as weapons.
3. **Reducing Dependence on the US Dollar and SWIFT**: In response, BRICS aims to lessen its reliance on the US dollar and the SWIFT financial system, particularly after Russian banks were cut off from SWIFT in 2022.

Key takeaways from the Kazan declaration

1. **Stand on Geopolitical Conflicts:**
   a. **On Ukraine:** Stressed the importance of resolving the conflict peacefully through dialogue and diplomacy.
   b. **On West Asia Crisis:** Expressed grave concern over the worsening **humanitarian crisis in Gaza** and **the West Bank. Condemned the loss of civilian lives and destruction of infrastructure** caused by Israeli attacks in Southern Lebanon.
   c. **On Western Sanctions:** Highlighted the **harmful impact of illegal unilateral sanctions**, stressing how these measures disrupt the global economy, international trade, and achievements of SDGs.
2. **BRICS Grain Exchange:** Discussed the creation of a **BRICS Grain Exchange platform**, aimed at **facilitating grain trade within BRICS nations**. The platform may expand in the future to include other agricultural sectors.
3. **Financial Integration Support:** The summit emphasized the need for greater financial integration among BRICS members, focusing on: using local currencies for trade, streamlining cross-border payments, India's UPI system was recognized as a successful model, a BRICS-led payment system was proposed as an alternative to SWIFT.
4. **On Big Cats:** Supported member countries' efforts to protect endangered species, particularly big cats. It recognized **India's initiative** to establish an **International Big Cats Alliance**.
   a. Encouraged further collaboration among BRICS nations to conserve these vulnerable species.

Significance of Kazan in Russia

1. Kazan, with strong petrochemicals, military, and growing IT sectors, was named **Russia's 3rd capital** in 2009 (after Moscow and St. Petersburg).
2. It is the **capital of the Republic of Tatarstan**, situated at the confluence of the **Volga** and **Kazanka rivers**. It's population is nearly evenly split between **ethnic Russians** (48.6%) and **Tatars** (47.6%), a mainly **Muslim Turkic group**.

India and BRICS

1. India is a key member, providing a platform for **global engagement** on security, terrorism, climate, and trade.
2. It gains access to a market of over **3 billion people** and benefits from **NDB funding** for development projects.

3. It promotes a more inclusive **global order** and **South-South cooperation** in trade and technology.

4. In the **15ᵗʰ BRICS Summit**, leaders referred to BRICS as a **pillar of the New World Order**.

5. India faces the dilemma of balancing a **China-centric** and a **West-centric** world order.

Challenges and Solution for the BRICS Grouping

Challenges	Solutions
Overlap with other groupings like **IBSA** (India, Brazil South Africa) and **BASIC** (Brazil, South Africa, India and China) poses challenges.	Clearly define roles of each grouping to avoid duplication and ensure complementarity.
Ongoing **economic slowdowns** and **trade disputes** can impact objectives.	Boost intra-BRICS trade and investments, reducing reliance on external economies.
Diverging geopolitical interests, like **China's Belt and Road Initiative**, cause tensions.	Promote open dialogue to address disagreements and focus on shared interests like global governance reforms.
The dominance of **Russia**, **India**, and **China** may limit the influence of **Brazil** and **South Africa**.	Empower Brazil and South Africa through targeted initiatives addressing their priorities.
Despite achievements and high membership interest, there are concerns about BRICS losing its appeal.	Strategically expand membership to include other influential developing nations, increasing global impact.

Conclusion

The success of BRICS depends on its ability to overcome internal differences, find common ground, and leverage its strengths. While expansion offers greater representation in global governance, realizing its potential will require strong cooperation and effort from all member states. By focusing on these key areas, BRICS+ can achieve its goals and become a major player in global governance.

4. Maldives President. Muizzu's Visit to India

In October 2024, President of Maldives, Mohamed Muizzu, arrived India on a State visit. This is the first bilateral visit of President Dr. Muizzu to India.

- He had earlier visited India in June 2024 to attend the swearing-in ceremony of the Prime Minister and the Council of Ministers.

Why Muizzu's visit to India is important?

1. Maldivian President's visit to India comes after a period of tension between the two countries.

2. Muizzu, who assumed office in November 2023, had **campaigned on an 'India Out'** platform, calling for the withdrawal of Indian military personnel from the Maldives.

3. This led to strained relations, as **Muizzu was perceived to be closer to China**, evident from his official visits to **Turkey and China** soon after taking office, bypassing India.

   a. **Traditionally**, India had been the first destination for Maldivian presidents.

4. Relations worsened when Maldivian officials made **derogatory comments about Indian PM Modi,** which sparked a social media conflict between Maldivians and Indians.

5. The tensions earlier this year affected tourism, with Indian tourist numbers to the Maldives dropping by 50,000, causing a loss of $150 million.

   a. **India was the biggest source market** for tourism to the Maldives in 2023, accounting for over 11% of the 1.8 million tourist arrivals.

Context to Muizzu's Changed Approach

1. Muizzu's softened approach toward India reflects his realization of the Maldives' **domestic and economic challenges**.

2. Despite his earlier rhetoric, Muizzu emphasized that the Maldives would not compromise India's security and stressed the importance of maintaining a balanced relationship with both India and other countries, including China.

3. Facing a looming economic crisis, including debt repayments and downgraded credit ratings by Moody's, Muizzu's visit is seen as an attempt to seek financial assistance from India.

Key outcomes of Muizzu's Visit

I. Vision Document and Comprehensive Economic and Maritime Security Partnership (CEMSP)

1. A Vision Document was released, outlining the roadmap for the bilateral relationship between India and Maldives.

2. The document aims to bring together **India's Viksit Bharat 2047 plan** and Maldives' own development objectives to become a **developed country by 2040.**

II. Economic Cooperation

1. India extended financial support to Maldives through a bilateral currency swap agreement worth INR 30 billion and USD 400 million.

2. Negotiations for a **Free Trade Agreement (FTA) were initiated** to boost economic cooperation and Indian investments in Maldives.

3. The two sides agreed to **settle trade transactions in local currencies**.

III. Defence and Maritime Security

Both countries recognized the importance of collaboration in defence and maritime security, agreeing to:

1. Enhance Maldives' surveillance and monitoring capabilities.

2. Support the Maldives National Defence Force (MNDF) with equipment and infrastructure.

3. Strengthen disaster response, risk mitigation, and information-sharing capabilities.

4. Inaugurate the Maldivian Ministry of Defence building constructed with India's assistance.

IV. Development Cooperation

India and Maldives will collaborate on multiple infrastructure projects, including:

1. The timely completion of the **Greater Malé Connectivity Project (GMCP).**

2. Feasibility studies for island connections and a commercial **port at Thilushi**.

3. Joint development of an **Agriculture Economic Zone** and fish processing facilities.

V. Digital Cooperation, Health Cooperation, and Capacity Building

1. India will **assist Maldives in developing** its digital and financial infrastructure, including launching services like **UPI and RuPay.**

2. India will help **establish Jan Aushadhi Kendras** and enhance emergency medical evacuation capacity.

3. India will provide customized **training for civil servants** and launch a **program for women-led development.**

VI. People-to-People Ties

1. Plans were announced to **establish a consulate** of Maldives in Bengaluru and a consulate of India in Addu City.

2. India will support the e**stablishment of higher education institutions and skilling centers** in Maldives.

3. An **ICCR Chair will be established** at Maldives National University to foster academic exchange.

VII. Key Agreements and Initiatives

1. **Five agreements were signed**, including agreements on a bilateral currency swap, training of judicial officials, prevention of corruption, law enforcement training, and youth and sports cooperation.

2. The two leaders **inaugurated 700 social housing units** and **launched a new runway** at the **Hanimaadhoo International Airport**.

3. The **RuPay card was launched** in Maldives to enhance ease of payments for Indian tourists.

India-Maldives Bilateral Relation: An Overview

India was among the first to recognize Maldives after its independence in 1965 and establish diplomatic relations with the country. Since then, the two nations have enjoyed a strong and growing relationship.

1. **India's Role as a First Responder and Net Security Provider:** India has consistently demonstrated its commitment to Maldives' security and stability. Some notable examples include:

   a. **1988 Coup Attempt:** India's swift intervention under Operation Cactus helped neutralize the coup attempt and restore stability in Maldives.

   b. **2004 Tsunami:** India was the first to respond to Maldives' needs during the devastating tsunami, providing critical assistance and support.

   c. **2014 Water Crisis:** India provided swift assistance during the water crisis in Malé, demonstrating its commitment to supporting Maldives in times of need.

   d. **COVID-19 Pandemic:** India's rapid and comprehensive assistance to Maldives during the pandemic further reinforced its credentials as a reliable partner.

2. **Security and Defence Cooperation:** India and Maldives have a strong defence partnership, which has been strengthened through various initiatives, including:

   a. **Comprehensive Action Plan for Defence:** Signed in April 2016, this plan has consolidated defence cooperation between the two nations.

   b. **Training Opportunities:** India provides the largest number of training opportunities for the Maldivian National Defence Force (MNDF), meeting around 70% of their defence training requirements.

3. **Development Cooperation:** India has been actively engaged in development cooperation with Maldives, with a focus on:

   a. **Infrastructure Development:** India has executed several development projects in Maldives, including the Indira Gandhi Memorial Hospital and the Maldives Institute of Technical Education.

   b. **Education and Capacity Building:** India has implemented various programmes to support education and capacity building in Maldives, including the Technology Adoption Programme in Education Sector.

   c. **Infrastructure and Connectivity Projects:** India has provided significant support to Maldives through infrastructure and connectivity projects, including:

   d. **Greater Male Connectivity Project:** This project aims to **connect Male to Villingili, Gulhifalhu, and Thilafushi** islands through a series of bridges, causeways, and roads.

4. **Bilateral Economic and Trade Relations**

   India and Maldives have a growing economic relationship, with:

   a. **Trade Partners:** India emerged as Maldives' 2nd largest trade partner in 2022 and the largest in 2023.

   b. **Currency Swap Agreement:** The RBI signed a Currency Swap Agreement with the Maldives Monetary Authority (MMA) under the SAARC Currency Swap Framework, enabling MMA to make drawls in multiple tranches up to a maximum of USD 200 million from the RBI.

5. **Tourism and Indian Community**

   a. **Tourism:** In 2023, Indians formed the largest group of tourists visiting Maldives, with over 200,000 travellers.

   b. **Indian Community:** Indians are the second largest expatriate community in Maldives, with an approximate strength of around 22,000.

Significance of Maldives for India

Maldives is India's key maritime neighbor in the Indian Ocean Region (IOR) and holds a special place in vision of **'SAGAR'** (Security and Growth for All in the Region) and India's **'Neighbourhood First Policy'.**

1. **Strategic Importance**

   a. Maldives is barely **70 nautical miles away from Minicoy** and 300 nautical miles away from India's West coast.

   b. It is situated at the hub of commercial sea-lanes running through Indian Ocean (particularly the 8° N and 1 ½° N channels).

   c. It has potential to allow a **third nation's naval presence** in the area.

2. **Geo-political interest**

   a. Securing sea lanes of communication; Fighting piracy and sea-based terrorism;

   b. Making Indian Ocean a conflict free zone and restoring its status as sea of tranquil;

   c. Exploring blue economy and Enhancing trade; Security of Indian expatriates working there.

3. **China Angle:** The Maldives has emerged as an important **'pearl' in China's "String of Pearls"** construct in South Asia.

4. **Internal security angle: Radicalisation**

   a. In the past, the number of Maldivians drawn towards terrorist groups like the Islamic State (IS) had increased.

   b. Political instability and socio-economic uncertainty are further fuelling the rise of Islamist radicalism in the island nation.

   c. This gives rise to the possibility of remote Maldivian islands being used as a launch pad for terror attacks against India and Indian interests.

Conclusion

President Muizzu's visit to India is critical for addressing the Maldives' urgent economic issues and repairing bilateral relations. With significant debt repayments looming, discussions with Indian leaders could provide essential financial support. This evolving relationship reflects a transition from past tensions to a more cooperative framework, underscoring the significance of strong ties between neighboring countries.

5. Britain returns Chagos Islands to Mauritius

1. On **October 3, 2024**, the **United Kingdom** announced a historic agreement to cede **sovereignty** of the **Chagos Islands** to **Mauritius**.

2. This decision is seen as a significant **political development**, particularly concerning the strategic **Diego Garcia military base**, which has been jointly operated by the **UK** and the **US**.

What is the Chagos Archipelago?

1. **Geographical Location**: The Chagos archipelago consists of **58 islands** located approximately **500 km** south of the **Maldives** in the **Indian Ocean**.

2. **Historical Background**:

   a. Initially uninhabited until the late **18th century** when the **French** established coconut plantations using **slave labor** from **Africa** and **India**.

   b. The islands were ceded to the **British** in **1814** after the **Napoleonic Wars**.

   c. In **1965**, the UK formed the **British Indian Ocean Territory (BIOT)**, which included Chagos. Following Mauritius's **independence** in **1968**, Chagos remained under British control despite Mauritius's claims.

What is Diego Garcia?

1. **Military Significance**: **Diego Garcia** is the largest island in the Chagos archipelago and hosts a vital **military base**.

2. Strategic Use:

a. An agreement with the **US** in **1966** allowed for the establishment of a military presence, making Diego Garcia a crucial location for military operations, especially during the **Gulf War** and post-**9/11** conflicts.

b. It serves as a monitoring outpost for the **Malacca Strait**, crucial for global trade routes, particularly concerning **China**.

Why did Mauritius seek Sovereign Rights over Chagos?

1. **Legal Claims**: **Mauritius has consistently claimed that the UK illegally occupies Chagos.** The issue has been raised in various international forums.

2. **UN Actions**:

a. In **2017**, the **UN General Assembly** requested the **International Court of Justice (ICJ)** to assess the legal status of the Chagos archipelago.

b. The **ICJ ruled that the detachment from Mauritius was not conducted with the genuine consent of the local population**, which has led to calls for the UK to withdraw.

Significance of the UK-Mauritius Treaty:

1. **Sovereignty Transfer**: The treaty allows Mauritius to implement **resettlement programs** on the Chagos Islands (**excluding Diego Garcia**), marking a shift in control.

2. **Trust Fund**: The UK will establish a **trust fund** for the benefit of the **Chagossians**, supporting those displaced by earlier policies.

3. **Continued Military Presence**: Diego Garcia will remain under UK sovereignty for an initial period of **99 years**, maintaining its military operations.

Implications of the Treaty:

1. **Geopolitical Balance**: The resolution of the dispute is critical for **Western commitment** to a free and open **Indo-Pacific**. An unresolved issue could push Mauritius to engage with alternative partners like **China**.

2. India's Position: As a former British colony, India has supported Mauritius's claims over Chagos. It voted in favor of Mauritius at the **UNGA** and has strengthened ties with Mauritius amid **China's** rising influence in the Indian Ocean. Recent developments include India's construction of **infrastructure** in Mauritius, enhancing bilateral relations.

6. India Rejects USCIRF Report on Religious Freedom

1. India rejected a report by the **U.S. Commission on International Religious Freedom (USCIRF)**, which claims there are "**increasing abuses**" against religious minorities in the country.

2. The **Ministry of External Affairs (MEA)** has labeled the **report as "biased" and accused USCIRF** of promoting a **"motivated narrative."**

Highlights of the USCIRF Report (2024):

1. The report called for India to be designated as a "**Country of Particular Concern**"(CPC).

a. Countries that commit systematic, ongoing, and egregious violations of religious freedom are designated as a CPC by the **US State Department.**

2. The report states that vigilante **groups killed, assaulted, and lynched individuals,** while religious leaders were unjustly arrested, and homes and places of worship were destroyed.

3. It also criticised the **Citizenship Amendment Act, 2019, Uniform Civil Code, and state-level anti-conversion and cow slaughter laws.**

4. **USCIRF:** USCIRF is a **US federal commission established in 1998** under the **International Religious Freedom Act**, with commissioners appointed by the President and congressional leaders from both parties.

a. It is based on international human rights standards, especially Article 18 of the Universal Declaration of Human Rights that ensured freedom of religion.

b. It monitors the universal right to **freedom of religion or belief (FoRB)** in countries other than the US.

C. SECURITY

1. Tata-Airbus C-295 Facility Launch: India's first private-sector Final Assembly Line (FAL)

1. **On October 28 2024, Prime Minister Narendra Modi, alongside Spanish Prime Minister Pedro Sanchez, inaugurated Tata Advanced Systems Limited's (TASL) new C-295 aircraft manufacturing facility in Vadodara, Gujarat.**

2. This facility marks an important moment in India's defence landscape, as it is the **country's first private-sector Final Assembly Line (FAL)** dedicated to military aircraft production.

3. This initiative is a critical step towards **enhancing India's defence self-reliance and capability.**

   Significance of the Event:

1. Defence Minister emphasized the importance of this project, stating it is a **achievement for India's aerospace sector,** as it is the **first time a complete military aircraft will be manufactured by a private company in India.**

2. **Strategic Partnership**: The collaboration between **TASL and Airbus Defence and Space symbolizes a strengthened defence relationship between India and Spain,** aiming for long-term technological cooperation.

What is C-295 Program:

1. **In 2021, India's Ministry of Defence signed a ₹21,935-crore agreement with Airbus for the procurement of 56 C-295 transport aircraft.**

2. This procurement is intended to **replace the Indian Air Force's aging fleet of Avro-748 planes.**

3. **Delivery Schedule**:

a. **Fully Assembled Aircraft**: 16 C-295 aircraft will be **delivered fully assembled from Spain.**

b. **Local Assembly**: The **remaining 40 aircraft will be assembled at the new facility in Vadodara.**

c. **Timeline**: The first locally produced aircraft is **expected to be completed by September 2026,** with all 40 units scheduled for delivery by August 2031.

Facility Capabilities:

1. **The Vadodara facility is designed to handle the entire production lifecycle, encompassing:**
   a. Component manufacturing
   b. Assembly
   c. Testing
   d. Final delivery
   e. Future maintenance and upgrades

2. The facility aims to create a holistic ecosystem for military aircraft production in India, **promoting indigenous capabilities** and reducing reliance on foreign suppliers.

Significance of the Tata Aircraft Complex:

The Tata Aircraft Complex will support a comprehensive approach to military aircraft production. This includes:

1. In addition to Tata, major defence public sector **units such as Bharat Electronics Ltd. and Bharat Dynamics Ltd.** will contribute to the project, along with various Micro, Small and Medium Enterprises (**MSMEs**).

2. **Make in India Initiative**: The **C-295 project exemplifies the "Make in India" initiative,** with a focus on domestic production and technological advancement.

   Employment Generation:

1. The facility is projected to create **direct employment for over 3,000 individuals** and **more than 15,000 indirect jobs,** significantly boosting local economies.

2. PM Modi highlighted the **facility's potential to transform the job landscape, creating thousands of opportunities in the region.**

Indigenization and Self-Reliance:

1. **Over 18,000 components for the C-295 aircraft will be produced locally,** showcasing India's growing capabilities in indigenous defence manufacturing.

2. **Strategic Autonomy**: The successful establishment of this facility enhances India's strategic autonomy, reducing dependence on foreign military imports and strengthening national security.

2. Launch of Nirdeshak - 2nd Survey Vessel (Large)

1. In Oct 2024, **Nirdeshak**, the 2nd of the four **Survey Vessels (Large)** (SVL) being constructed by **Garden Reach Shipbuilders and Engineers (GRSE)** in collaboration with **L&T Shipbuilding**, was launched for the **Indian Navy**.

2. The ship is named after the former **Nirdeshak**, a naval survey vessel decommissioned in December 2014 after 32 years of service.

3. These are the largest survey vessels for the Indian Navy to be built in the country

About the SVL Ships

1. The 1st ship of this class, **Sandhayak**, was launched in 2021.

2. These ships will replace the older **Sandhayak-class** survey vessels, equipped with modern **hydrographic equipment** for gathering **oceanographic data**.

3. **Survey Vessel (Large)** ships have a **displacement** of approximately **3,400 tons** and accommodate **235 personnel**.

4. The ships can operate at a **cruising speed** of **14 knots** and reach a **maximum speed** of **18 knots**.

5. **Bow and Stern Thrusters** are incorporated for **improved maneuvering** during shallow water survey operations.

   a. **Bow and stern thrusters** are equipment used to propel (move) a vessel at low speed and to move it forward or backward, thus **helping to maneuver boats**, particularly when anchored or in shallow waters.

6. The **hulls** (body of a ship) are constructed using **DMR 249-A steel**, developed domestically by the **Steel Authority of India Limited (SAIL)**.

Capabilities and Roles

1. Each ship can carry **four Survey Motor Boats** and an **integral helicopter**. Their primary function is conducting **coastal and deep-water hydrographic surveys** of ports and navigational channels.

2. They also collect **oceanographic and geophysical data** for both **defense** and **civil applications**.

3. These vessels can provide **limited defense support** and serve as **hospital ships** during emergencies.

4. It was built using **'Integrated Construction' technology**.

5. It is **propelled by two marine diesel engines** combined with **fixed-pitch propellers**.

3. Dragon Drones: A New Weapon in the Russia-Ukraine War

1. Recently, a new, lethal weapon has emerged in the Russia-Ukraine conflict known as the "**Dragon Drone**."

2. Both sides have shared images of these drones unleashing fire from the sky, which led to the weapon's nickname.

3. These drones **discharge a molten metal** that burns at an extreme temperature of **2,427°C**.

What are Dragon Drones?

1. **Composition:** Dragon drones release a substance called **thermite** which is a **mixture of aluminium and iron oxide**. This substance was originally **developed more than 100 years ago for welding railroad tracks**.

2. **Reaction:** When ignited (typically using an electrical fuse), thermite starts a **self-sustaining chemical reaction** that is **very hard to stop**.

3. **Destructive Power:** Thermite **can burn through almost anything**, from clothing and trees to military vehicles, and it **even burns underwater**.

4. **Human Impact:** Exposure to thermite can result in severe, potentially fatal burns and significant bone damage.

Why Are Dragon Drones So Dangerous?

1. **High Precision**: The combination of thermite with high-precision drones makes these "dragon drones" **very effective in bypassing traditional defense systems**, which **increases their lethality**.

2. **Impact**: According to the anti-war group **Action on Armed Violence (AOAV)**, the drones are both "highly effective" and "dangerous."

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Deployment of Dragon Drones in the Russia-Ukraine War

1. Dragon drones are thought to have 1st been used in the Russia-Ukraine conflict in September.
2. Ukrainian forces reportedly used them to ignite vegetation that Russian troops hid behind, burning the cover and exposing enemy positions.
3. Shortly after, Russia began deploying its own dragon drones in the conflict.

Has Thermite Been Used in Weapons Before?

1. **Yes**, thermite has been used in weapons in previous wars.
2. **World War I**: **German zeppelins** dropped **thermite-filled bombs**, which were considered an innovative tactic at the time.
3. **World War II**: **Thermite-based incendiary bombs** became common for both the Allies and Axis forces in aerial bombing campaigns.
   a. Estimates suggest that the Allies dropped around 30 million **thermite bombs** on Germany and 10 million on Japan. Additionally, **thermite hand grenades** were used **to disable artillery without causing explosions**.
4. **Modern Applications**: In modern conflicts, thermite is primarily used by **espionage agents and special operations teams** because of its **ability to burn intensely without making a loud explosion**.

Is It Legal to Use Thermite in Weapons?

1. The use of thermite in warfare is **not banned under international law**. However, there are **limitations on how it can be used**.
2. **International Law**: The use of thermite is **not prohibited**, but its **use against civilian targets is banned** under the *Convention on Certain Conventional Weapons* (CCW), a **Cold War-era agreement** issued by the **United Nations**.
   a. **Restrictions**: While thermite is not banned entirely, **Protocol III of the CCW restricts its use to strictly military targets**.
   b. The reason is that thermite **can cause severe burns and respiratory injuries**, making it a dangerous and indiscriminate weapon.

Why Are Dragon Drones a Concern?

1. **Collateral Damage**: Dragon drones emit extreme heat, which can destroy both military targets and civilian infrastructure, risking harm to civilians and property in populated areas.
2. **Psychological Impact**: The sight of drones releasing fire can cause severe psychological stress, leading to long-term mental health issues for those affected.
3. **Environmental Damage**: Thermite can easily ignite vegetation, causing wildfires that damage the environment, harm wildlife, and disrupt agriculture, affecting local incomes.
4. **Ethical and Legal Concerns**: Using such weapons raises ethical issues. International humanitarian law demands that conflicts avoid harm to civilians and civilian property, which must be considered when deploying dragon drones.

4. 'Digital Arrest' Fraud

1. **In October 2024, cases of digital arrest fraud raised serious concerns in India.**
2. One notable incident involved a 73-year-old man in Pune.
3. Cybercriminals pretended to be Mumbai police officers, falsely accusing him of **drug trafficking** and **money laundering**.
4. This caused him to feel trapped in his home and led to a financial loss of **Rs 45 lakh**.
5. This alarming trend shows that cyber scams are becoming more common and affecting people from different backgrounds.

Nature of the Fraud

How the Fraud Works

1. **Impersonation**: Criminals **pose as officers from agencies such as the police or the CBI and make victims believe that they are in trouble.**
2. **Psychological Pressure**: They **create fear and confusion, pushing victims to comply with their demands.**
3. Victims are falsely accused of various crimes, **such as cybercrime or financial fraud.** The accusations are often exaggerated and often involve fabricated evidence.

4. **Demand for Payment**: To avoid arrest or legal consequences, victims are pressured to pay a fine or bribe. Scammers may **demand payment through various methods**, such as wire transfers, **gift cards, or cryptocurrency.**

Recent Cases

1. **Elderly Victim in Pune**: This man was confined to his home and lost Rs 45 lakh.
2. **Southwest Delhi Case**: A man was **scammed out of Rs 19 lakh by people pretending to be from the Mumbai financial task force.**
3. **Retired Professor and Industrialist**: One **victim lost Rs 75 lakh and another Rs 7 crore under similar circumstances.**

   Scale of the Problem: These scams **are not isolated; many people from various backgrounds have been targeted, including educated professionals** and wealthy individuals.

Government Response and Public Awareness:

1. In a recent episode of **Mann Ki Baat**, Prime Minister **Narendra Modi** talked about this issue and urged the public to stay alert.
2. He pointed out the tricks used by scammers and said that many people have lost large sums of money.
   Statistics on Cybercrime:
1. Between January 1 and April 30, **2024**, there were **7.4 lakh complaints** reported through the **National Cybercrime Reporting Portal**.
2. Losses from different types of scams include:
   a. **Digital Fraud**: Rs 120.3 crore
   b. **Trading Scams**: Rs 1,420.48 crore
   c. **Investment Scams**: Rs 222.58 crore
   d. **Romance/Dating Scams**: Rs 13.23 crore
3. Many of the criminals are linked to countries like **Myanmar**, **Laos**, and **Cambodia**.

   RBI Data : The **Reserve Bank of India (RBI)** reported **29,082 cases** of card or internet-related fraud during the 2023-24 period, showing the seriousness of online scams.

Proposed Solutions and Strategies

1. **Better Coordination**: The **National Cyber Coordination Centre** will help different law enforcement agencies work together more effectively.

2. **Quick Investigations**: Authorities should investigate reported scams quickly to catch and punish the criminals.
3. **Public Awareness Campaigns**:
   a. More programs are needed to teach the public how to recognize and protect themselves from these scams.
   b. Information should be shared through social media, traditional media, and community outreach.
4. **Use of Technology**: Invest in tools to detect and prevent fraud, including systems that monitor suspicious activities.
5. **Reporting Mechanisms**: Encourage victims to report cybercrimes right away through platforms like the **National Cybercrime Reporting Portal** for quicker action.

In conclusion, The rise of **digital arrest fraud** is a growing threat in India's digital world. It highlights the need for clear measures to combat cybercrime. As scammers become more clever, a united approach involving government action, cooperation among law enforcement, and public education is essential to protect people and maintain trust in online transactions. The proactive response from leaders, including Prime Minister Modi, shows a commitment to tackling this urgent issue and helping citizens avoid being exploited by cybercriminals.

5. THAAD: A US Missile Defense System Deployed to Israel

THAAD is a highly advanced missile defense system designed to intercept and destroy short, medium, and limited intermediate-range ballistic missiles. It operates both within and outside the atmosphere during the terminal phase of a missile's flight.

Developed by Lockheed Martin Corporation.

Components of a THAAD Battery: 95 soldiers, 6 truck-mounted launchers, 48 interceptors (8 per launcher), Radar surveillance and radar and Tactical fire component

Capabilities:

THAAD provides a rapidly deployable defense against ballistic missile threats with ranges:

1. Short-range (up to 1,000 km)
2. Medium-range (1,000-3,000 km)
3. Limited intermediate-range (3,000-5,000 km)

6. Exercises/Operations in News

NAME	TYPE	PARTICIPANTS	BRIEF DESCRIPTION
SIMBEX (Singapore India Maritime Bilateral Exercise)	Naval exercise	Singapore - India	• **Edition:** 31st • **Harbour phase** of the exercise was held at **Visakhapatnam** • **Sea Phase** was held in the **Bay of Bengal.** • **SIMBEX,** which began as **'Exercise Lion King'** in **1994.**
KAZIND 2024	Military exercise	India-Kazakhstan	• **Edition:** 8th • **Location**: Auli, Uttarakhand (September 30 to October 13) • The exercise involved personnel from the Indian Army's **Kumaon Regiment, as well as the Indian Air Force**, and Kazakhstan's Land Forces and Airborne Assault Troopers. • **Last edition** of the Joint Exercise was held at **Otar, Kazakhstan**
MALABAR	Naval exercise	India, US, Japan, Australia	• **Edition:** 28th • **Location**: Vishakhapatnam • Annual maritime exercise, which take place both in harbour and at sea. • Notable, MALABAR, which was initiated in **1992** as a bilateral exercise between India and the US, gained further traction as a significant maritime engagement, with Japan and Australia joining in subsequently.
Naseem-Al-Bahr	Naval exercise	India-Oman	• **Location:** Goa (October 13 to 18) • The exercise was conducted in **two phases**: with harbour phase followed by the sea phase. • **Participants from India:** INS Trikand and Dornier Maritime Patrol Aircraft • **Other Exercises between India and Oman:** 　o Army exercise**: Al Najah** 　o Air Force exercise**: Eastern Bridge.**

D. ECONOMY

1. What is the livestock census and why is it conducted?

In October 2024, Ministry of Fisheries, Animal Husbandry & Dairying launched the **21st Livestock Census** in New Delhi.

1. The **Livestock Census is a comprehensive headcount conducted every 5 years** to account for **domesticated animals, poultry,** and stray animals in India.
   a. This census collects detailed information on various aspects of these animals, **including species, breed, age, sex, and ownership status.**
   b. **"Headcount"** refers to the **total number of individual animals of a particular species or breed present in a given area or region**
2. **Since 1919, a total of 20 livestock censuses have been conducted,** with the most recent being in 2019.
3. The **21st Livestock Census** was **launched on October 25, 2024**, and the enumeration process will take place from **October 2024 to February 2025**.
4. Approximately **87,000 enumerators** will visit **homes, farms, institutions (like gaushalas, dairy farms, and veterinary colleges),** and other establishments to gather data on livestock, targeting around **30 crore households** across the country.

Which animals will be counted in the 21st census?

1. **According to the Department of Animal Husbandry and Dairying**, information on **16 animal species will be collected in the 21st census.**
2. These 16 species include: **cattle, buffalo, mithun, yak, sheep, goat, pig, camel, horse, ponies, mule, donkey, dog, rabbit, and elephant.**
3. In total, the **census will capture information on 219 indigenous breeds** of these sixteen species recognised by ICAR-National Bureau of Animal Genetic Resources (NBAGR).

   a. **ICAR** is the apex body responsible for coordinating, guiding, and managing research and education in **agriculture** across India.
   b. It operates under the **DARES**, **Ministry of Agriculture and Farmers Welfare.**
4. Besides these, the census will also carry out a headcount of poultry birds such as **fowl, chicken, duck, turkey, geese, quail, ostrich, and emu.**

What is the Objectives of the Livestock Census:

The livestock sector is important for **employment in rural areas** and contributes significantly to the economy:

1. **Gross Value Added (GVA):** The livestock sector contributes roughly **4.7% to the overall economy, while poultry and animal husbandry account for about 30% of the agricultural sector's GVA.** In comparison, the **entire agriculture sector contributes approximately 15% to GVA.**
2. The census data will **help to estimate GVA from the livestock sector and inform policies to ensure sustainable growth** in this area.
3. The Union Minister said that the Livestock Census **"shapes policies, ensures sustainable growth of India's Livestock Sector."**
4. **Sustainable Development Goals (SDGs):** The census data will be helpful in **tracking progress toward the SDGs, particularly Goal 2 (Zero Hunger) and Target 2.5,** which aims to maintain genetic diversity in food and nutrition.

How will the 21st livestock census be different from the previous exercises?

This census will be **fully digitized, similar to the previous one in 2019,** adding several advancements:

1. **Online data collection through a mobile application**, with monitoring via a digital dashboard.
2. It will **also capture the latitude and longitude** of data collection locations.
3. **The 21st census will capture several new data points. These include:**

a. Collection of data on **pastoral animals** and the **socio-economic status of pastoralists for the first time.**

b. **Detailed information on the income sources of households** dependent on the livestock sector.

c. Gender-specific data on stray cattle.

What did the 2019 Livestock Census find?

The last census reported a total livestock population of **535.78 million**, which included:

1. **192.9 million** cattle
2. **148.88 million** goats
3. **109.85 million** buffaloes
4. **74.26 million** sheep
5. **9.06 million** pigs

All other animals accounted for just **0.23%** of the total livestock population in India.

2. New SEBI Rules to Curb F&O Frenzy

1. In October 2024, the **Securities and Exchange Board of India (SEBI)** introduced **6 new measures** aimed at **regulating the equity index derivatives market**, commonly known as **futures and options (F&O)**.

   a. These **regulations come in response to a significant increase in trading volumes**, which has **raised concerns about retail investor losses** and systemic risks to the economy.

From Contract Value To Weekly Expiry

➤ Option buyers to **pay premiums upfront** as opposed to earlier where brokers could provide collateral

➤ **No special pricing** on expiring contracts. These enabled traders to take larger positions

➤ Derivatives contracts' stipulation to have a value between ₹5-10L has been revised upwards to ₹15-20L

➤ Position limits to be **monitored throughout the day** instead of only at the end

➤ Exchanges will **limit weekly expiries** to one index per week, simplifying current practice of multiple expiries

Key Measures Implemented by SEBI:

1. **Recalibration of Contract Size**

   a. **New Minimum Contract Size**: The minimum contract size for **index derivatives has been raised from ₹5-10 lakh to ₹15 lakh.**

   b. **Rationale**: This adjustment aims **to ensure that participants take on appropriate risks** and limit speculative trading, **particularly among small investors.**

c. **Implication**: This could **reduce hyperactivity among small traders**. **Retail investors, especially from tier 2 and tier 3 cities, may need to rethink their strategies,** leading them to avoid high-risk index derivatives.

2. **Upfront Collection of Options Premium**

   a. **New Requirement**: SEBI has mandated the upfront collection of options premiums **from buyers, effective February 1, 2025.**

   b. **Purpose**: This measure is designed to **limit excessive intraday leverage and ensure well-judged risk management** at the investor level.

   - **Intraday trading**, also known as **day trading**, is the practice of buying and selling stocks or financial instruments within the same trading day.

   - **The goal** of intraday trading is to **earn profit from short-term price movements** in the stock market.

   c. **Implication**: This will help to **mitigate the risks associated with over-leveraged positions,** reducing aggressive speculation.

   - **Overleveraging** occurs when a trader borrows more money than they can realistically afford to repay, using leverage to increase their position in the market.

3. **Rationalization of Weekly Index Derivative Products**

   a. **Limit on Expiry Products**: SEBI has directed that **each exchange can only provide weekly expiry contracts** for one benchmark index, effective **November 20, 2024**.

   - A **"weekly expiry contract"** refers to a financial derivative that expires at the end of each week, meaning the trader has a limited time frame to exercise their option before it becomes worthless.

   - A **benchmark index** is a collection of securities that represents a specific market segment or type of asset. For example, the **Nifty 50** is a benchmark index that tracks the performance of the 50 largest companies in India.

- Investors use these indexes to compare the performance of their investments to the market or a specific sector. This helps them determine if their investments are doing better or worse than the overall market.

b. **Objective**: This is **intended to reduce speculative trading associated** with multiple **short-tenure options contracts** that expire weekly.

- **Short-terms options** are flexible tools for tactical trading strategies to mitigate specific event risks or make a directional bet on price movement in the short term.

c. **Implication**: By limiting these products, the **regulation aims to decrease market volatility**, particularly on expiry days, and reduce naked options selling.

4. **Intra-day Monitoring of Position Limits**

a. **New Compliance Measure**: **Effective April 1, 2025, SEBI will require intra-day monitoring of position limits** for equity index derivatives.

- **Equity derivatives** are financial instruments whose value is derived from the movements of a stock or a stock index.

b. **Goal**: This measure **aims to detect and address excessive trading activity** in real-time, not just at the end of the day.

c. **Implication**: This proactive **approach will help maintain orderly market behavior** and prevent speculative excesses throughout the trading day.

5. **Removal of 'Calendar Spread' Treatment on Expiry Day**

a. **Change in Treatment**: **Starting February 1, 2025,** the benefit of offsetting positions (**calendar spread**) across different **expiries will not apply on the day of expiry.**

- **An offset** is a financial market strategy that requires a trader to take an opening position and then take a directly opposite position. For example, if someone belong 100 shares of XYZ, selling 100 shares of XYZ would be the offsetting position.

b. **Reasoning**: This is **designed to address the significant basis risk that can arise on expiry days,** where contract values may fluctuate unpredictably.

c. **Implication**: This will compel traders to roll over their positions earlier, **reducing speculative behavior and stabilizing pricing**.

6. **Increased 'Tail Risk' Coverage on Expiry Day**

a. **New Margin Requirement**: An additional **Extreme Loss Margin (ELM) of 2%** for short options contracts will be imposed to cover tail risks, effective immediately.

- **Extreme Loss Margin (ELM)** is a margin that exchanges charge in addition to the normal margin requirements to cover potential losses that exceed the estimate provided by Value at Risk (VaR).

- ELM is a fixed percentage of the contract value and is applied to both buy and sell positions.

b. **Purpose**: This aims to protect against unexpected market movements, particularly on volatile expiry days.

c. **Implication**: This measure will **encourage greater accountability among market participants** and act as a protective buffer against sudden market downturns.

SEBI - Securities and Exchange Board of India

1. SEBI, **established on April 12, 1992**, is the **regulator for India's securities market**. It aims to ensure transparency and protect investors.

2. **Headquartered in Mumbai and has regional offices in New Delhi, Ahmedabad, Kolkata, and Chennai.**

3. **In 2014, SEBI gained more powers**, including conducting search and seizure operations and enforcing stricter penalties. It is now a leading global regulatory authority.

4. **Objectives of SEBI:** SEBI's main goals are to regulate India's securities market, safeguard investors' interests, ensure a safe investment environment, and prevent market malpractices.

5. **Key departments include:** Information Technology, Foreign Portfolio Investors, Office of International Affairs,
National Institute of Securities Market, Investment Management, Commodity and Derivative Market Regulation,

Human Resource

6. **Functions of SEBI:** Protecting investor interests, promoting market development, regulating securities market operations, serving as a platform for market professionals, educating investors, preventing fraudulent practices

    monitoring company takeovers and share acquisitions

7. **Powers of SEBI:**
    a. **Quasi-judicial:** Making judgments in cases of market fraud and unethical practices.
    b. **Quasi-executive:** Inspecting documents and taking legal actions against violators.
    c. **Quasi-legislative:** Formulating rules and regulations for market practices, including insider trading and disclosure requirements.

8. The **Supreme Court of India** and the **Securities Appellate T**ribunal oversee SEBI's functions.

3. Centre Increases MSP for Rabi Crops for 2025-26

1. **In Oct 2024, the Union government announced the Minimum Support Prices (MSP) for 6 rabi crops** for the **2025-26 Rabi Marketing Season (RMS)**.

2. The MSP for wheat, **India's second-largest crop**, has been raised by **₹150 per quintal** (6.59%), bringing the new MSP to **₹2,425 per quintal**.

3. This decision was made by the **Cabinet Committee on Economic Affairs under Prime Minister Narendra Modi.**

    What are MSPs, and How are They Decided?

1. Minimum Support Prices **(MSPs) are a crucial mechanism in India's agricultural framework,** designed to safeguard farmers from fluctuating market prices.

2. **Farmers produce various crops year-round, such as paddy (rice) during the kharif season (sown in June, harvested in November) and wheat during the rabi season (sown in November, harvested in March).**

3. Typically, farmers sell their produce in the market.

4. However, **when market prices drop significantly— due to bumper harvests or low international prices**—farmers can face financial distress, threatening their livelihoods and the country's food security.

How are they calculated ?

● When a farmer grows a crop, he incurs costs, some of it explicit and some implicit or unpaid. The CACP considers the following costs:

① A2	**② A2+FL**	**③ C2**
Covers all cash and in kind expenses incurred by farmers on seeds, fertilisers, chemicals, hired labour, fuel, irrigation, etc	Actual costs plus an imputed value of unpaid family labour	Includes 'A2+FL' along with revenues forgone on owned land (rent) and fixed capital assets (interest)
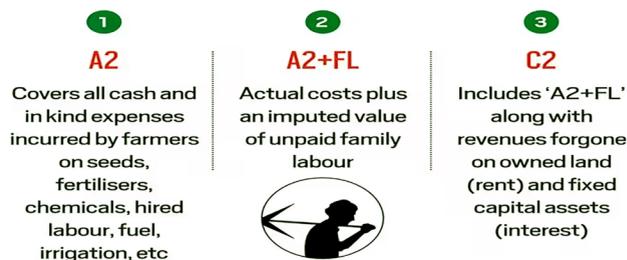
The government uses A2+FL formula to calculate the MSP for agricultural product.

Purpose of MSPs:

MSPs are announced by the government annually to prevent such scenarios. They serve several purposes:

1. **Price Floor**: **MSPs ensure that farmers receive a minimum price for their produce, protecting them from market fluctuations.**

2. **Incentivization**: By setting MSPs, the government encourages the **production of certain crops**

3. **Ensuring a stable supply of essential food grains.**

Coverage of MSPs:

The government announces MSPs for **23 crops** across various categories:

Category	Crop Types
Cereals (7 types)	Paddy, Wheat, Maize, Bajra, Jowar, Ragi, Barley
Pulses (5 types)	Chana, Arhar/Tur, Urad, Moong, Masur
Oilseeds (7 types)	Rapeseed-Mustard, Groundnut, Soybean, Sunflower, Sesamum, Safflower, Nigerseed
Commercial Crops (4 types)	Cotton, Sugarcane (FRP instead of MSP), Copra, Raw Jute

Sugarcane: (Sugarcane has a Fair and Remunerative Price (FRP) instead of a Minimum Support Price (MSP).

1. **The FRP applies only to sugarcane, while the MSP covers a wider range of crops.**
2. The Cabinet Committee on Economic Affairs **(CCEA) announce the Fair and Remunerative Price (FRP) of sugarcane.**
3. The **CCEA is chaired by Prime Minister** Narendra Modi and includes other senior ministers.
4. **The FRP is the minimum price that sugar mills** must pay to sugarcane growers.
5. The CCEA's decision was based on **recommendations from the Commission for Agricultural Costs and Prices (CACP)** and consultations with state governments and other stakeholders.

Determination of MSPs:

The decision regarding MSPs is made by the Union government, largely based on recommendations from the **Commission for Agricultural Costs and Prices (CACP). When determining MSPs, the CACP considers several factors:**

1. **Demand and Supply**: Analyzing the availability of the commodity in the market.
2. **Cost of Production**: Assessing the expenses **incurred by farmers to grow the crop.**
3. **Market Price Trends**: Reviewing both **domestic and international price trends.**
4. **Inter-Crop Price Parity**: Evaluating price relationships among different crops.
5. **Terms of Trade**: **Examining the price ratio between agricultural and non-agricultural products.**
6. **Margin Requirement**: Ensuring a minimum of **50% margin** over the cost of production.
7. **Consumer Implications**: Considering the **effects of MSP on consumers of the product.**

Procurement Practices:

1. **Not all agricultural produce is procured at MSPs.**
2. Actual procurement varies by crop and region, and **MSPs lack statutory backing—meaning farmers cannot legally demand MSP as a right.**
3. Farmer unions**, which led protests that resulted in the repeal of three controversial farm laws, have called for legislation that would provide MSPs with mandatory status,** transitioning from being merely indicative prices.

Details of MSP Increases for Rabi Crops for 2025-26 :

	MSP (Rs/ Quintal) for RMS 2024-25	MSP (Rs/ Quintal) for RMS 2025-26	Absolute Increase (Rs/ Quintal)	% Increase
Wheat	2275	2425	150	6.59
Barley	1850	1980	130	7.03
Gram	5440	5650	210	3.86
Lentil (Masur)	6425	6700	275	4.28
Rapeseed & Mustard	5650	5950	300	6.02
Safflower	5800	5940	140	2.41

The government approved MSP hikes for several rabi crops, with increases ranging from **2.41% to 7.03%**.

Comparison to Previous Year:

1. The increases this year are consistent with previous patterns. In the 2024-25 RMS, MSP hikes ranged from **2.65% to 7.08%**.
2. The increase for **rapeseed and mustard this year is particularly significant,** representing the highest absolute increase compared to prior years.

Importance of Wheat and Other Rabi Crops:

Wheat Production:

1. **Wheat is crucial for India,** covering an area of **318.33 lakh hectares** in the 2023-24 season, with an estimated production of **113.92 million tonnes**.
2. **Uttar Pradesh leads in wheat production, followed by Madhya Pradesh, Punjab, and others.**
3. In the current RMS (2024-25), the government procured **26.6 million tonnes** of wheat, benefiting **22 lakh farmers**.

Other Crops:

1. **Gram**: As the largest pulse crop by area, gram is grown on **95.87 lakh hectares** with a production of **11.03 million tonnes**. Maharashtra is the leading producer.
2. **Barley**: The new MSP of ₹1,980 is crucial for **states like Uttar Pradesh, Rajasthan, and Madhya Pradesh, where barley is widely cultivated.**
3. **Lentils (Masur)**: With a ₹275 increase, this **crop is promoted to boost domestic supply, as India imports a significant amount of lentils.**

4. **Rapeseed and Mustard**: Second only to soybean, this oilseed crop is vital for cooking oil production in India.

5. **Safflower**: The MSP for safflower increased to ₹5,940, with major production in Karnataka, Maharashtra, Telangana, and Andhra Pradesh**.**

Implications for Farmers:

According to the Commission for Agricultural Costs & Prices (CACP):

1. **Wheat Farmers**: 22 lakh farmers benefited from MSP in the current RMS.

2. **Lentil Farmers**: 1.13 lakh farmers are supported by the new prices.

3. **Mustard Farmers**: 5 lakh farmers benefit from these MSP hikes.

4. **Gram Farmers**: The number of farmers benefiting from MSP has decreased slightly due to market prices being favorable.

Price Support Scheme:

1. The procurement of **pulses and oilseed**s is managed by the National Agricultural Cooperative Marketing Federation of India **(NAFED) and the National Cooperative Consumers' Federation of India (NCCF)** under the Price Support Scheme.

2. The decline in the number of gram farmers utilizing MSP in the current RMS season is attributed to higher market prices for gram.

Conclusion :

The increase in MSP for rabi crops for 2025-26 reflects the government's commitment to ensuring fair prices for farmers while also addressing food security and price stabilization in economy.

4. Mudra Loan Limit Doubles in New 'Tarun Plus' Category

1. **In October 2024, The Indian government increased the loan limit under the Pradhan Mantri Mudra Yojana (PMMY) from Rs 10 lakh to Rs 20 lakh,** introducing a new category called **'Tarun Plus.'**

2. This initiative aims to **support emerging entrepreneurs, facilitating their growth and expansion.**

3. The announcement was **initially made by Finance Minister Nirmala Sitharaman in the July 2024 Union Budget**, specifically **targeting individuals who have successfully repaid previous loans** in the existing 'Tarun' category.

About Pradhan Mantri Mudra Yojana (PMMY):

1. **Launched:** In April 2015

2. **Objective**: facilitate easy collateral-free micro credit of **up to ₹10 lakh**

3. **Loan Classification**: These loans are categorized as **MUDRA loans** and are provided by various financial institutions, including:
   a. Commercial Banks
   b. Regional Rural Banks (RRBs)
   c. Small Finance Banks
   d. Micro Finance Institutions (MFIs)
   e. Non-Banking Financial Companies (NBFCs)

What is MUDRA (Micro Units Development & Refinance Agency Ltd.):

1. **Role**: MUDRA is the f**inancial institution established by the Government of India to support the non-corporate small business** sector through last-mile financial institutions.

2. **Application Process**: **Eligible individuals can apply for PMMY loans** through any of the mentioned institutions, as **MUDRA does not lend directly to micro-entrepreneurs.**

Categories of Loans under PMMY:

1. **Shishu**: Loans up to Rs **50,000**

2. **Kishore**: Loans above Rs **50,000 and up to Rs 5 lakh**

3. **Tarun**: Loans above Rs **5 lakh and up to Rs 10 lakh**

4. **Tarun Plus**: Newly introduced, **covering loans up to Rs 20 lakh for those in the Tarun category.**

Interest Rates on Mudra Loans:

1. **Public Sector Banks (PSBs)**: Interest rates range from 9.15% to 12.80%.

2. **Private Banks**: **Interest rates vary from 6.96% to 28%,** depending on **factors like the cost of funds, borrower's risk profile**, and loan tenure.

Benefits of PMMY:

1. **Borrowers do not need to provide collateral to secure loans**, reducing the risk to personal or business assets.

2. Loans are **readily available for entrepreneurs establishing micro-sized enterprises across India.**

3. **In case of default** due to unforeseen circumstances, the **government is responsible for loan repayment.**

4. **Quick Capital**: Loans up to Rs 10 lakh can be obtained quickly and easily.

5. **Women Empowerment**: Special concessional benefits are **available for women entrepreneurs under the MUDRA scheme.**

6. **Rural Support**: The loans are **accessible to both rural and urban small-scale businesses,** with rural areas benefiting from enhanced accessibility.

7. **Loan repayment can be extended up to 7 years, providing flexibility.**

8. Options for cash credit, equipment financing, etc., are available under the MUDRA scheme.

9. **MUDRA Card**: Applicants can **obtain a MUDRA card for instant access to funds and overdraft facilities.**

5. Govt set to expand horticulture mission to boost modern farming techniques

1. In October 2024, The Union Government decided to expand the **Mission for Integrated Development of Horticulture (MIDH)** by adding **4 new components:**
   a. **Hydroponics,**
   b. **Aquaponics,**
   c. **Vertical Farming, and**
   d. **Precision Agriculture.**

2. This initiative aims to boost modern farming techniques and enhance horticultural practices across India.

About MIDH:

The MIDH is a **Central Sponsored Scheme (CSS)** that promotes the cultivation of various agricultural products, including: Fruits, Vegetables, Root and tuber crops, Mushrooms, Spices, Flowers, Aromatic plants, Coconut, Cashew, Cocoa, and Bamboo.

Revision of Guidelines and Cost Norms:

1. The Ministry of Agriculture and Farmers' Welfare has begun revising the MIDH operational guidelines and cost norms, **with new updates expected to be released within a month.**

2. The cost norms under MIDH may see an **upward revision of 20%** compared to the existing rates, which were last fixed in **April 2014.**

What was the need of Revision ?

1. **Several states have raised concerns about outdated rates under the MIDH.**
   o **For example**, during a recent conference, **Odisha's Agriculture Minister said, "We are still giving 10-year-old rates."**

2. State officials have consistently highlighted the **need for the revision of MIDH guidelines and cost norms.**

Recent Developments

1. The **Agriculture Ministry has received in-principal approval for the revision** when the Union Cabinet approved the rationalization of all CSS under the ministry into **2 umbrella schemes:**
   o **Pradhan Mantri Rashtriya Krishi Vikas Yojana (PM-RKVY)**
   o **Krishonnati Yojana (KY).**

2. The updated guidelines and cost norms **will be notified within a month.**

Horticulture Sector Growth

1. India's total horticulture production increased to **334.60 million metric tonnes** in **2020-21**, up from **240.53 million metric tonnes** in **2010-11.**

2. Horticulture production has surpassed food grain production, establishing India as the **second-largest producer of fruits and vegetables** globally.

3. The annual allocation for MIDH for the financial year **2024-25** is **₹2,000 crore.**

New Components:

1. Hydroponics:

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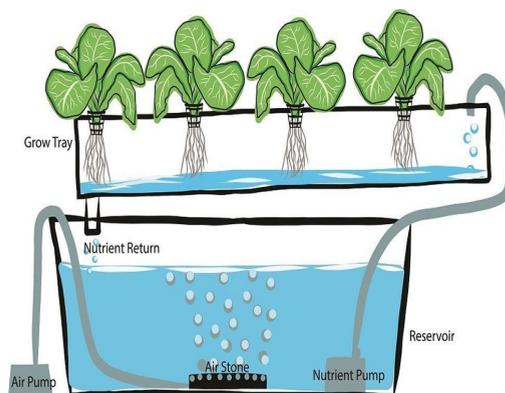
a. **Hydroponics is a method of growing plants without soil,** using nutrient-rich water instead.

b. In this system, **plants are cultivated in a controlled environment** where their **roots are submerged in a water** solution that contains all the essential nutrients they need to grow.

c. This method allows for more efficient use of water and space, and it can lead to **faster growth and higher yields compared to traditional soil-based agriculture.**

d. Hydroponics can be **practiced indoors or outdoors and is often used for growing vegetables**, herbs, and even some fruits.

2. Aquaponics:
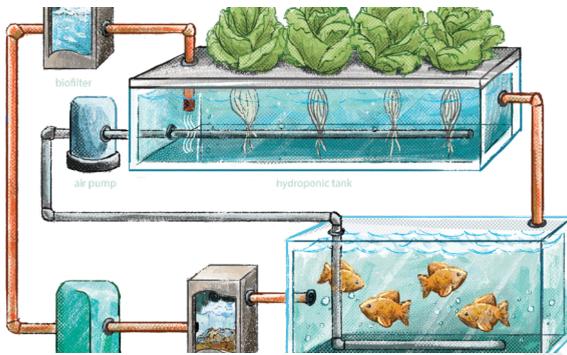
a. Aquaponics is a **sustainable farming system that combines aquaculture (raising fish) and hydroponics (growing plants in water without soil).**

b. In this system, **fish waste provides organic nutrients for the plants,** while the plants help filter and purify the water for the fish.

Here's how it works: -

1. **Fish Tank**: Fish are **raised in a tank, producing waste that contains ammonia.**

2. **Biofiltration**: **Beneficial bacteria convert the ammonia into nitrites and then nitrates,** which are essential nutrients for plants.

3. **Plant Growth**: The **nutrient-rich water is circulated to the plants, where they absorb the nutrients** and help clean the water.

4. **Return to Fish Tank**: The purified water is then returned to the fish tank, creating a closed-loop system.

3. Vertical Farming:

a. Vertical farming is an **innovative agricultural practice where crops are grown in vertically stacked layers** or in a controlled environment, often indoors.

b. This method **maximizes space and can be implemented in urban areas,** making it suitable for places with limited land availability.

Key features of vertical farming include:

1. By stacking layers of crops, **vertical farming can produce more food** in a smaller footprint compared to traditional farming.

2. These farms often use **advanced technologies like climate control, LED lighting,** and hydroponics or aeroponics, allowing for year-round production regardless of external weather conditions.

3. Vertical farms **typically use less water than conventional farming methods due to recirculating systems,** and they can minimize the need for pesticides and herbicides.

4. By situating vertical farms closer to urban centers, **they can reduce transportation costs and carbon footprints**, providing fresh produce to local markets.

Precision Agriculture:

a. **Precision agriculture, also known as precision farming**, is an advanced farming management concept that **uses technology and data analysis to optimize agricultural practices.**

b. The goal is to increase crop yields, improve efficiency, and reduce environmental impact **by applying precise amounts of inputs (like water, fertilizers, and pesticides) exactly where and when they are needed.**

Key components of precision agriculture include:

1. Using **sensors, drones, satellite imagery, and soil testing** to gather detailed information about crop health, soil conditions, and environmental factors.

2. Global Positioning System **(GPS) is used for mapping fields and guiding machinery** to ensure precise application of inputs.

3. **Variable Rate Technology (VRT)**: This allows farmers to apply different amounts of inputs based on specific field conditions, tailoring treatments to meet the needs of different areas within a field.

4. **Automation and Robotics**: Many **precision agriculture practices involve automated machinery** and robots that can perform tasks with high accuracy.

What is Rashtriya Krishi Vikas Yojana (RKVY)?

1. **Launched in 2007-08 by the Ministry** of **Agriculture**, RKVY aims for a 4% annual growth in the agriculture sector.

2. With increased investments, the agriculture and allied sectors achieved a growth rate of **3.64%** during the XIth Plan, **compared to 2.46% in the Xth Plan.**

VISION

1. Historically, **agricultural GDP growth has lagged behind targets**.

2. **With over 50% of India's workforce** reliant on **agriculture**, challenges such as fragmented land, dependency on monsoons, and lack of modern techniques necessitate robust investment in the sector.

3. RKVY was introduced to encourage states to enhance their agricultural investments and ensure the economic upliftment of farming communities.

MISSION

To empower states to develop comprehensive agricultural plans that consider agro-climatic conditions, technology, and integrate various sectors like livestock and fisheries, facilitating inclusive agricultural development.

OBJECTIVES

1. Increase public investment in agriculture and allied sectors.

2. Provide states with flexibility in planning and executing schemes.

3. Ensure district and state agricultural plans align with local conditions and priorities.

4. Reduce yield gaps through targeted interventions.

5. Maximize farmer returns and enhance production and productivity across agriculture and allied sectors.

6. India's Fertilizer Crisis as Global Prices Rise

1. In October 2024, experts and policymakers raised concerns about **rising prices for components used in petroleum-based fertilizers**, driven by the **ongoing crises in Ukraine and Gaza** and emphasized the need for India to boost its fertilizer production to reduce reliance on imports.

2. In India's major food-producing state, Uttar Pradesh, the Agriculture Minister highlighted a critical stock shortage, noting that the current supply can sustain only 10 more days.

   - It is particularly concerning as rabi crop sowing has begun across key wheat-growing regions, and fertilizers like Diammonium Phosphate (DAP) and NPK (Nitrogen, Phosphorus, and Potassium) are crucial for crop growth.

Current Fertilizer Import Scenario

1. **Heavy Reliance on Imports**: A report by the **Standing Committee of Parliament on Chemicals and Fertilizers** (Aug 2023), noted that India's fertilizer production does not meet its demand, leaving a significant gap filled by imports:

   a. **Urea:** 20% of demand is met through imports.

   b. **DAP:** 50-60% of the demand is imported.

   c. **MOP (Potash):** Fully dependent on imports to meet domestic needs.

2. **Primary import sources:** India's fertilizer imports largely come from China, Russia, Saudi Arabia, UAE, Oman, Iran, and Egypt, which may be disrupted due to regional conflicts.

India's Fertilizer Production and Consumption Trends:

Category	Details
Consumption Patterns	In 2021-22, India's total fertilizer consumption reached around **580 Lakh Metric Tonnes (LMT)** (630 LMT in 2020-21) across major chemical types: 1. Urea: 342 LMT 2. DAP (Diammonium Phosphate): 93 LMT 3. MOP (Muriate of Potash): 24 LMT 4. NPK (Nitrogen, Phosphorus, Potassium): 121 LMT.
Production Shortfall	India produced around **435 LMT** of fertilizers in 2021-22, leaving a shortfall of **144 LMT** to meet demand. MOP is entirely imported, but domestic production of other fertilizers included: 1. Urea: 250 LMT 2. DAP: 42 LMT 3. NPK: 90 LMT 4. SSP (Single Super Phosphate): 53 LMT
Government Subsidies	**2023-24 Budget Allocation**: The government allocated **₹1.79 lakh crore** for fertilizer subsidies, broken down as follows: 1. **Indigenous P&K Fertilizers**: ₹25,500 crore 2. **Imported P&K Fertilizers**: ₹18,500 crore 3. **Indigenous Urea**: ₹1,04,063.20 crore 4. **Imported Urea**: ₹31,000 crore

Impact of Ongoing Conflict on Global Fertilizer Market

1. **Market Instability**: Conflicts in **Ukraine and Gaza** have disrupted the global fertilizer market, particularly affecting **oil and petroleum-based fertilizer prices**.

2. **Supply Chain Disruptions**: Global supply chains, especially from major fertilizer producers like **Russia**, face disruption, impacting India's imports.

3. **Price Volatility**: Rising oil prices due to geopolitical tensions increase fertilizer costs since many fertilizers are **petroleum by-products**.

Effects on India

1. **Rising Import Costs**: Higher global fertilizer prices lead to increased **import costs for India**, impacting the fertilizer subsidy budget.

2. **Potential Supply Constraints**: India's dependence on imports from conflict-affected regions, such as **Russia and West Asia**, raises risks of limited fertilizer availability.

3. **Budget Strain**: The government allocated **₹1.79 lakh crore** for fertilizer subsidies in 2023-24, with funds covering both domestic and imported fertilizers.

4. **Need for Self-Reliance**: The crisis highlights India's need to reduce import dependence by:
   a. Expanding **domestic production capacity**
   b. Promoting **nano urea** as an alternative
   c. Encouraging **natural farming** for sustainable practices

Government Actions to Address the Issue

1. **New Investment Policy (NIP)**: The NIP supports new **urea manufacturing units** by public and private companies, increasing production capacity from **208 Lakh Metric Tonnes per annum (LMTPA)** in 2014-15 to **285 LMTPA**.

2. **Nutrient-Based Subsidy (NBS)**: In 2021, **Potash from Molasses** was included under the NBS to promote **local production** and reduce import reliance.

3. **Public-Private Joint Ventures**: Public Sector Undertakings (PSUs) and private companies collaborate to enhance urea production, with projects like **Ramagundam Fertilizers** in Telangana and **Hindustan Urvarak & Rasayan** plants in northern states.

4. **Neem Coated Urea (NCU):** The **Department of Fertilizers (DoF)** mandates **100% Neem Coated Urea production**, improving soil health, reducing pest attacks, enhancing crop yield, and increasing **Nitrogen Use Efficiency (NUE)** with reduced non-agricultural diversion.

5. **New Urea Policy (NUP) 2015:** Aims to increase local urea production, improve energy efficiency in plants, and optimize government subsidy spending.

7. 1ˢᵗ Edition of World Bank B-READY Index

Recently, World Bank (WB) launches the **1ˢᵗ edition** of its **Business-Ready (B-Ready) Index.**

1. As a new project, B-Ready is in a **three-year rollout phase**, spanning 2024 to 2026.
   - The assessment currently **includes 50 economies (excluding India)** and plans to expand to 180 by 2026.

2. The B-READY framework replaces the **World Bank's Ease of Doing Business (EoDB) rankings,** which measured how easy it was to start and operate a business.
   - The EoDB report was discontinued in 2021 due to irregularities in data and ethical concerns.

3. **The 2024 Business Reform Action Plan rankings** prepared by the Department for Promotion of Industry and Internal Trade **will include some of the indicators tracked by B-Ready index.**

What is the B Ready Index?

1. **About:** It is a new **data collection and analysis project** of the world bank group to **assess the business and investment climate worldwide,** accompanied by an annual **corporate report.**

2. **Aim:** To **promote private investment, create jobs, and enhance productivity** to support inclusive and sustainable economic development.
   - It also aims to ensure that the **data produced are both comparable across economies and representative** within each economy.

3. **It aims to achieve objective by focusing on three main areas**

a. **Reform Advocacy:** Encourages policy reforms by sharing benchmarks and fostering dialogue among governments, businesses, and the World Bank.

b. **Policy Guidance**: Offers tailored recommendations for policy changes based on data comparisons to global best practices.

c. **Analysis and Research**: Supplies detailed data to support research on private sector development factors.

What is the Analytical Framework of the B Ready Index?

1. It is structured **topics crucial for private sector development,** reflecting different stages in a business's lifecycle, **including opening, operating (or expanding), and closing (or reorganizing) a business**.

2. **Cross-Cutting Themes:** covers three important cross-cutting areas across the ten topics.

3. **Digital Adoption**: Examines how governments and businesses integrate digital tools.

4. **Environmental Sustainability**: Evaluates regulations that affect business environmental practices.

5. **Gender**: Analyzes anonymized gender data to assess the impact of programs and regulations on businesses.

6. **For each of the 10 topics, B-READY considers 3 pillars.**

Pillars of B-Ready Index

Pillar I Regulatory Framework	Pillar II Public Services	Pillar III Operational Efficiency
Rules and regulations that firms must follow as they open, operate, and close a business	Facilities to support regulatory compliance and institutions and infrastructure to enable business activities	Ease of regulatory compliance and effective use of public services directly relevant to firms

What is the difference between the Ease of Doing Business (EODB) and the B-ready index?

Aspects	EODB	B Ready
Focus of Assessment	**Primarily small and medium** enterprises.	Targets **private sector development** as a whole.
Assessment	Examine **only burden of regulation on firms.**	Examines **regulatory burden** on firms and **quality of regulation.**
Analytical Framework	**10 indicators across various categories.**	**Ten topics, three pillars, three themes.**
Data Collection Method	Expert consultations and case studies emphasized either **legal (de jure) or practical (de facto) regulations**, but not both consistently.	Combines **expert insights and firm surveys** for a balanced view of regulations, improving data comparability across economies.
Geographical Reach	**Main business city** in 191 economies and a second city in 11	Aims for wider coverage, including local regulations

What is the significance of the adoption of B ready index for India?

1. **Boosting Competitiveness**: The B-Ready Index helps India improve its **business environment to attract foreign investment**, essential for economic growth.

2. **E-commerce Support**: Targeting $200 billion in e-commerce exports by 2030, the index helps identify and streamline issues in **digital trade and logistics.**

3. **Informed Policy**: The data from the index provides insights into **business challenges**, guiding policymakers to create targeted reforms in trade and compliance.

4. **Encouraging Innovation**: By emphasizing digitalization and sustainability, the index motivates businesses to innovate, boosting productivity.

5. **Promoting Inclusivity**: The index includes gender equality measures, supporting India's goals for inclusive growth and better access for women and underrepresented groups.

6. **Monitoring**: Regular updates allow India to monitor its progress and adjust strategies to remain competitive in the global market**.**

7. **Transparency & Data Integrity**: It ensures data integrity through strict gathering processes and safeguards, while promoting transparency by making foundational documents, such as the B-READY manual and handbook.

Challenges in the Implementation of Index in India

Data Availability: Reliable data collection and analysis can be difficult.

Policy Resistance: Existing stakeholders may resist changes to regulations.

Capacity Building: Ensuring that local governments have the necessary skills and resources.

Monitoring and Evaluation: Evaluating the impact of reforms is crucial but often complex.

Way Forward

1. **Enhancing Governance**: Building the ability of government institutions to create and enforce effective policies.

2. **Involving Stakeholders**: Engaging businesses, civil society, and other groups in the reform process to foster collaboration and support.

3. **Capacity Building**: Providing training and resources to local governments to better assist businesses.

4. **Promoting Inclusivity**: Ensuring that reforms benefit a diverse range of businesses, especially small and medium enterprises.

8. India entering cyclical slowdown

1. In October 2024, Japanese brokerage **Nomura** reported that India's economy has likely entered a **cyclical slowdown**, with **growth possibly falling below 6.7%** due to emerging risks.

   a. They anticipate **weak urban demand, high interest rates**, and **slower wage growth** will keep consumption low.

2. Nomura projects **6.7% GDP growth for FY25** and **6.8% for FY26**, cautioning that downside risks may impact these targets.

3. They consider the **RBI's 7.2% growth estimate for 2024-25 overly optimistic**, given current economic conditions.

4. **Key urban consumption indicators have weakened recently:**

Dampening demand

Nomura links weak urban demand signals, like slowing growth in non-durables' sales and air passenger traffic, to lower salary growth
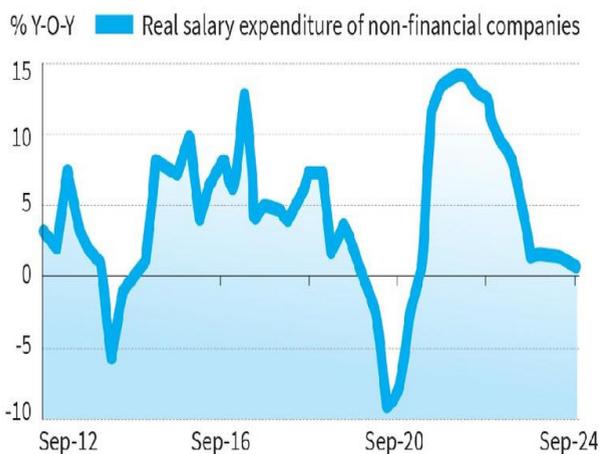
Source: CMIE, CEIC and Nomura Global Economics

   a. **Lower real salary hikes** impacting purchasing power

   b. **Fading pent-up demand** (sudden increase in demand) from the post-pandemic period

   c. **Tight credit conditions** reducing spending capacity

5. This trend suggests continued weakness in urban demand in the near term.

Urban Consumption Weakening

1. **Decline in Consumption Indicators**: Key indicators of **urban consumption** have shown a downturn:

   a. **Passenger vehicle sales** have declined.

   b. **Airline passenger traffic** growth has slowed.

   c. **FMCG companies** report weak urban demand.

2. This decline in urban demand is likely to continue in the short term.

Moderation in Salary Growth

1. **Salary and Wage Growth**: Companies are **reducing the amount they spend on salaries**. This means they are either giving **smaller pay increases** or **not hiring as many people**.

2. When adjusted for **urban inflation** (the increase in living costs in cities), the **real growth** in salary and wages is slowing down.

3. **Trends in Salary Growth:**

   a. In Q2 of FY25, real salary growth is at 0.8% year-on-year.

   b. In Q1 of FY25, it was slightly higher at 1.2%.

   c. For all of FY24, it was 2.5%.

   d. In FY23, it was much higher, at 10.8%.

4. This trend reflects **slower nominal salary growth** and **leaner workforce adjustments**.

Factors Influencing Slowdown

1. **Reduced Post-Pandemic Demand**: The initial surge in consumer demand post-pandemic has tapered, lessening its boost to the economy.

2. **Impact of Tight Monetary Policy**: The **RBI's stringent monetary policies** and regulatory measures on credit expansion have led to slower growth in:

   a. **Personal loans**

   b. **Non-banking finance company lending**

What is Cyclical Slowdown?

1. A cyclical slowdown refers to a **period of reduced economic activity** that happens at regular intervals. It is generally **short-to-medium term** and stems from natural changes in the business cycle.

2. **Recovery Measures**: To combat a cyclical slowdown, the economy usually requires:

   a. Fiscal and monetary interventions

   b. Temporary credit market recapitalization

   c. Need-based regulatory adjustments

Key Factors Affecting India's Economic Growth

1. **Consumption**: Private consumption, which makes up **55-60% of India's GDP**, has been declining due to:

   a. **Lower household income growth**, affecting urban consumption

   b. **Drought or near-drought conditions** in three of the past five years, along with low food prices, which have heavily impacted rural spending

2. **Savings**: Household savings, essential for **providing investment loans**, have dropped:
   a. From **35% of GDP in FY12 to 17% in FY18**
   b. Households, including **MSMEs**, now account for **24%** of total GDP savings
3. **Investment**: Investment levels, indicated by **Gross Fixed Capital Formation (GFCF)**, have fallen:
   a. **Overall GFCF** decreased from **34% in 2011 to 29% in 2018**
   b. **Private sector GFCF** declined from **27% in 2011** to **21% in 2018**
   c. **Gross Fixed Capital Formation** represents the **net increase in physical assets** (investment minus disposals). It excludes the depreciation of fixed capital.
4. The **NBFC crisis**, triggered by the **IL&FS default**, led to a **liquidity crunch**. The **RBI Annual Report** also noted ongoing structural issues in **land, labor, and agricultural marketing** that need resolution.

9. Why India Secretly Flew Its 200 Tonnes of Gold Back Home

1. On **Dhanteras** (October 29, 2023), a day when many Indians buy gold for good luck, the **Reserve Bank of India (RBI)** announced it had brought back **102 tonnes of gold** from the **Bank of England** and the **Bank for International Settlements (BIS)**.
2. This follows a similar move in **May 2023**, when the RBI repatriated (bring back) **100 tonnes** of gold, marking the largest gold transfer since the 1990s.

Recent Developments

1. **Gold Transportation**: The RBI transported **102 tonnes of gold** with strict security measures, using special planes. The gold is now **stored safely in RBI vaults in Mumbai** and **Nagpur**.
2. **Total Gold Reserves**: After this repatriation, India's total gold reserves stand a nearly **855 tonnes**. Out of this, **510 tonnes** are in India, while **345 tonnes** are still overseas (according to **RBI's "Half Yearly Report on Management of Foreign Exchange Reserves"**).
   a. Specifically, **324 tonnes** are stored in the Bank of England and the BIS, with **20.26 tonnes** in gold deposits.

India's Gold Holdings and Global Rank

1. **Global Ranking**: India **ranks 8th** in sovereign gold holdings (June 2024, World Gold Council). The US leads the list.
2. **Gold Reserves**: India gold holdings makes 9.57% of its foreign exchange reserves.
3. **Countries Ahead of India**: Germany, Italy, France, Russia, China, and Japan have more gold reserves than India.

Why Was the Gold Kept Abroad?

Historical Context

1. The gold was moved to the UK during **India's 1991 foreign exchange crisis** when the country had very **low foreign reserves—less than $1 billion,** enough for only 3 weeks of imports.
2. **Leasing Strategy**: In May 1991, India leased smuggled gold to the State Bank of India, which sold it to a Swiss bank to raise $200 million.
   a. The RBI then secured loans from the Bank of England and the Bank of Japan using gold as collateral.

Other Reasons

1. **Mitigating Geopolitical Risks**: The RBI stores gold in multiple international locations, reducing the risk of concentrated reserves within India.
   a. **Global Financial Hubs**: Reserves are held in key financial centers like London and New York, ensuring accessibility and security amid domestic or regional disruptions.
2. **International Liquidity**: Gold in hubs like London, New York, and Zurich provides the RBI with quick access to global markets. These cities are major gold trading centers, allowing the RBI to convert gold into cash efficiently.
3. **Collateral for Financial Instruments**: India can use its gold reserves as collateral for loans or other financial tools, strengthening economic resilience. These reserves help India meet its international financial obligations.

Reasons for Recent Repatriation

1. **Economic Growth**: Bringing the **gold back shows that India's economy is getting stronger.** The **past decision to send gold abroad was linked to economic struggles,** while the recent return reflects confidence in growth.
   a. Economist Sanjeev Sanyal said **that this move symbolizes a major shift from the failures of 1991.**
   b. India's gold reserves **exceed 101% of its external debt**, improving its debt repayment capacity.

2. **Global Tensions**: The timing is significant, as it coincides with global issues, like the **Russia-Ukraine war** and rising conflicts in **West Asia**.
   a. Gold is viewed as a **safe investment during uncertain times**, as it tends to keep its value.
   b. Holding gold domestically protects it from foreign sanctions or restrictions. For example, US sanctions froze Russia's access to $300 billion in gold and reserves due to the Ukraine war.

3. **Protection Against Inflation**: Gold helps protect against inflation and currency drops. It is generally more stable than other assets, making it a reliable choice.
   • Gold's liquidity makes it attractive for investors needing quick access to cash.

4. **Increasing Market Confidence:** Gold is viewed as a **"safe haven" asset**. Having gold within India boosts public trust in the financial system, especially in emerging markets.

5. **Global Trend of Gold Repatriation:** Central banks worldwide are bringing gold back home. For example, **Venezuela** repatriated gold from US and Europe in 2011, Austria in 2015.

6. **Cost Savings:** The RBI incurs insurance, transportation, and custody fees for holding gold abroad. Repatriation reduces these costs.

Future Use of Gold

1. **Stabilize Local Gold Prices**: By managing gold reserves at home, the RBI can help control local prices and stabilize the market.

2. **Prepare for Financial Risks**: **Gold can serve as a backup during financial crises,** helping to manage inflation and protect against currency drops.

The Economic Crisis of 1990-91

1. Starting in late 1990, India faced a severe **balance of payments crisis** due to falling remittances and rising oil prices after Iraq invaded Kuwait. This led to a **current account deficit** of **3% of GDP**, the highest in 2 decades.

2. **India's foreign exchange reserves were critically low,** covering only about **3 weeks** of imports, raising fears of a potential default on external payments.

3. **RBI's Role**: Under Venkitaramanan's leadership, the **RBI acted decisively. The bank pledged gold to international banks in exchange for loans.**
   a. In **April 1991**, India raised **$200 million** by selling **20 tonnes** of gold confiscated from smugglers.
   b. In **July 1991**, it shipped **47 tonnes** of gold to the **Bank of England for an additional $405 million.** This **helped repay international debts and provided some breathing space during the crisis.**

Import Compression Strategy

1. **Initial Measures**: Before seeking international loans, the **RBI initiated a program to reduce imports by raising the cash margin required on imports.**

2. **Policy Changes**: Cash margin increased four-fold from **October 1990 to April 1991**. This included raising costs associated with imports, effectively reducing the current account deficit.

3. **Results**: By **1991-92**, the deficit dropped to **0.3% of GDP**, minimizing the need for foreign exchange.

4. **Although the incoming government of Narasimha Rao implemented further reforms, the RBI's early actions significantly contributed to this improvement**.

What is the Significance of Gold in the Economy?

1. **Limited Supply & Intrinsic Value:** Unlike currencies that can be printed at will by central banks, **gold has a finite supply** due to geological limitations.
   • This **scarcity, combined with its unique physical properties** and historical significance, gives gold intrinsic value.

2. **Hedge Against Inflation:** Gold has historically performed well during **inflation** by holding its value well. A 2023 World Gold Council study found a **positive correlation** between **gold prices and US inflation** over 50 years. This makes gold valuable for hedging against inflation.

3. **Diversification & Stability:** Gold **diversifies a country's foreign reserves,** reducing dependence on a single currency and offering stability during economic challenges.
   - Additionally, holding gold reserves can be seen as a sign of confidence in a country's economy by international investors.

4. **Jewelry & Cultural Significance:** The demand for gold in jewellery remains strong globally, particularly in certain regions like India and China.
   - Additionally, gold holds **cultural significance** in many societies, further influencing its value and demand.

Conclusion

Bringing the gold back is an important step in India's financial strategy, showing improved economic conditions and smart management of reserves. This move is not just about the gold itself; it symbolizes national strength and confidence in future growth. As global tensions continue and uncertainties arise, the return of gold reinforces India's commitment to financial stability and security.

10. Industrial Output Drops for the First Time in Nearly Two Years

India's industrial output, measured by the Index of Industrial Production (IIP), fell by 0.1% in August 2024, released by National Statistical Office **(NSO)**, **MoSPI.**
   A. This is the **first decline in 21 months and is due to a high base effect** along with drops in mining and electricity output.

What is the High Base Effect ?

A **high base effect occurs when a current value is compared to a very high previous value.** This can lead to a **deceptive perception of growth or decline**, as the percentage change from a high base can appear smaller than it actually is.

Example:
1. **Year 1:** A company sells 100 units of a product.
2. **Year 2:** Sales increase to 120 units. This is a 20% increase, which seems significant.
3. **Year 3:** Sales increase to 130 units.

This is only an 8.33% increase, but it might seem like a **slowdown compared to Year 2**. **However, the increase from Year 1 to Year 3 is still 30%,** which is substantial.
   - The **reason for this perceived slowdown is the high base effect**. The increase in Year 3 was from a higher starting point (120 units) compared to Year 2.

Key Data Highlights:

1. **Previous Performance:** Industrial output had increased by **4.7%** in July 2024 and **10.9%** in August 2023.

2. **Cumulative Growth:** For the **financial year 2024-25,** industrial growth from April to August is at **4.2%**, down from **6.2%** in the same period last year.

Sectoral Performance:

1. **Mining Output:** Decreased by **4.3%** in **August**, compared to a **3.8%** increase in **July** and a **12.3%** rise in **August last year.** Heavy rain affected mining activities.

2. **Electricity Output:** Fell by **3.7%** in August, down from **7.9%** growth in July and **15.3%** a year ago.

3. **Manufacturing Sector:** This sector, which makes up **77.6%** of the IIP, dropped to a **22-month low** with only **1.0%** growth in August, compared to **4.4%** in July and **10.0%** in August 2023.

Use-Base Classification

1. **Primary Goods:** Went into **negative growth for the first time in 3.5 years**, contracting by **2.6%** in August, compared to **5.9%** growth in July and **12.4%** a year ago.

2. **Capital Goods:** Grew by **0.7%** in August, down from **11.8%** in July and **13.1%** a year ago. This sector is **important as it shows how much companies are investing.**

3. **Consumer Goods:** Mixed results were observed:
   a. **Consumer Durables:** Grew by **5.2%** in August, down from **8.3%** in July and **6.0%** a year ago, indicating steady demand.

b. **Consumer Non-Durables**: Continued to decline for the third month, dropping by **4.5%** in August, compared to **-4.3%** in July and **9.9%** growth last year. This shows ongoing issues in rural demand.

Sectoral Breakdown:

1. **Manufacturing Declines**: Out of 23 manufacturing sectors, **11** showed **declines in August**. Notable drops included:
   a. Other manufacturing: **-8.2%**
   b. Printing and media: **-7.1%**
   c. Fabricated metal products: **-6.5%**
   d. Pharmaceuticals: **-6.1%**
2. **Growth Leaders**:
   a. Electrical equipment: **17.7%**
   b. Wearing apparel: **14.0%**
   c. Furniture: **13.9%**.

Index of Industrial Production (IIP)

1. The Index of Industrial Production **(IIP) is an important measure of industrial activity in India, published by the NSO (MoSPI).**
2. It serves as a **quantum index,** reflecting the **physical production of various items**, although some items are reported in value terms.
3. The IIP includes sectors like **mining, manufacturing, and electricity**, but excludes construction, gas, and water supply due to data limitations.
4. The IIP measures the growth rate of **different industry groups over a specific** period.
5. It provides insights into the **performance of the manufacturing sector by** comparing **current industrial output to a reference period.**
6. The **IIP is published monthly,** with data typically released six weeks after the reference month, and **currently uses 2011-2012 as its base year**.

Background of the IIP

1. **India's first formal attempt** to calculate the **IIP was made in 1937,** covering 15 major industries.
2. **Since 1950, the all-India IIP has been published monthly.**
3. The base year has been updated multiple times to reflect changes in industrial structure and growth, with the **latest revision occurring in 2017**.

Components of the IIP:
The IIP consists of three main categories: **Mining, Manufacturing** and **Electricity**
Additionally, the 8 core industries, which contribute about 40% to the IIP, include: Electricity, Refinery products, Steel, Crude oil, Coal, Natural gas, Cement and Fertilizers

How is the IIP Calculated?
1. The IIP is calculated as a weighted average of production relatives across various industrial activities.
2. The Laspeyres fixed base formula is used for this calculation. The IIP is updated regularly to ensure it reflects the current industrial landscape.

Change in Base Year:
In 2017, the IIP's base year was updated from 2004-05 to 2011-12. Previous base years included 1937, 1946, 1951, and others.

Relationship Between IIP and the Core Sector:
1. The core sector is composed of **eight critical industries: coal, crude oil, fertilizers, steel, natural gas, refinery products, cement, and electricity.**
2. The performance of the core sector often predicts overall economic activity.
3. A rise in the core sector usually corresponds with increased economic growth.
4. Manufacturing, which contributes over 67% to GDP growth, benefits from a positive IIP trend. **Typically, positive IIP growth** is linked with **positive GDP growth**, making it a useful indicator for economic recovery.

Major Industries in the Index of Industrial Production

List of Major Industries in the Index of Industrial Production	
Industry	**Weight**
Coal	10.33
Electricity	19.85
Crude oil	8.98
Cement	5.37
Natural gas	6.88
Steel	17.92
Refinery products	28.04
Fertilizers	2.63
Total	100

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E. SCIENCE & TECHNOLOGY

1. NASA's Europa Clipper Mission

1. On **October 14**, **NASA** launched Europa Clipper spacecraft from **Florida** on a mission to study whether **Jupiter's moon Europa** has conditions suitable to support **life**.

2. This focuses on the large **subsurface ocean** believed to exist beneath its thick outer shell of **ice**.

3. The **spacecraft will not take a direct path to Jupiter; instead, it will fly by Mars** and then return by **Earth**, using the **gravity** of each planet to increase its momentum like a **slingshot**.

4. This robotic solar-powered probe is scheduled to enter **orbit** around **Jupiter** in **2030** after traveling about **1.8 billion miles** (approximately **2.9 billion km**) over a duration of **5-1/2 years**.

5. It is the **largest spacecraft** that NASA has built for a planetary mission, measuring about **100 feet** (approximately **30.5 meters**) long and about **58 feet** (approximately **17.6 meters**) wide with its **antennas and solar arrays fully deployed,** which makes it larger than a **basketball court**.
   a. Its expansive **solar arrays**, folded up for launch, will collect sunlight to power the spacecraft's **nine scientific instruments** as well as its electronics and other subsystems.

6. The spacecraft weighs approximately **13,000 pounds** (about **6,000 kg**).

7. Although **Europa**, the **fourth-largest** of Jupiter's **95 officially recognized moons**, is just a quarter of **Earth's diameter**, its vast global ocean of **salty liquid water** may contain **twice the water** found in **Earth's oceans**.

8. **Europa's diameter** is roughly **1,940 miles** (approximately **3,100 km**), which is about **90%** that of our moon, making it a candidate for potential **habitat for life** beyond Earth in our solar system.

9. Its icy shell is believed to be **10-15 miles** (approximately **15-25 km**) thick, sitting atop an ocean that is **40-100 miles** (approximately **60-150 km**) deep.

10. **According to the deputy associate administrator of NASA's science mission** directorate, scientists believe Europa has suitable conditions beneath its icy surface, including **water**, **energy**, **chemistry**, and **stability** to support life.

11. Mission objectives include measuring the **internal ocean** and the layer of ice above it, mapping the moon's **surface composition**, and searching for **plumes of water vapor** that may vent from Europa's icy crust.
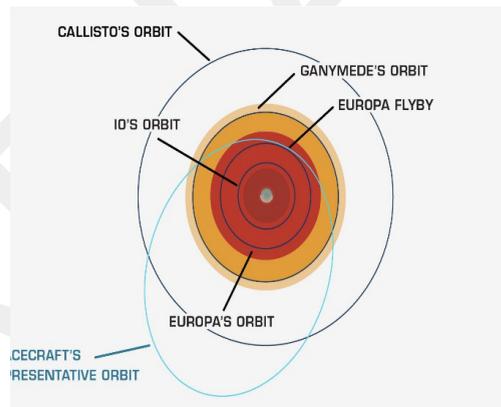
12. The **Europa Clipper** is planned to conduct **49 close flybys** of Europa starting in **2031**, coming as close as **16 miles** (approximately **25 kilometers**) to the moon's surface over a span of **three years**.

13. Jupiter is surrounded by a **magnetic field** approximately **20,000 times stronger** than Earth's, capturing and accelerating charged particles to create radiation that could harm spacecraft.

14. **To protect its sensitive electronics from this radiation, NASA designed a vault made** of **titanium** and **aluminum** inside the Europa Clipper.

15. One of the **main challenges of the Europa Clipper mission is to deliver a spacecraft robust enough to withstand Jupiter's radiation** while also being sensitive enough to gather necessary measurements to investigate Europa's environment.

16. NASA said that the Europa Clipper is loaded with more than **6,060 pounds** (approximately **2,750 kg**) of **propellant** to reach Jupiter.

Other visitors to Jupiter and Europa

1. NASA's twin **Pioneer spacecraft** and then **two Voyagers** swept past Jupiter in the 1970s.
2. The Voyagers provided the **first detailed photos of Europa** but from quite a distance.
3. **NASA's Galileo spacecraft** had repeated flybys of the moon during the 1990s, passing as close as 124 miles (200 kilometers). Still in action around Jupiter, **NASA's Juno spacecraft** has added to Europa's photo album. Arriving at Jupiter a year after Clipper will be the European Space Agency's Juice spacecraft, launched last year.

Ganymede and other possible ocean worlds

Like **Europa, Jupiter's jumbo moon Ganymede** is thought to host an underground ocean. But its frozen shell is much thicker — possibly 100 miles (160 kilometers) thick — making it tougher to probe the environment below. Callisto's ice sheet may be even thicker, possibly hiding an ocean.

Saturn's moon Enceladus has geysers shooting up, but it's much farther than Jupiter. **Ditto for Saturn's moon Titan**, also suspected of having a subterranean sea. While no ocean worlds have been confirmed beyond our solar system, scientists believe they're out there — and may even be relatively common.

2. Space X achieved the feat of catching the rocket booster

Elon Musk, the CEO of SpaceX, has been a driving force behind the development and implementation of reusable rockets.

Why is Elon Musk focusing on reusability of rockets?

Feature	Reusable Rockets	Non-Reusable Rockets
Cost	Significantly lower launch costs due to reusability	High cost per launch as the entire rocket is discarded
Environmental Impact	Reduced environmental impact due to less manufacturing waste	Higher environmental impact due to manufacturing new rockets for each mission
Technological Advancement	Drives innovation in propulsion, guidance, and control systems	Limited technological advancement in reusability
Launch Frequency	Enables more frequent and affordable launches	Limits launch frequency due to high costs
Components	Rocket boosters and potentially other components can be reused	Entire rocket is discarded after a single use
Retrieval	Requires advanced retrieval technology to recover components safely	No retrieval necessary
Examples	SpaceX's Falcon 9, Falcon Heavy	Most rockets before the 21st century

What is a Rocket Booster?

1. Rocket boosters are essential components of multi-stage rockets, providing the **initial thrust** needed to lift the rocket off the ground and into orbit.
2. They are **typically discarded** after their **primary function is complete**.
3. When a rocket booster is **intentionally landed in the ocean**, it's often referred to as a **splashdown**.
4. Recovering rocket boosters from the sea poses significant challenges due to the harsh marine environment.
5. Saltwater environment can cause corrosion to the booster's structure, reducing its lifespan and increasing maintenance costs.
6. Retrieving a booster from the ocean requires specialized equipment and procedures, such as cranes, barges, and underwater inspection.

On 14 October 2024 space X achieved the feat of catching the rocket booster of Space X Starship midair with giant robotic arms .

1. SpaceX Starship rocket system lifted off from **Starbase in Boca Chica, Texas.**

2. SpaceX starship super heavy booster **did not make splashdown** in the ocean instead **it landed safely at the launch site.**

3. The booster detached from Starship three minutes and 40 seconds after the launch.

4. Super heavy booster **restarted 13 Raptors** to return towards the Texas coast.

5. The boosters slowed its speed from a peak speed of **27350km/hr**.

6. The booster was descending at angle and later straightened as it approached the gantry.
   - Gantry is structure that holds the rocket before it is launched.

7. The **gantry** had large hands which had been **named Mechazilla**.

8. These giant chopsticks like hands caught the rocket booster which then switched off its engine .

SpaceX Starship

1. SpaceX Starship is a fully reusable, **stainless steel spacecraft** designed by SpaceX with the goal of transporting humans and cargo to the Moon, Mars, and beyond.

2. SpaceX Starship is a **two-stage rocket** designed for **deep-space missions**.

3. **Super Heavy Booster**: This is the first stage of Starship. It's a massive booster designed to provide the initial thrust needed to lift the spacecraft off the ground. Super Heavy is powered by multiple **Raptor engines** and is designed to be fully reusable.
   a) Raptor is a highly efficient **full-flow staged combustion** rocket engine developed by SpaceX.
   b) **Full-Flow Staged Combustion**: This design allows for exceptionally **high specific impulse**, meaning it can produce **more thrust per unit of propellan**t, making it more efficient.
   c) **Specific Impulse i**s a measure of a **rocket engine's efficiency**. It quantifies how **much thrust a rocket** can produce for a given amount of propellant consumed.

   d) With less fuel to carry, a rocket can carry a **larger payload**, making it more versatile for various missions.
   e) **Payload refers to the cargo carried by a spacecraft**, aircraft, or other vehicle.

4. **Starship Upper Stage:** This is the second stage of Starship. It's **designed to carry payloads** to orbit, the Moon, Mars, and beyond. Starship is also designed to be **fully reusable**, with the ability to land on Earth or other celestial bodies.

5. The rocket system is **nearly 120 metres tall**, making it **the largest rocket ever** — taller than even the Saturn V (111 meters).

3. IndiaAI and Meta Collaborate for Open Source AI Innovation in India

1. **On October 25, 2024, IndiaAI, in collaboration with Meta, announced the** establishment of the **Center for Generative AI, Srijan** at IIT Jodhpur.
   a. **INDIAai is a knowledge portal, research organisation** and an ecosystem building initiative.
   b. It stands **to unite and promote collaborations with various entities in India's AI ecosystem.**
   c. **The portal provides the latest** and **up-to-date information and analysis on AI** as news and articles, provides detailed information on the key ecosystem players, and provides insights into the global and Indian AI landscape.

2. Additionally, they launched the **YuvAi Initiative for Skilling and Capacity Building** in partnership with the All India Council for Technical Education (**AICTE**).

3. This collaboration aims **to advance open source artificial intelligence (AI) in India,** enhance indigenous AI applications, and **enhance skill development in the sector.**
   a. **Open Source AI refers to artificial intelligence technologies and frameworks whose source code is made publicly available** for anyone to use, modify, and distribute.
   b. This approach **encourages collaboration and innovation in the AI community by allowing developers and researchers** to build upon each other's work.

What is Generative AI ?

1. **Generative AI** refers to a type of artificial intelligence that **can create new content, including text, images, music, and videos, based on patterns it has learned from existing data.**

2. Unlike traditional AI, which **often focuses on analyzing or classifying data, generative AI generates original outputs** that resemble the training data.

Key Components of the Collaboration

1. **Center for Generative AI, Srijan :**
   a. **Purpose:** To promote **research and development in AI** and ensure the growth of responsible and ethical AI technologies in India.
   b. **Focus Areas:**
      i. **Empowering researchers, students, and practitioners through education and capacity building.**
      ii. **Supporting open science innovation across the AI technology landscape.**
   c. **Goals:**
      i. **Enhance India's AI capabilities.**
      ii. **Foster solutions tailored to local needs.**

2. **YuvAi Initiative for Skilling and Capacity Building:**
   a. **Objective: To bridge the AI talent gap by empowering 100,000 students** and **young developers (ages 18-30) to leverage open-source large language models (LLMs)** to address real-world challenges.
      i. Large Language Models **(LLMs) are advanced AI systems that understand and generate human language.**
      ii. They are **trained on large amounts of text data and can perform tasks like text completion, translation, and summarization,** making them useful for chatbots and content creation.
      iii. **However, they can have issues like bias in their responses, the risk of spreading misinformation,** high resource use, and **ethical concerns about how they are used**.
   b. **Key Components:**
      i. Establishment of a **Gen AI Resource Hub** with courses, case studies, and open datasets.

   ii. An **LLM for Young Developers Course** designed by Meta.
   iii. **Master Training Activation Workshops** to introduce foundational AI concepts.
   iv. **Unleash LLM Hackathons: Students submit AI solutions for real-world problems,** with **top ideas receiving mentorship, seed grants, and market support.**
   v. **AI Innovation Accelerator:** Identification and support for 10 student-led startups experimenting with **open-source AI models, offering incubation and visibility.**

Impact on India's AI Ecosystem:

1. The collaboration **aims to equip the next generation with tools necessary to address pressing challenges** and enhance India's position in the global AI landscape.

2. The initiative aligns with **India's ambition to become a $5 trillion economy by promoting a robust AI ecosystem** that supports technological advancement and economic growth.

3. The partnership involves the **Ministry of Electronics and Information Technology (MeitY)**, **IIT Jodhpur, AICTE, and Meta,** emphasizing the importance of collaborative efforts in advancing AI technology responsibly and ethically.

4. Space Docking Experiment (SPADEX)

Recently, a Hyderabad-based private firm handed over two **400 kg class satellites to ISRO**, which will be part of the **Space Docking Experiment (SPADEX) planned at the end of 2024.**

About Space Docking

1. Space docking involves **precise connection of two spacecraft**, whether manned or unmanned, allowing those **to operate as a single unit for critical tasks** such as refuelling, repair, and crew exchange.
   a. It enables the construction of cutting-edge facilities (like International Space Station) in orbit and advancing space exploration.

2. Some spacecraft dock with the International Space Station and others berths with the station.

a. **In Docking,** the spacecraft can maneuver and attach to the station by itself.

b. **In Berthing,** an astronaut uses the station's robotic arm to capture the spacecraft. Then Mission Control takes control from the ground and directs the arm to maneuver the spacecraft to the attachment site.

About Space Docking experiment (SPADEX)

1. ISRO's SPADEX is **a technology demonstration experiment** aimed at mastering autonomous docking, a critical capability that only a select few countries (the US, Russia, and China) have.

2. The two satellites named '**Chaser'** and '**Target'** will be launched into slightly different orbits by a **single PSLV-class vehicle** with an aim to dock at an **altitude of about 700 km.**

   a. They will align precisely at speeds of approximately **28,000 km/h** to perform a 'space handshake' docking to become a single orbiting entity.

3. These satellites will perform **complex maneuvers**, including:

   a. **Autonomous Rendezvous and Docking**: The spacecraft must autonomously navigate, approach, and securely dock while coordinating with each other.

   b. **Formation Flying**: Demonstrating precise orbital control to maintain relative positions, a key skill for future in-space assembly and satellite servicing.

   c. **Remote Operations**: The mission will experiment with controlling one spacecraft using the Attitude Control System of the other in docked configuration.

      i. Additionally, it will explore the **use of robotic arm** technologies for in-space manipulation and servicing.

Significance for India

1. **Space Exploration**: SPADEX focuses on **scalable and cost-effective** docking technology developed in India, essential for India's space exploration ambitions such as

   a. **Gaganyaan** for human space flight,

   b. **Chandrayaan-4** for lunar sample returns,

   c. **Bharatiya Antariksha Station (BAS)** for permanent infrastructure in outer space, etc.

2. **Private Sector Participation**: Marks a milestone in private sector participation, enabled by space sector reforms like IN-SPACe.

   a. This is the first instance of complete satellite integration by a private company to be used by the ISRO.

3. **Future Impact**: Enables **international collaboration** opportunities for building space infrastructure and deep space exploration along with earning crucial **foreign exchange**.

4. **Other Potential Applications:** Longevity of Geostationary Satellites, future interplanetary missions (such as Mars), assembling space solar stations for generating electricity from the Sun, etc.

Challenges

1. **Complex Docking Mechanism**: Satellites travelling at immense speeds (about 8-10 km per second) requires precise communication and coordination for docking.

   a. Any errors in the navigation and control system can result in collision or failure to dock as seen recently in the Sunita Williams' case.

2. **Automated Systems**: Autonomous complex maneuvers in real-time is technologically challenging due to various dynamic factors such as relative speeds and trajectories.

3. **Sensor Reliability**: The sensors used for docking (e.g., cameras, LIDAR, and radar) can face difficulties in the harsh environment of space.

4. **Other challenges**: Space debris threat, microgravity effects, data transfer and communication stability, etc. must also be considered at the planning stage.

Conclusion

The development of advanced space technologies by India represents a significant leap forward in space exploration capabilities. Such advancements reflect the nation's commitment to scientific and technological self-reliance and its aspirations to be a frontrunner in global space research and development, in line with the Atmanirbhar Bharat vision.

5. ISRO-DBT Agreement: To Conduct Biotechnology Experiments in Space Station

1. In October 2024, the Indian Space Research Organisation (ISRO) made an agreement with the Department of Biotechnology (DBT) to create and carry out experiments for **India's planned space station, the Bharatiya Antariksh Station (BAS).**

   a. The DBT, which is part of the Ministry of Science and Technology, works to grow the biotechnology field in India. This includes using biotechnology in areas like farming, healthcare, animal science, the environment, and industry.

2. The **BAS space station is expected to be up and running between 2028 and 2035.**

3. It will help India improve its abilities in space exploration and biotechnology.

Objectives of the Collaboration:

The **joint experiments will focus on studying biological and environmental factors that affect human health and the use of resources in space**. Some possible studies include:

1. The effect of **weightlessness on muscle loss.**

2. Finding types of **algae that can be used for food or preserving nutrients.**

3. **Using algae to make jet fuel.**

4. The impact of space radiation on astronauts' health.

Context of the Agreement:

Before working on the BAS project, **ISRO is focusing on the Gaganyaan mission, India's first crewed spaceflight, planned for 2025-2026.**

Uncrewed Test Missions:

1. **Gaganyaan-1**: A mission without a crew to test spacecraft systems.

2. **Gaganyaan-2**: A second uncrewed mission with a humanoid robot named **Vyommitra**.

The partnership with DBT supports the government's larger goal of advancing biotechnology and bio-manufacturing in India.

Key Highlights of the ISRO-DBT Agreement:

1. This agreement is part of the **DBT's BioE3 policy (Biotechnology for Economy, Environment, and Employment).**

2. The **goal is to strengthen India's bio-economy, which is expected to grow to $300 billion by 2030.**

3. The agreement focuses on:

   a. Space-based bio-manufacturing.

   b. Health research.

   c. Regenerative medicine.

   d. Biotechnology for managing waste.

These **efforts will also help support Indian startups in the biotechnology sector, driving innovation in areas like medicines, biotherapeutics**, and bio-based technologies.

What is BioE3 Policy ?

Approval: in August 2024, The **Union Cabinet, chaired by Prime Minister Shri Narendra Modi, approved** the **BioE3 (Biotechnology for Economy, Environment and Employment) Policy** to promote **High Performance Biomanufacturing**.

Strategic Focus Areas:

1. High-value bio-based chemicals, biopolymers, and enzymes

2. Smart proteins and functional foods

3. Climate-resilient agriculture

4. Carbon capture and utilization

5. Marine and space research

What will be the Benefits of the Bharatiya Antariksh Station (BAS) ?

1. A space station would **facilitate scientific experiments in microgravity,** which can lead to **breakthroughs in fields such as materials science, biology, and medicine.**

2. **Previous studies on the International Space Station (ISS) have provided valuable insights into how plants adapt to space conditions,** which can enhance food sustainability.

3. **Technological Advancements**: The design and operation of a space station will foster advancements in:

   a. Life support systems.

   b. Robotics.

   c. Space habitat construction.

These innovations are critical for the sustainability of long-duration space missions.

Global Leadership and Prestige:

1. Successfully establishing and **operating a space station would enhance India's position as a leader in space exploration**, facilitating international collaborations and partnerships.

2. A space station could **provide opportunities for Indian companies in satellite manufacturing, servicing, and other aerospace sectors.**

3. Building on the **experience gained from the Gaganyaan mission, a space station would allow Indian astronauts to undertake long-duration missions,** which is essential for developing capabilities for future crewed explorations.

Challenges in Building and Operating a Space Station

Challenge	Solution
Engineering complexities: Designing a safe and sustainable space station to withstand harsh conditions, including cosmic radiation and micrometeoroids.	Utilize advanced materials and engineering techniques, including enhanced radiation shielding and micrometeoroid protection systems.
Life support systems: Developing reliable systems for air, water, and waste management for long-term missions.	Invest in robust, autonomous life support technologies with redundancy, regular testing, and periodic upgrades.
High financial investment: Building a national space station estimated to **cost between $10 billion and $30 billion, compared to ISRO's budget of around $1.95 billion for 2024-25.**	Explore public-private partnerships and international collaborations to share costs and leverage additional funding sources.
International competition: While partnerships can provide assistance, **competition among established space powers like the U.S., Russia, and China presents challenges.**	Promote collaborative projects and agreements to share knowledge, resources, and technology while navigating competitive dynamics.
Health risks of long-duration missions: Risks include **bone density loss and increased intracranial pressure, alongside psychological stresses from isolation.**	Implement countermeasures **like exercise regimens, nutritional support, and mental health resources to manage physical and psychological health.**
Logistical support: Maintaining a space station requires consistent resupply of essentials; without reusable rockets, ISRO may face challenges in logistics.	Establish partnerships with commercial spaceflight companies and invest in developing a reliable fleet of resupply vehicles.

6. How LiDAR helped discover a lost Mayan city

1. **Recently,** A vast **ancient Maya city, complete with palaces and pyramids, has been discovered in a dense jungle in Mexico**

2. This remarkable discovery was made **possible through the use of LiDAR technology.**

What is LiDAR?

1. LiDAR stands for **Light Detection and Ranging**.

2. It is a **type of remote sensing technology that uses light in the form of laser pulses to measure distances from a sensor** (usually on an aircraft) to the Earth's surface.

3. **Functionality**: LiDAR can **create highly detailed 3D maps of the ground,** with an accuracy of up to 10 centimeters, as reported by the US Geological Survey.

How LiDAR Works?
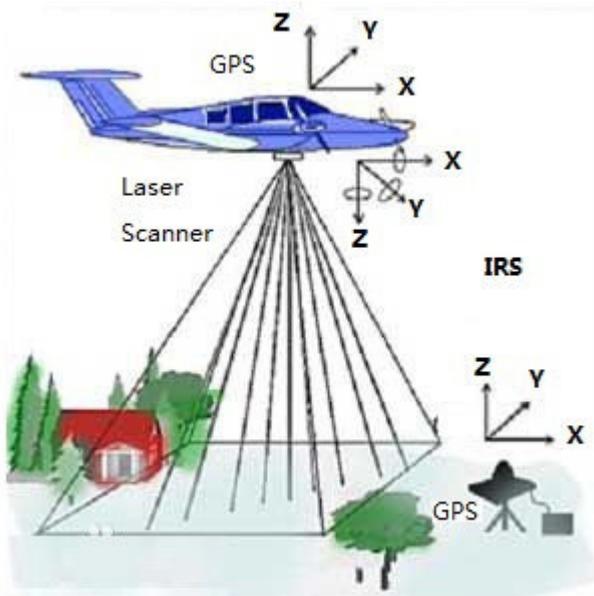
1. **Key Components: A LiDAR system consists of:**
    a. A **laser** that emits light pulses.
    b. A **scanner** that captures the reflected light.
    c. A **GPS receiver** that provides precise location data.
2. **The Process**:
    a. The laser **sends out rapid pulses of light toward the ground.**
    b. When the **light hits the surface (like trees, buildings, or land), some of it reflects back to the sensor.**
    c. The LiDAR system **measures the time it takes for the light to return, allowing it to calculate how far away the ground is.**
3. **Data Collection:**
    a. The data collected initially forms a **"point cloud," which includes numerous points that represent the various surfaces on the Earth.**
    b. Each point can reveal details about what the light hit, allowing researchers to differentiate between features like trees and structures.
4. **Refining the Data**:
    a. Scientists can process the point cloud data to create what's known as a **"bare earth" Digital Elevation Model.**
    b. This model shows the **ground surface without any vegetation or buildings, making it easier to identify hidden structures.**

Why LiDAR is Useful for Archaeology?

1. LiDAR provides precise, **3-dimensional information about the Earth's shape and surface features.**
2. This data is **valuable not only for geographers and engineers but has become increasingly important for archaeologists.**
3. **Efficiency**:
    a. **Traditional archaeological work often involved labor-intensive methods**, where researchers had to walk through dense vegetation, clearing paths to find potential sites.
    b. This could take a long time and require a lot of effort.
    c. **LiDAR changes this by allowing researchers to analyze large areas quickly and from a distance**, making it much easier to identify sites of interest.

The Discovery of Valeriana:

1. The lead researcher in this **recent study used publicly available LiDAR data collected in 2013 as part of a forest monitoring project.**
2. This data helped them identify the previously unknown city, which they named **Valeriana**.
3. **Key Features of Valeriana**:
    a. The city includes several important characteristics of a Classic Maya political center:
        i.   **Enclosed plazas** connected by wide pathways.
        ii. **Temple pyramids** that serve as important ceremonial structures.
        iii. A **ballcourt** for games that were significant in Maya culture.
        iv. A **reservoir**, which was likely created by damming a seasonal watercourse, providing water for the inhabitants.
4. The researchers believe this city dates back to before **150 CE**, marking it as an important site in Maya history.

Future Implications:

1. The **researcher hopes that discovering Valeriana will lead to more findings about hidden Mayan cities and settlements.**
2. Interestingly, this **city is situated near a major highway and close to a town where people have been farming for years**.

3. Despite this proximity, it was **unknown to both the local government and the scientific community until now.**

4. This discovery emphasizes the potential for using LiDAR technology to uncover more of the ancient Maya civilization, suggesting that **there are still many hidden sites waiting to be discovered.**

Conclusion

The discovery of the lost Mayan city Valeriana showcases how LiDAR technology can transform archaeological research. By revealing hidden structures beneath thick vegetation, LiDAR allows researchers to explore and understand the rich history of ancient civilizations like the Maya. As more studies utilize this technology, we can expect to uncover even more about our past and the remarkable societies that once thrived.

7. Unified Genomic Chip

1. Recently, Prime Minister launched **Unified Genomic Chip** and **indigenous sex-sorted semen technology for the benefit of livestock in India**.

2. **Genomics:** It is the study of all of an organism's genes (the genome), including interactions of those genes with each other and with the environment.

About Unified Genomic Chip (UGC)

1. It is a **Single Nucleotide Polymorphism (SNP)** chip.

2. **Objective**: Designed for **genomic profiling** and **evaluation** of **Indian cattle breeds.**
   a. It has enabled the direct application of **DNA technologies** to enhance the **genetic potential (genetic improvement)** of diverse dairy animal populations in the country.
   b. These chips will **help farmers to identify high-quality cattle early** and enhance dairy farming efficiency.

3. **Variants of the chip**:
   a. **Gau** chip for cattle
   b. **Mahish** chip for buffaloes

4. **Developed by**: Consortium led by the **Department of Animal Husbandry and Dairying (DAHD),** Ministry of Animal Husbandry, Dairying and Fisheries.
   a. It comprises of National Dairy Development Board (NDDB), National Institute of Animal Biotechnology (NAIB), etc.

About Single Nucleotide Polymorphisms (SNPs)

1. It refers to a **variation in a DNA sequence** where a single nucleotide is different from the reference sequence.
   a. DNA sequences are formed from a chain of four nucleotide bases: **Adenine** (A), **Cytosine** (C), **Guanine** (G), and **Thymine** (T).
   b. An SNP may replace the nucleotide **Guanine (G) with the nucleotide thymine (T)** in a certain stretch of DNA.

2. These are the most common type of **genetic variation among people**.

3. They are **commonly used in research studies and by genetic testing companies.**

Single Nucleotide Polymorphisms (SNPs)
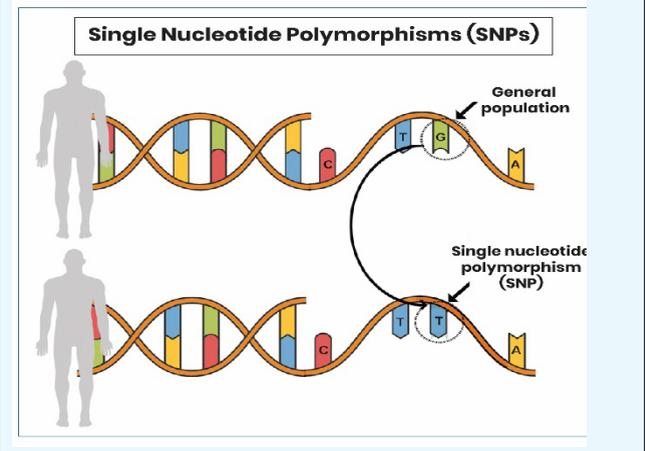
About Sex-sorted Semen Technology

1. Sex Sorted Semen is the **'gender selected' semen used in Artificial Insemination (AI)** for cattle and buffaloes.

2. It **ensures the birth of only female calves with more than 90% accuracy** whereas conventional semen produces equal proportion of male and female (50:50) calves.

3. Under the 'Make in India' and 'Atmanirbhar Bharat' initiative, the **NDDB has developed the indigenous technology** of sex sorted semen.
   a. Till now it was manufactured by multinational companies.

About Genetic/Breed Improvement

1. It involves **selecting animals with superior traits**, producing frozen semen, and disseminating it in the respective breeding tracts, in order **to increase productivity of dairy animals.**

a. It also **promotes conservation of indigenous breeds.**

2. It involves different techniques such as **Artificial Insemination**, **In-Vitro Fertilization (IVF)**, **Embryo transfer technology (ETT)**, etc.

3. **Need for Genetic/Breed Improvement:**

   a. Building a **disease-free closed herd**

   b. Developing **climate-tolerant** and **disease-resistant** breeds.

   c. Contributes to the overall **genetic pool** of the breed, ensuring long-term sustainability.

   d. **Empowering farmers** and building resilient livelihoods.

   e. Reducing **dependence over exotic species** and cross breeds.

Other Initiatives Taken by India for Genetic/ Breed Improvement

1. **Rashtriya Gokul Mission (2014)**: Launched with the aim of development and conservation of indigenous bovine breeds and **genetic upgradation** of bovine population. Under it, following initiatives have been taken

   a. Implementation of **Nationwide Artificial Insemination Programme**

   b. Accelerated breed improvement programme using bovine **In-Vitro Fertilization technology (IVF)**

   c. **Progeny Testing** and Pedigree Selection Programme to produce high genetic merit bulls.

   d. Delivery of quality artificial insemination services at farmers doorstep through **Multi Purpose Artificial Insemination Technicians in Rural India (MAITRIs).**

   e. Establishment of **breed multiplication farm**.

2. **IndiGau**: India's **first Cattle Genomic Chip** for the conservation of pure varieties of indigenous cattle breeds like, Gir, Kankrej, Sahiwal, Ongole etc.

   a. **Launched by NAIB** (under the aegis of the Department of Biotechnology).

3. **Other initiatives**:

   a. Breed improvement under **National Livestock Mission (NLM), 2014**.

   b. **e-pashuhaat Portal** for connecting breeders and farmers regarding availability of bovine **germplasm**.

- **Germplasm**: Genetic material of an individual that may be transmitted from one generation to another.

   c. **Information Network for Animal Productivity and Health (INAPH)**: Developed by NDDB, facilitates capturing of real time reliable data on Breeding, Nutrition and Health Services.

Key Challenges related with the Genetic Improvement

- Little information on the **performance status** of cattle breeds in their native environment is available
- Five to six generations needed to upgrade the level of improved breed
- Absence of **breeder organizations/ programmes** for each breed.
- Lack of **semon production centers** and research institutes

Conclusion

Launch of Unified Genomic Chip for cattle and indigenous sex-sorted semen technology will help in improving the genetic potential and productivity of the cattle and increase in farmers' income. Also, it will support food security of the country.

Important Indigenous Cattle/Buffaloes Breeds	
Cattle	
Breed	**Breeding Tract**
Gir and Kankrej	Gujarat
Tharparkar and Sahiwal	Punjab and Rajasthan
Badri	Uttarakhand
Deoni, Dangi and Khillari	Maharashtra
Ongole	Andhra Pradesh
Buffalo	
Breed	**Breeding Tract**
Banni and Jaffarabadi	Gujarat
Bhadawari	Uttar Pradesh and Madhya Pradesh
Murrah	Haryana and Delhi
Mehsana	Gujarat and Maharashtra

8. Biobank Laws: Key to Advancing Precision Medicine in India

1. Precision medicine is bringing in a new era of **personalised healthcare**.
2. In India, despite significant advancements in this area, the absence of **strong biobank regulations** poses a key challenge to further progress in precision medicine.

What is meant by the Precision Medicine?

1. **Precision medicine** is an **emerging personalized healthcare approach** that customizes treatment according to a person's genetic makeup, environment, and lifestyle.
2. Precision medicine began with the completion of the **Human Genome Project**.
   a. **Human Genome Project** is a research effort aimed at determining the chemical makeup of the entire human genetic code (genome), and identifying, mapping and sequencing all of the genes of the human genome.
   b. It plays a key role in diagnosing and treating **cancers**, **chronic diseases**, and **immunological**, **cardiovascular**, and **liver diseases**.
3. Emerging technologies like **gene-editing** and **mRNA therapeutics** also contribute to precision medicine.
4. **Key Technological Successes:**
   a. **Gene therapy** restored vision in people with genetic mutations. In the U.K., researchers reversed **diabetes** using reengineered **stem cells**.
   b. **mRNA vaccines** were rapidly developed during the COVID-19 pandemic, earning a **Nobel Prize**.
   c. **Organ-on-chips** allows testing drugs on microfluidic devices replicating human cells, aiding in drug testing.
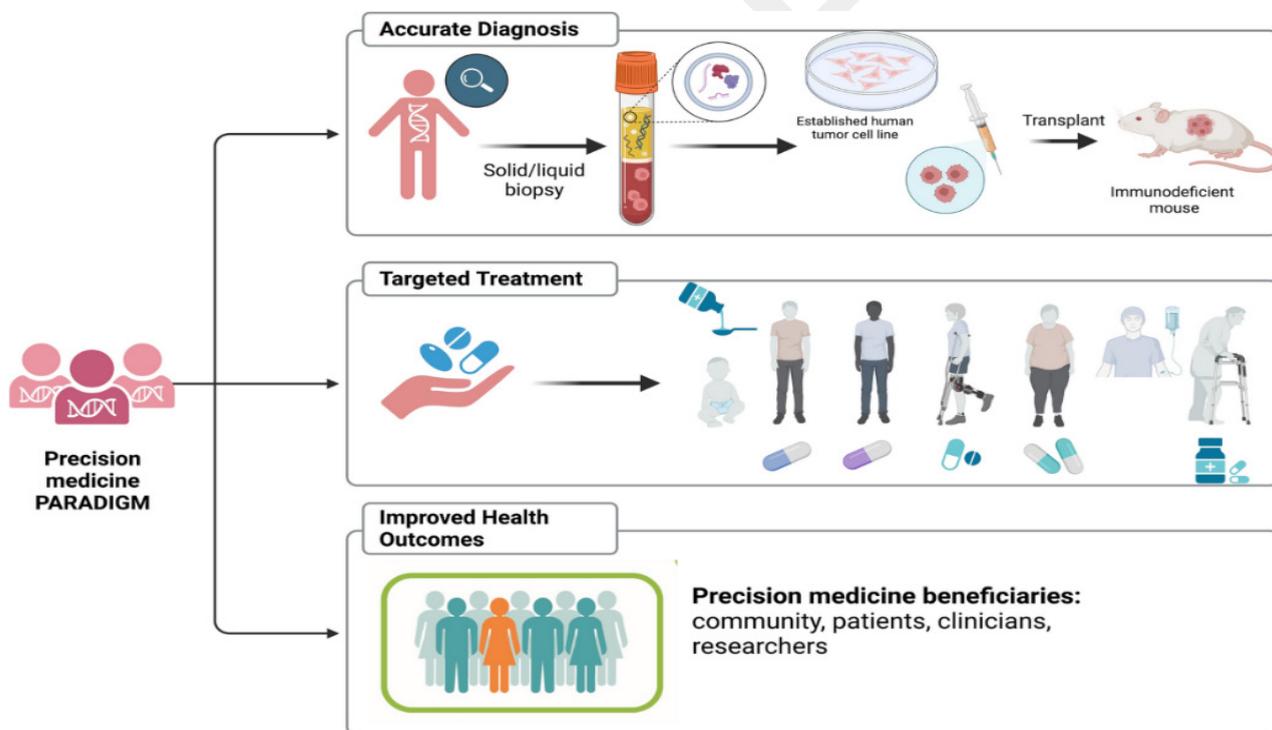
Precision Medicine in India

1. India's **precision medicine market** is growing rapidly and projected to reach over **$5 billion by 2030**.
2. Currently, it contributes **36%** to the **national bioeconomy**, focusing on **cancer immunotherapy**, **gene editing**, and **biologics**.
3. The development of precision therapeutics is also part of the **new 'BioE3' (Biotechnology for Economy, Environment and Employment) Policy**.

a. **BioE3' policy** aims to promote **high-performance biomanufacturing**, which is the use of advanced biotechnological processes to produce products like medicine and materials.

4. **Recent Developments in India:** In **October 2023**, the **Central Drugs Standard Control Organization** approved **NexCAR19**, a domestically developed **CAR-T cell therapy**.

a. **CAR T-cell therapy** (chimeric antigen receptor T-cell therapy) is a type of treatment in which a patient's T cells (a type of immune system cell) are changed in the laboratory so they will attack cancer cells.

Advancements in precision medicine in India:

1. The Indian precision medicine market is estimated to be growing at a CAGR of 16% and will be worth more than $5 billion by 2030.

2. It contributes 36% of the national bioeconomy.

3. **The New 'BioE3' ((Biotechnology for Economy, Environment and Employment)** policy also includes the development of precision therapeutics.

4. **The policy aims to harness the power of biotechnology** and develop new manufacturing methods that **replicate or mimic processes found in natural biological systems.**

5. The BioE3 policy emphasizes **innovation in research and development (R&D) and entrepreneurship, establishing Biomanufacturing, Bio-AI hubs and bio-foundries to** expand India's skilled biotechnology workforce.

6. **This aligns with 'Lifestyle for Environment' programs**, and targets the development of regenerative bioeconomy models.

7. **In 2023,** the Central Drugs Standard Control Organization approved NexCAR19, India's domestically developed CAR-T cell therapy.

8. The Siemens Healthineers, in collaboration with the Indian Institute of Science, Bengaluru, launched new **AI-driven facilities** for precision medicine.

Biobanks in Precision Medicine

1. A **biobank is a repository** of biological samples, such as blood, DNA, cells, tissues, and/or organs alongside their genetic data.

2. Large, diverse biobanks are critical for precision medicine; otherwise, benefits will reach only a limited population.

3. India has **19 registered biobanks** with diverse biological specimens.

4. Major initiatives like the Genome India Project, Phenome India and **Paediatric Rare Genetic Disorders (PRaGeD)** mission have begun collecting large-scale genetic data.

a) Earlier this year, the **'Genome India 'programme** finished sequencing **10,000 genomes from 99 ethnic groups**, to identify treatments for rare genetic diseases, among others.

b) The pan-India 'Phenome India' project has collected 10,000 samples to create better prediction models for cardio-metabolic diseases. The **PRaGeD** mission could help identify new genes or variants to develop targeted therapies for genetic diseases that affect children.

5. However, biobank regulations in India are a significant hurdle to realising the full potential of precision medicine.

Challenges in regulating Biobanks in India:

1. Global standards vs. India's regulatory gaps:

a. The U.K., the U.S., Japan, China, and many European countries have laws or comprehensive regulations addressing several biobanking issues, including informed consent, withdrawal rights, privacy, and data protection.

b. India's regulation of biobanks is inconsistent, with gaps that could undermine public trust and limit the potential of precision medicine.

c. There is a lack of regulations to protect the rights of individuals.

2. Inadequacies in ethical guidelines and data practices:

a. The Indian Council for Medical Research's guidelines for biomedical and health research involving human participants, as well as the Department of Biotechnology's (DBT) practices for data storage and analysis, have many gaps.

- **Example:** Participants are expected to consent to providing samples without knowing how their data will be used and for how long they will be stored.

b. Genetic information can reveal insights about an individual and their family, potentially leading to discrimination.

3. **Lack of Central regulation and penalties:**

- Without a single authority to regulate biobanks and no penalty for misconduct, there is a considerable risk of inconsistencies arising from sample mishandling and ethical violations like data sharing for non-consenting purposes.

4. **Risks of unregulated access to biological samples:**

- Many pharmaceutical companies, including those abroad, will have access to samples from India, as many research projects often require researchers and pharmaceutical companies to collaborate with biobanks during drug discovery and development.

5. **Impact of regulatory gaps on Data ownership and profits:**

- Indians could be deprived of the ownership of biological samples, the data and the profits from the resulting research findings.

Seizing the opportunity for leadership in Bio-banking:

1. **Enhancing public trust through strong protections:**
   a. Vital data, privacy protections and regulatory oversight **by an expert committee will encourage more people** to share samples and participate without worry.
   b. It will also allow research to happen on the right foundations.

2. **India's pharmaceutical diplomacy and global aspirations:**
   a. India is a part of international groups like the Quad and BRICS, **with pharmaceuticals as a critical component of its soft diplomatic initiatives.**
   b. It is a major supplier of generic drugs and a hub of vaccine manufacturing, and it plans to expand its leadership to include next-generation therapeutics.
   c. For this, India will have to **align its biobanking laws with global standards,** which will encourage public participation and trust.

Fostering greater public confidence in biobanking practices will encourage participation in precision medicine research, which in turn will enhance healthcare outcomes for India's population and solidify its role in the global biopharmaceutical landscape.

9. Haber-Bosch Process and Its Impact on Food and the Environment

1. Annually, the **Haber-Bosch process extracts hundreds of millions of tonnes of nitrogen** from the atmosphere to produce fertilizer, contributing 165 million tonnes of reactive nitrogen to the soil.

2. This industrial method vastly **surpasses the amount of reactive nitrogen** naturally replenished by biological processes, estimated between 100 and 140 million tonnes each year.

3. The synthesis of ammonia from nitrogen and hydrogen through this process is essential, as it provides a crucial mechanism to support the increasing global food demand, which could not be met by natural processes alone.

What is the Haber-Bosch Process?

1. The Haber-Bosch process **synthesizes ammonia directly from hydrogen and nitrogen**, developed by **Fritz Haber**.

2. Haber received the **1918 Nobel Prize in Chemistry** for **making ammonia production economically feasible**.

3. **Carl Bosch** scaled it into an **industrial process** using **high-pressure techniques and a catalyst**, earning a **joint Nobel Prize in 1931**. It was the **1st industrial method to use high pressure** for a chemical reaction.

4. **Process:** Nitrogen from the air combines with hydrogen under high pressure and moderate heat. An iron-based catalyst lowers the required temperature, and ammonia is removed as soon as it's formed to maintain equilibrium.
   a. Higher pressure and lower temperature yield more ammonia.

5. It remains the **most cost-effective method for nitrogen fixation** and continues as a cornerstone of the chemical industry worldwide.

How ammonia is made on an industrial scale

Ammonia is made of nitrogen and hydrogen. Under extreme heat, the molecules separate and form a compound, but it is short-lived because of the heat. The German chemist Fritz Haber heated the N2-H2 combination to various temperatures in a platinum cylinder and applied pressure to create ammonia. This graphic demonstrates the Haber-Bosch process

Credit: FRANCIS E. WILLIAMS
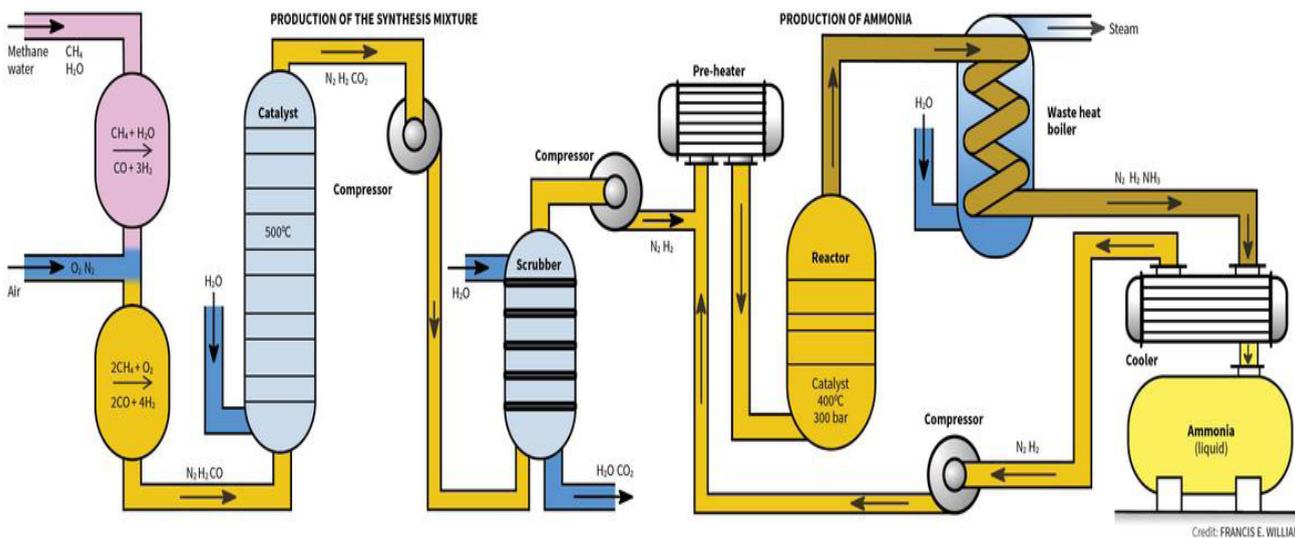
What is the nitrogen molecule?

1. **Composition**: Nitrogen (N2) molecules in the atmosphere contain two nitrogen atoms bound by a strong triple bond, making it nearly unreactive.
2. **Energy Requirement**: Breaking the nitrogen bond requires high energy (946 kJ/mol). Once broken, nitrogen forms reactive compounds like ammonia (NH_3) or nitrates (NO_3^-), essential for plant growth.
3. **Plant Requirement**: Plants need reactive nitrogen to synthesize enzymes, proteins, and amino acids. Healthy plants contain 3-4% nitrogen.

> **Ammonia (NH_3)**, **colourless**, **pungent gas** composed of nitrogen and hydrogen. It is the simplest stable compound of these elements and serves as a starting material for the production of many commercially important nitrogen compounds. The **major use** of ammonia is as a **fertilizer**.

How is nitrogen availed in nature?

1. Among natural things, only lightning has enough energy to destroy the N2 triple bond.
2. In a lightning bolt, nitrogen in the air combines with oxygen to generate nitrogen oxides such as NO and NO2. They can then combine with water vapour to create nitric and nitrous acids (HNO_3 and HNO_2, respectively).
3. Reactive nitrogen-rich droplets fertilize farmlands, woods, and grasslands when it rains. This pathway is estimated to replenish soil by around 10 kg of nitrogen per acre per year.
4. Apart from lightning, a gentle metabolic process carried out by Azotobacter bacteria can also create reactive nitrogen.
5. Some microorganisms such as Rhizobia have developed symbiotic relationships with legume plants (clover, peas, beans, alfalfa, and acacia) to provide reactive nitrogen in exchange for nutrition.
6. Azolla, a species of aquatic fern with a symbiotic association with the cyanobacterium Anabaena azollae, can absorb and convert nitrogen from the air to reactive nitrogen, so dried and decaying Azolla is an effective fertilizer for farmland.

What is the nitrogen cycle?

1. Plants usually get their reactive nitrogen from the soil, where they absorb minerals dissolved in water such as ammonium (NH_4^+) and nitrate (NO_3^-).
2. Humans and animals need nine pre-made nitrogen-rich amino acids from plants. Nitrogen makes up approximately 2.6% of the human body.

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3. The nitrogen ingested by plants and animals returns to the soil through excreta and the decomposition of dead bodies. But the cycle is incomplete: some nitrogen is released back into the environment in molecular form. Nitrogen from human waste is also rarely returned to the fields.

4. Although legumes can produce nitrogen independently, important food crops such as rice, wheat, corn, and potatoes and less well-known crops like cassava, bananas, and common fruits and vegetables draw nitrogen from the soil.

5. As the human population multiplies, nitrogen in agricultural soil depletes faster, needing fertilizers to compensate.

6. Farmers understood this early. They cultivated legumes or fertilized their crops with ammonia to increase output where possible.

7. They also used ammonium-bearing minerals from volcanic eruptions and naturally occurring nitrates found in caves, walls, and rocks as fertilizer.

How is ammonia made?

1. Ammonia (NH_4) is made of nitrogen and hydrogen, both of which exist naturally as two-atom molecules. Under extreme heat, the molecules separate and form a compound, but it is short-lived because of the heat.

2. The reversible reaction $N_2 + 3H_2 = 2NH_3$ (the '=' sign has been used here as a stand-in for bidirectional arrows) must be maintained in specific conditions to harvest considerable amounts of ammonia.

3. The German chemist Fritz Haber heated the N_2-H_2 combination to various temperatures in a platinum cylinder and calculated the amount of ammonia created.

4. He also used hot ammonia to decompose into nitrogen and hydrogen, attempting to approach the equilibrium point from the opposite direction.

5. At 1,000 degrees Celsius, Haber found that harvestable ammonia made up just one-hundredth of 1% of the mixture — too little for commercial production.

6. Then Haber wondered if pressure could be the answer. He calculated that hydrogen and nitrogen would only remain united in extreme conditions: temperatures of 200 degrees Celsius and pressures of 200 atm (that is, 200-times the average air pressure at sea level).

7. But the ammonia production rate was still too slow, so Haber set about looking for a catalyst. He also realised that if he could cool the ammonia to a liquid state, he could collect most of it.

Downsides of Fertilizers

1. **Reduced Crop Yields and Quality:** Imbalanced fertilizer application **can decrease crop yields and quality**, leading to financial losses for farmers.

2. **Soil Degradation:** Overuse or underuse of fertilizers causes **nutrient imbalances**, leading to **soil degradation, erosion**, and **reduced fertility** over time.

3. **Environmental Pollution:** Excess fertilizers result in **nutrient runoff** (nitrogen, phosphorus) **into water bodies**, causing **eutrophication, algal blooms**, and other environmental issues.

4. **Health Risks:** Overuse of fertilizers leads to **nitrate accumulation in crops**, posing health risks when consumed in large amounts.

5. **Environmental Impact:** Excess nitrogen in fertilizers harms the environment by over-nourishing plants, **accelerating biochemical reactions**, and **releasing reactive nitrogen into the atmosphere**.

What is Green Ammonia?

1. Green ammonia is **produced using hydrogen from water electrolysis** and nitrogen from the air.

2. These are **combined in the Haber process**, **powered by renewable electricity**, to produce ammonia (NH_3).

3. The entire process is **100% renewable and carbon-free**.

4. **Uses:**
   a. **Fuel for Engines**: It can replace diesel and marine fuel oil in locomotives and shipping.
   b. **Power Generation**: Used as a fuel source for electricity generation.
   c. **Fertilizer Production**: A key component in making fertilizers for agriculture.
   d. **Industrial Feedstock**: Serves as feedstock for various industries, including water purification and pharmaceuticals.

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10. Streamlining Organ Transplants in India through NOTTO's Central Database

1. In October 2024, the **National Organ and Tissue Transplant Organisation (NOTTO)** have decided to create a **centralized database for patients awaiting cornea and other tissue transplants**.
   - The **cornea** is the transparent front part of the eye that covers the iris, pupil, and anterior chamber.

2. All registered cornea transplant centers and tissue banks, including eye banks, must link to the national registry maintained by NOTTO.

3. **States must share data** on cornea and tissue donations, transplants conducted, and stored corneas and tissues.
   a. They are directed to ensure mandatory linkage of all tissue transplant and banking organizations to this database.

4. **Opt-Out Approach**: The organisation is also considering an opt-out method for cornea donation, whereby anyone who dies in a hospital will be presumed to be a cornea donor unless they register their dissent (refusal).

Actions Against Non-Performing Eye Banks

1. **State Responsibilities**: States must address underperforming eye banks, potentially issuing warnings or declining registration renewals.

2. **Performance Criteria**: Eye banks collecting fewer than 50 eyes or 100 corneas annually could face non-renewal of registration.

3. **THOTA Requirements**: As per the **Transplantation of Human Organs and Tissues Act (THOTA)**, eye banks should collect at least 500 corneas over five years.

Organ Transplantation in India: Overview

1. **Sushruta**, known as the **father of surgery**, performed early plastic surgery and skin grafts **around 600 BC**.

2. The **1st documented modern skin transplant** occurred in **1869**.

3. Transplantation involves replacing organs, tissues, or cells with healthy ones, from the same person or a donor.

4. Transplantable organs include the heart, kidneys, liver, lungs, intestine, and pancreas.

5. **Xenotransplantation**: Involves transplanting cells, tissues, or organs from animals to humans.

Status of Organ Transplantation in India

1. **India ranks 3rd globally** after the USA and China, in the number of transplants each year.

2. Only 4% of patients needing liver, heart, or kidney transplants receive them.

3. Over 3 lakh patients await transplants, with 20 people dying daily due to the shortage, especially of deceased donors.

4. India has developed capacity for rare transplants like pancreas, intestine, limbs, lungs, and uterus, alongside common ones like kidney, liver, and heart.

Organ Allocation in India

1. **Health is a state subject**; each state has a **Nodal Agency** for organ allocation.

2. Nodal agencies connect to state transplant hospitals, managing waiting lists through a digital system.

3. State agencies link to **Regional Organ & Tissue Transplant Organisations (ROTTO)**, which connect to the **National Organ & Tissue Transplant Organisation (NOTTO)** to form a **National Waiting-List Registry**.

NOTTO Annual Report 2023-24

1. **Gender Distribution of Donors:** 63% of living donors are women while 77% of deceased donors are men.

2. **Foreigners' Allocation Rule:** Organs from deceased donors are allocated to foreigners only if no matching Indian patients are available.

3. **Organ Donation Rate:** Remains low at less than 1 per million population.

Steps taken by the government

1. **National Organ Transplant Program (NOTP):** Implemented by the **Directorate General of Health Services**.

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a. Aims to train manpower, promote deceased organ donation, enhance transplant infrastructure, and establish a **Digital National Organ & Tissue Donation and Transplant Registry**.

2. **Legal Framework**

   a. **Transplantation of Human Organs Act (THOA)** enacted in 1994, amended in 2011 as the **Transplantation of Human Organs and Tissues Act (THOTA), 1994**.

   b. The purpose of the act is to regulate organ removal, storage, and transplantation for therapeutic purposes and prevents commercial organ dealings.

   c. The act **recognizes brain stem death as legal death** in India.

3. **Revised Guidelines for Organ Donation and Transplantation (2023)**

   a. **Removed the upper age limit of 65 years** for receiving deceased donor organs.

   b. **Domicile requirement** for organ transplant registration removed, allowing interstate registration.

   c. Implemented under the **National Organ Transplant Program (NOTP)**.

4. **National Organ Transplantation Guidelines**

   a. **Policy**: **"One Nation, One Policy"** for organ donation and transplantation.

   b. **No domicile requirement**: Patients can register for organ transplantation in any state.

   c. **No age limit**: Removed the upper age limit of 65 years for registration to receive organs.

   d. **No registration fees**: States advised not to charge registration fees, aligning with 2014 rules.

5. **National Organ & Tissue Transplant Organisation (NOTTO)**

   a. Established under NOTP.

   b. Responsible for creating a network for organ procurement and distribution.

   c. Maintains a **national registry for organ donation surveillance**.

   d. Includes national networking, a national registry, a biomaterials centre, and a cadaver retrieval facility at Safdarjung Hospital, New Delhi.

6. **Awareness Drives**

   a. Activities include **Indian Organ Donation Day (IODD)**, seminars, workshops, sports events, walkathons, marathons, and NOTTO Scientific Dialogue 2023.

   b. **Angdaan Mahotsav**: Launched in July 2023 to promote awareness about deceased organ donation across the country.

11. Bone Ossification Test and Its Legal Implications

1. **In October 2024**, an accused in the murder case of former Maharashtra **MLA Baba Siddique claimed to be 17 years old.**

2. This raised a legal question about his age, as the **Mumbai Police cited an Aadhaar card** showing he **was 19.**

3. To resolve this, the court ordered a **bone ossification test**, conducted at **J J Hospital**, which confirmed that the accused, **Dharmaraj Kashyap**, **was not a minor.**

What is a Bone Ossification Test?

1. **Ossification** is the **natural process where bones form, starting from the fetus** and continuing into late adolescence.

2. The **bone ossification test** involves taking **X-rays** of **specific bones, especially in the hands and wrists**, to assess bone growth.

3. The **X-ray images are compared with standard images of bone development to estimate a person's age.**

4. **Methodology:** The test focuses on the **growth stages of various bones** in the hands and wrists.

   • A **scoring system** may be used to evaluate **how mature these bones are compared to a population standard.**

Types of Bone Ossification

There are **2 primary types of ossification, or bone formation:**

1. Intramembranous Ossification:

   a. **How It Works**: This process **turns a type of tissue called mesenchyme directly into bone.** Special cells called osteoblasts build the bone by creating a framework of fibers and minerals.

b. **Bones Made**: This method mostly creates **flat bones, like those in the skull and collarbone.**

2. Endochondral Ossification:

a. **How It Works**: This process starts with cartilage, which is a **softer tissue. Osteoblasts come in and replace the cartilage with bone.**

b. **Bones Made**: This method forms most of the **long bones in the body, such as the thigh bone (femur) and the upper arm bone (humerus).**

Visual representation of both processes:

Intramembranous vs. Endochondral
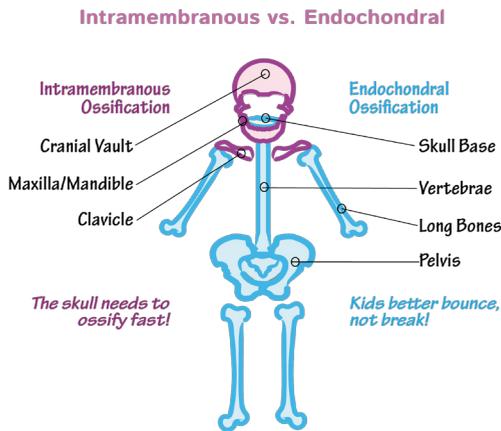
Key Differences:

Feature	Intramembranous Ossification	Endochondral Ossification
Starting material	Mesenchymal tissue	Hyaline cartilage
Process	Direct conversion of mesenchymal tissue to bone	Replacement of cartilage with bone
Resulting bones	Flat bones (e.g., skull, clavicle)	Long bones (e.g., femur, tibia)
Timeframe	Relatively rapid	Slower, occurs over a longer period

Other Methods for estimating age in humans that do not involve ossification:

1. Dental Development

a. **Tooth Eruption**: The timing of when specific teeth emerge can help estimate age, especially in children.

b. **Tooth Wear**: The **degree of wear on teeth can provide clues about age, as wear patterns change over time.**

2. **Radiographic Methods**

a. **Dental X-rays**: These can show the development of teeth and jaw structures.

b. **Other X-rays**: General bone **X-rays can help assess age-related changes in bone structure.**

3. **Physical Development**: Tracking growth spurts in height and **weight can indicate age, particularly in children and adolescents.**

4. **Histological Analysis:** Examining **tissue samples under a microscope can reveal age-related changes in bone and other tissues.**

5. **Biochemical Markers:**

a. **Blood Tests**: Certain **biomarkers in blood can correlate with age, such as levels of specific proteins or hormones.**

b. **Telomere Length**: Measuring the length of telomeres **(protective caps on DNA) can provide insights into biological age.**

6. **Dental Cementum Analysis:** Analyzing the layers of cementum on teeth can help estimate age, as cementum forms in layers throughout life.

Importance of Age Determination in Criminal Justice:

1. In India, people under **18 years** are considered minors and are protected under the **Juvenile Justice (Care and Protection of Children) Act, 2015**.

2. Minors are **treated differently in the legal system,** with a focus on rehabilitation instead of punishment.

3. Instead of adult courts, minors appear before a **Juvenile Justice Board (JJB)**, which can **recommend options like community service or placement in a special home.**

Legal Framework Post-2021 Amendment:

The **2021 amendment** to the **J J Act** requires that **for children over 16** accused of **serious crimes, an initial assessment** of their ability to understand their actions is needed to decide **if they should be tried as adults.**

Court's Stance on Bone Ossification Test

1. Under **Section 94** of the **J J Act**, if it is **clear that someone looks like a minor, the JJB can proceed without age confirmation**.

2. However, **if there are doubts, an age determination must be done.**

3. Acceptable evidence for age includes:
    a. **School certificates**
    b. **Birth certificates from local authorities**
4. **If no documents are available, an ossification test may be done**, but **only** as a last option.

Judicial Observations

1. Courts have said that **ossification tests should not replace existing documents** that prove age.
2. The Supreme Court has said that **ossification tests should be the last method** used after trying other ways to confirm age.

Reliability of Bone Ossification Tests

1. The accuracy of ossification tests **can be influenced by how different people mature.**
2. Tests usually provide an age range (**e.g., 17-19 years**), and courts have to decide how to interpret these ranges.
3. For example, the **Delhi High Court** ruled that in cases under the **POCSO Act**, the **upper limit of the age range should be used, along with a two-year margin of error.**

Conclusion

The recent use of a bone ossification test in the Baba Siddique murder case highlights the challenges of determining age in the legal system. While these tests provide useful information, their reliability can vary, making it important for courts to consider scientific findings alongside existing documents. As laws change, courts must find a balance between scientific results and legal principles to ensure fair treatment for everyone in the justice system.

12. India Eliminated Trachoma as a Public Health Problem:WHO

1. In October 2024, the **World Health Organization (WHO)** has **officially recognized India** for **eliminating Trachoma**, an eye disease caused by a bacterial infection, as a public health issue.
2. India became the **3rd country in the Southeast Asian region**, to successfully eliminate trachoma.
3. India has now joined **Nepal and Myanmar as well as 19 other countries** globally that have previously achieved this feat.

What is Trachoma?

1. Trachoma, caused by **bacterium Chlamydia Trachomatis**, is a **contagious bacterial eye infection** that can lead to **irreversible blindness** if untreated. It is caused by **poor hygiene and unclean water**.
2. It **spreads through direct contact** with secretions of infected individuals (via hands, clothes, bedding or hard surfaces) or **indirectly via flies** and remains a **leading infectious cause of blindness** worldwide.
3. With repeated episodes of infection over many years, the eyelashes may be drawn in so that they rub on the surface of the eye. This causes pain and may **permanently damage the cornea.**
4. It is a **public health problem in 39 countries** and is responsible for the blindness or visual impairment of about **1.9 million people**.
5. In 2023, **1.3 million people received surgical treatment** for advanced stage of the disease, and **33 million people** were **treated with antibiotics**. **Global antibiotic coverage** in 2023 was **29%**.
6. Trachoma is hyperendemic in many of the poorest rural areas of Africa, Central and South America, Asia, Australia, and the Middle East. Africa remains the most affected continent.

Prevention and Control

1. Endemic countries are implementing WHO's **SAFE strategy**, which includes:
    a. **Surgery** for trachomatous trichiasis (blinding stage),
    b. **Antibiotics** (azithromycin) for mass drug administration,
    c. **Facial Cleanliness** to reduce infection spread,
    d. **Environmental Improvement**, focusing on water and sanitation.
2. WHO adopted the SAFE strategy in **1993** and launched the **Global Elimination of Trachoma by 2020** initiative in **1996**. The World Health Assembly's resolution in **1998** set the elimination goal for 2020.
3. The target was updated to **2030** in the **Neglected Tropical Diseases (NTDs) Road map 2021–2030**. WHO leads international efforts to eliminate trachoma and supports member states through surveys, monitoring, and resource mobilization.

How did India achieve this milestone?

1. In the 1950s and 1960s, trachoma was a major public health issue, affecting over 50% of the population in states like Gujarat, Rajasthan, Punjab, Haryana, Uttar Pradesh, and Nicobar Islands.

2. By 1971, it caused 5% of all blindness cases in India.

Trachoma Spread in India

1971	2005	2017	2018	2024
Trachoma caused 5% of blindness cases in India	Reduced to 4% of all blindness cases	India declared free from infective trachoma, with only 0.7% prevalence	Trachoma prevalence dropped further to 0.008%	India Achieves Trachoma-Free Status
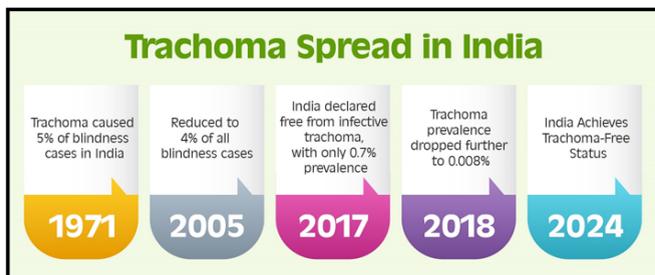
Initiatives to Combat Trachoma

1. India's efforts were driven by the **National Programme for Control of Blindness and Visual Impairment (NPCBVI)** and the adoption of the **WHO SAFE strategy**, focusing on treatment and prevent future infections.

2. **National Trachoma Control Program (1963)**: Supported by **WHO** and **UNICEF**, it addressed trachoma through:
   a. **Surgical Treatment**: Addressing the blinding stage of the disease, known as trachomatous trichiasis.
   b. **Antibiotic Distribution**: To treat existing infections.
   c. **Facial Cleanliness**: Promoted hygiene to reduce spread.
   d. **Environmental Improvements**: Enhancing access to water and sanitation.

3. **Integration into National Programs (1976)**: Ensured sustained resources for elimination efforts.

4. **Significant Progress**: By 2005, trachoma caused only 4% of blindness. By 2018, this dropped to 0.008%, confirmed by assessments and surveys.

Elimination of Trachoma

1. **Success Declared in 2017**: India was declared **free from infective trachoma** in **2017**, based on the **National Trachoma Survey Report (2014-17)**.
   a. Active infections among children fell to just 0.7%, far below WHO's 5% elimination threshold.

2. **Continued Vigilance (2019-2024)**: India continued surveillance from 2019 to 2024, ensuring no re-emergence of the disease and maintaining its trachoma-free status.
   a. India now stands alongside **Nepal, Myanmar**, and **19 other countries** that have also **successfully eliminated trachoma** as a public health issue.

Neglected Tropical Diseases (NTDs)

1. NTDs are a group of infections primarily affecting marginalized communities in Africa, Asia, and the Americas. They are caused by various pathogens including viruses, bacteria, protozoa, and parasitic worms.

2. NTDs are common in tropical areas where people do not have access to clean water or safe ways to dispose of human waste.

3. These diseases generally receive less funding for research and treatment than malaises like tuberculosis, HIV-AIDS and malaria.

4. **Examples of NTDs:** Snakebite envenomation, Scabies, Yaws, Trachoma, Leishmaniasis, Chagas disease.

5. About 40% of people require interventions against NTDs in India which is highest in the world.

6. WHO certified India as free of Guinea Worm disease (2000) and Yaws (2016).

7. India has the world's largest absolute burden of at least 10 major NTDs- hookworm, dengue, lymphatic filariasis, leprosy, kala-azar and rabies, ascariasis, trichuriasis, trachoma and cysticercosis.

13. Jordan: 1st Country to Eliminate Leprosy

1. Recently, **Jordan became the first country to eliminate leprosy**, receiving official verification from the **World Health Organization (WHO)**.

2. This achievement shows Jordan's commitment **to eradicating leprosy, a disease that has afflicted humanity for centuries.**

World Leprosy Day (WLD)

1. Every year WLD is celebrated on the last Sunday of January.

2. The theme for World Leprosy Day 2024 is "Beat Leprosy".

3. In **India, National Anti Leprosy Day** is observed on **30th January every year**, i.e., Mahatma Gandhiji's martyrdom day, as Gandhiji was deeply committed to the cause of leprosy.

What is Leprosy

1. **Leprosy**, or **Hansen's disease**, is a chronic infectious disease caused by the slow-growing bacterium **Mycobacterium leprae**.

2. It has a long incubation period, with symptoms potentially appearing **five to 20 years** after infection.

3. It primarily affects the skin, nerves, and respiratory tract.

4. Though **curable**, leprosy has historically been associated with **social stigma, leading to the ostracism of those affected.**

   a. **Ostracism :** The **action of intentionally not including someone in a social group or activity:** AIDS patients often experience social ostracism and discrimination.

Current Status:

1. According to the WHO, **202,185 new leprosy cases** were reported globally in 2019, with **India, Brazil, and Indonesia accounting for the majority.**

2. Leprosy **can be completely treated with multi-drug therapy (MDT),** but misunderstandings and stigma still slow down efforts to fully eliminate it.

Jordan's Path to Elimination: Key Strategies and Interventions:

1. **Public Health Campaigns**:

   a. Emphasis on early detection and treatment to prevent complications and promote timely intervention.

2. **Access to Treatment**:

   a. Implementation of **multi-drug therapy (MDT)**, a **combination of antibiotics proven effective against leprosy.**

   b. Provision of **free treatment** to all citizens through the public healthcare system.

3. **Training of Healthcare Workers**:

   a. Training programs to equip health workers with skills to identify early symptoms of leprosy and administer appropriate treatment.

   b. Ensuring healthcare personnel were available in even the most remote areas to facilitate access.

4. **Surveillance Systems**:

   a. Establishing robust systems to monitor and track leprosy cases, ensuring isolated cases were effectively managed.

   b. Continuous monitoring of trends to identify any resurgence of the disease.

5. **Community Reintegration Programs**:

   a. Developing initiatives to assist those cured of leprosy in **reintegrating into society.**

   b. **Providing vocational training and psychological support** to overcome social barriers.

Jordan (Capital: Amman)
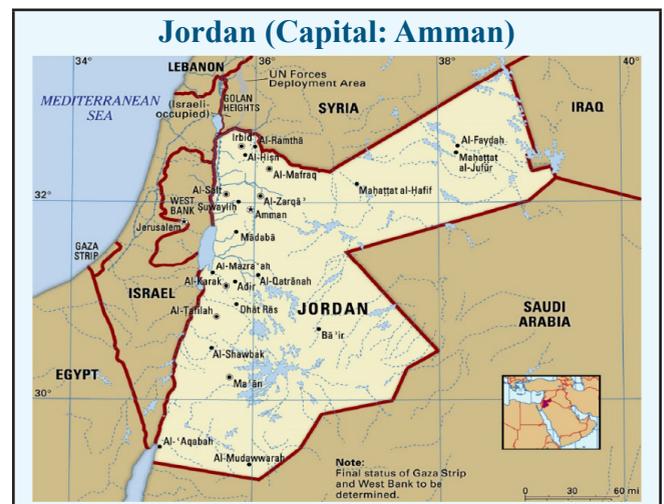
Political features
- **Location:** in the north of the Arabian Peninsula and in West Asia.
- **Bordering nations:** Syria, Iraq, Saudi Arabia, Israel, Palestine (West Bank).
- **Bordering water bodies:** Jordan river, Dead Sea and Gulf of Aqaba

Geographical features
- **Highest Point:** Jabal Umm Ad Dami
- **Rivers:** Yarmūk River, Jordan River.

Leprosy Mukt Bharat by 2027, three years ahead of the SDG

On 30th January, 2023, the Government of India has launched National Strategic Plan (NSP) & Roadmap for Leprosy (2023-27), to achieve zero transmission of leprosy by 2027 i.e. three years ahead of the UN Sustainable Development Goal (SDG) 3.3.

- Notable, India has achieved the elimination of leprosy as a public health problem **as per WHO criteria of less than 1 case per 10,000 population** at the National level in 2005. However, there are few districts within States where leprosy is still endemic.

14. Global Tuberculosis Report 2024

In October 2024, the **World Health Organization** has published the **Global Tuberculosis Report 2024** which is released annually.

What is Tuberculosis?

1. Tuberculosis (TB) is a **bacterial infection** caused by an organism called **mycobacterium tuberculosis,** which **mainly affects the lungs**, but can also impact other parts of the body.
2. TB **spreads through the air**, particularly in **close contact** with an infected person in crowded or poorly ventilated spaces.
3. **Symptoms:** Symptoms of active TB in the lungs include - cough with sputum or blood, chest pain, weakness and weight loss, fever and night sweats
4. **Treatment**: TB is treated with a **6-month course** of **four antimicrobial drugs**, administered with supervision and support from health workers or trained volunteers.

5. **Drug Resistance**: Resistance to TB drugs has been found globally.
   a. **Multidrug-Resistant TB (MDR-TB)**: Caused by bacteria resistant to the primary TB drugs, **isoniazid** and **rifampicin**. MDR-TB can be treated with 2nd-line drugs like **bedaquiline**.
   b. **Extensively Drug-Resistant TB (XDR-TB)**: A **severe form of MDR-TB** where bacteria do not respond to most 2nd-line drugs which limits the treatment options.
6. **HIV and Antimicrobial Resistance**: TB is the top cause of death among those with HIV and significantly contributes to antimicrobial resistance.

Key Highlights of the Global Tuberculosis Report 2024

1. **Record High TB Diagnoses**: In 2023, **8.2 million** people were **newly diagnosed** with TB, marking the **highest number recorded** by WHO since 1995. This is a notable rise from the **7.5 million new cases in 2022**.
2. **TB Deaths**: TB deaths in **2023** were estimated at **1.25 million** which is a **decrease** from **1.32 million in 2022** and shows a **steady decline** since the COVID-19 pandemic peak.
3. **TB Burden in Low-and Middle-Income Countries: 30 low-and middle-income countries** account for **87% of global TB cases**.
   a. **Top Five Contributors**: **India** - 26%, **Indonesia** - 10%, **China** - 6.8%, **Philippines** - 6.8%, **Pakistan** - 6.3%.
   b. These five countries collectively make up **56% of global TB cases**.
4. **Demographics of TB Patients:** Gender and Age Distribution across the globe are-
   a. **55%** of TB patients were **men**
   b. **33%** were **women**
   c. **12%** were **children and young adolescents**
5. **Key Risk Factors for TB**: Undernutrition, HIV infection, Alcohol use disorders, Smoking, Diabetes

Key Insights on India's Situation

1. **Improvement in Diagnosis**: The estimated number of tuberculosis cases in India slightly decreased in 2023 but the reported cases increased which is a positive sign that diagnosis gaps are closing.

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2. **India's TB Cases and Deaths in 2023**: India had around **28 lakh TB cases**, representing **26% of global cases**.

   a. **TB-Related Deaths**: Estimated at **3.15 lakh** which accounted for **29% of the global TB deaths**.

   b. Despite some reduction in cases and deaths, India still remains far from its TB elimination Target.

3. **TB Incidence Rate**: The **incidence rate of TB** per population also **decreased** in India, from 275 cases per 100,000 people in 2010 to 195 cases in 2023.

   a. However, there was an **increase in notified TB relapse cases** in 2023, marking the **highest level of relapses since 2010**. Most relapse cases were seen in **men**.

   b. A relapse of tuberculosis (TB) is when a patient who was previously treated for TB and declared cured experiences a re-emergence of clinical symptoms. This can happen even if the initial treatment was effective.

4. **Reduced Diagnosis Gap**: The gap between estimated cases and actual reported cases in India is narrowing.

   a. India reported **25.2 lakh TB cases** in 2023 which are higher from 24.2 lakh in 2022.

   b. **India** and **Indonesia** together accounted for **45% of the increase** in globally reported cases between 2021 and 2023, highlighting significant improvements in diagnosis.

5. **Progress Towards WHO End TB Targets**: India achieved only an **18% reduction in TB cases** between 2015 and 2023, which is short of the **50% reduction goal set for 2025**.

   a. TB-related deaths **decreased by 24%**, which still falls short of the **75% reduction target by 2025**.

6. **Preventive Treatment and High-Risk Groups:** The number of people receiving preventive TB treatment has been **steadily increasing**.

   a. High-risk groups include individuals with: **Nutritional deficiencies, Diabetes, Smoking habits**

7. **Funding for TB:** The funding for TB in India has been **declining**. Domestic funding in India has decreased from $345 million to $253 million.

8. **Health Expenditure:** Health expenditure per capita has **substantially increased** between 2000 and 2021 in several lower-middle-income countries, including **India**. This aims to support **universal health coverage**.

9. **National TB Prevalence Survey: India is among three countries** to have completed a **national TB prevalence survey** since 2019, strengthening its data for addressing TB.

Initiatives for Tuberculosis Elimination

Global Initiatives

1. **"Find. Treat. All. #EndTB" Initiative**: A collaborative effort by the **World Health Organization (WHO)**, the **Global Fund**, and the **Stop TB Partnership** to find and treat all TB cases and work toward ending TB globally.

2. **Global Plan to End TB (2023-2030)**: This plan is provided by '**Stop TB Partnership**' and aims to **end TB as a public health threat by 2030**. It is supported by **all UN member states** and aligns with **WHO's objectives**.

3. **End TB Strategy**: Part of **UN Sustainable Development Goal 3.3**, this strategy broadens the global effort to eliminate TB and includes ambitious targets for TB reduction.

4. **#ENDTB Strategy (WHO Initiative): Global Goals for 2035** -

   a. **95% reduction in TB deaths** compared to 2015 levels.

   b. **90% reduction in TB incidence rate** relative to 2015.

   c. **Zero families facing catastrophic costs** due to TB by 2035.

India's Initiatives

1. **National Tuberculosis Elimination Programme**: India aims to reduce TB burden and eliminate the disease by **2025**, five years before the global target of **2030**.

2. **National Strategic Plan (2017-2025)**: India aims to reduce TB incidence to **less than 44 new cases** or **65 total cases** per lakh population **by 2025**.

3. **Pradhan Mantri TB Mukt Bharat Abhiyan**: A national mission focused on making India TB-free.

4. **TB Harega Desh Jeetega Campaign**: A campaign aimed at increasing TB awareness and encouraging public participation in fighting TB.

5. **Free TB Medicines**: The government provides **free medicines for TB treatment**. It is very crucial because TB drugs can be costly and treatment may last up to **two years**.

6. **Ni-kshay Portal**: An **online Ni-kshay portal** tracks notified TB cases for better monitoring. Through the **Ni-kshay Mitra program**, community members can adopt TB patients and provide them with **monthly nutritional support**.

7. **National TB Call Centre – Ni-kshay SAMPARK**: This call center addresses **TB-related questions** and provides **tele-counselling** to patients on treatment procedures.

15. Marburg Virus Disease

1. In October 2024, Rwanda was facing a critical health crisis due to an outbreak of the Marburg virus.

2. This outbreak significantly threatens **Rwanda's already fragile healthcare system,** particularly given that about **80% of infections** have been among medical workers.

What is Marburg Virus disease :

1. The **Marburg virus** is a rare and dangerous virus that causes a severe illness in humans, known as **Marburg virus disease (MVD).**

2. **MVD**, formerly known as Marburg haemorrhagic fever.

3. It belongs to the same family of viruses as **Ebola**, called **Filoviridae**.

4. The virus is usually transmitted to humans from animals, especially **fruit bats**, which are believed to be the natural hosts.

5. The first known outbreak occurred in **1967** in Marburg, Germany.

6. Since then, outbreaks have mainly been reported in Africa, with notable incidents in **Angola, the Democratic Republic of the Congo, and Uganda.**

Transmission of Marburg Virus Disease (MVD)

1. **Initial Infection:**
    a. Historically, MVD infections originated from **Rousettus bats**, particularly the **Egyptian fruit bat**, through exposure in mines or caves where these bats reside.

2. **Human-to-Human Transmission:**
    a. The virus spreads via:
        i. **Direct contact:** Through **bodily fluids (blood, saliva, vomit) of infected individuals.**
        ii. **Indirect contact: Through contaminated** surfaces, materials, or objects, such as bedding and clothing.

3. **Healthcare Risks:**
    a. Medical workers are particularly vulnerable during outbreaks, especially when infection control measures are insufficient.

Symptoms of Marburg Virus Disease (MVD)

1. **Incubation Period:**
    a. Symptoms may develop within **2 to 21 days** following infection.

2. **Initial Symptoms:**
    a. **Common early symptoms include**: High fever, Severe headache, Muscle aches, Severe watery diarrhea, Abdominal pain and cramping and Vomiting

3. **Haemorrhagic Symptoms:**
    a. Many patients experience bleeding, which can occur in multiple locations such as: Digestive tract (leading to bloody diarrhea and vomiting), Nose, Gums and Vagina
    b. Fatalities often occur **8 to 9 days** after symptoms begin due to severe blood loss and shock.

Prevention and Treatment:

1. **Current Medical Response:**
    a. As of now, there are **no approved vaccines or specific treatments** for MVD.
    b. **Supportive Care:** Rehydration (oral or intravenous) and management of symptoms are critical for improving survival rates.

2. **Experimental Treatments:**
    a. Rwanda's Health Minister has indicated that the country is seeking **experimental vaccines and treatments.**
    b. The **Sabin Vaccine Institute** has provided **700 doses** of its **experimental Marburg vaccine,** which will be prioritized for healthcare workers.

16. Murine Typhus

A **75-year-old man from Kerala** has been diagnosed with murine typhus after returning from a trip to Vietnam and Cambodia.

a. This is the **first reported case** of this **rare bacterial disease in the state.**

About Murine Typhus:

1. It is an infectious disease caused by the flea-borne bacteria **Rickettsia typhi.**

2. **Transmission**:

   a. It is transmitted to humans through the bites of infected fleas.

   b. It is also known as endemic typhus, flea-borne typhus or flea-borne spotted fever.

   c. Rodents like rats, mice and mongoose, are known to be reservoirs of the disease.

   d. The disease-carrying fleas can also live on other small mammals, including pets such as cats and dogs. Once a flea is infected, it can spread the disease for the rest of its life.

   e. Transmission can also happen through exposure of mucous membranes to infected flea faeces.

3. It is spread when infected flea faeces come into contact with cuts or scrapes in the skin.

4. Murine typhus is not spread from one person to another, or from person to fleas.

5. The disease has been reported in coastal tropical and subtropical regions, where rats are prevalent.

6. In India, cases of murine typhus have been reported in the Northeast, Madhya Pradesh and Kashmir.

7. **Symptoms**

   a. The symptoms usually appear seven to 14 days after the exposure and include fever, headaches, body aches, joint pains, nausea, vomiting, and stomach aches.

   b. Some people may later develop rashes on the skin, days after the initial symptoms.

8. **Treatment**

   a. There is no vaccine currently available against the disease.

   b. The antibiotic doxycycline is considered effective in therapy, but early diagnosis is vital for treatment.

What is Next Generation Sequencing (NGS)?

Next Generation Sequencing **(NGS) is a set of advanced sequencing technologies that allow for the rapid and efficient sequencing of DNA and RNA.** Unlike traditional methods, which can be **time-consuming and expensive, NGS enables the simultaneous sequencing of millions of fragments of DNA**, making it **much faster and more cost-effective.**

Key Features of NGS:

1. **High Throughput**: NGS can **sequence millions of DNA fragments at once, providing a vast amount of data in a single run.**

2. **Cost-Effectiveness**: The price per base of sequencing has decreased dramatically, making it accessible for a wide range of applications.

3. **Speed**: NGS can produce results in days or even hours**, compared to weeks or months for older methods.**

4. **Versatility**: It can be used for various applications, including **whole genome sequencing, targeted sequencing, RNA sequencing, metagenomics, and epigenomics.**

5. **Data Analysis**: NGS generates large datasets that **require sophisticated bioinformatics tools for analysis**, which can **provide insights into genetic variations, gene expression, and more.**

Applications:

1. **Clinical Genomics**: Used in diagnostics and personalized medicine.

2. **Cancer Research**: Helps in identifying mutations and understanding tumor genomics.

3. **Microbial Genomics**: Allows for studying the diversity of microbial populations.

4. **Agrigenomics**: Used in plant and animal breeding for trait selection.

Overall**, NGS has revolutionized genomics, enabling researchers to explore genetic information at an unprecedented scale and detai**l.

F. GEOGRAPHY & ENVIRONMENT

1. Greenwashing Guidelines: How the Government is Tackling Misleading Environmental Claims

1. To stop companies from making false or misleading claims about their products **being eco-friendly,** the **Union Government introduced new guidelines on 15th Oct, 2024.**

2. These guidelines **require companies to support their claims with scientific proof.**

3. The **Guidelines for Prevention and Regulation of Greenwashing** were **issued by the Central Consumer Protection Authority (CCPA)**, which operates under the **Consumer Affairs Ministry.**

4. This move is **part of the government's effort to combat misleading advertisements.**

What is Greenwashing?

1. **Greenwashing is the practice of making false or misleading claims about a company's environmental impact.**

2. The **term "greenwashing" is often linked to Jay Westerveld, an environmentalist who wrote an essay in 1986** criticizing hotels that encouraged guests to **reuse towels to save the environment.**

3. The **term is a combination of "green" and "whitewashing".**

4. **Examples of greenwashing:**
   a. **Misleading labels**: Using labels like **"green" or "eco-friendly"** without clear definitions
   b. **Efficiency claims:** Claiming to be more energy efficient without reducing overall energy production
   c. **A notable example of greenwashing is the 2015 Volkswagen scandal,** where the German car company was found to have cheated on emissions testing for its supposed eco-friendly diesel vehicles.
   d. Several other major corporations, including **Shell, BP, and Coca-Cola, have also faced accusations of greenwashing.**

5. **Greenwashing can be harmful to the environment and misleading to consumers**.

Can Countries also be accused of greenwashing?

1. **Yes, Countries can also be accused of greenwashing.**

2. For instance, **they might mislead how much carbon dioxide their forests can absorb or misrepresent** the impact of new regulations on carbon emissions.

3. **Carbon trading, while a legitimate practice,** often comes under scrutiny because the methods used to generate trade credits may not be scientifically sound.

4. However, **more often, they lie or mislead, which are more serious cases of greenwashing.**

5. This problem has become so widespread that **United Nations Secretary-General António Guterres called for a zero-tolerance policy on greenwashing a few years ago.**

6. The **UN also set up a group of experts to suggest ways to reduce greenwashing by non-state entities,** such as companies and cities that claim to have net-zero emissions.

What Are the Advertising Guidelines for Preventing Greenwashing?

1. The **CCPA's role is to protect consumer interests, so its guidelines focus on stopping greenwashing in product or service advertisements.**

2. They define **greenwashing as "any deceptive or misleading practice"** that hides, omits, or **exaggerates important information or makes vague claims about a product's environmental benefits.**

3. Using **misleading words, symbols, or images to highlight positive environmental aspects while downplaying or hiding negative ones** would also be considered greenwashing according to the guidelines.

4. However, the guidelines allow the use of **"obvious exaggerations" or "puffery," which are common in advertising**, as long as they don't mislead.

a. For example, if a **company states that its growth is based on "sustainable principles,"** it would not be seen as a misleading environmental claim.

b. But if the company claims that **all its products are made sustainably, that claim would be examined for greenwashing.**

5. Generic terms like **"clean," "green," "eco-friendly," "good for the planet," "cruelty-free," "carbon neutral," "natural," "organic," and "sustainable"** can only be used if the company can provide evidence to back these claims.

6. The company must also **use "adequate and accurate" qualifiers and disclosures when advertising such descriptions.**

7. When companies use more technical terms like **"environmental impact assessment," "greenhouse gas emissions," or "ecological footprint,"** they must **explain these terms** and their implications in simple language that consumers can easily understand.

8. Specific claims such as **"compostable," "degradable," "non-toxic," "100 percent natural," "recyclable," "refillable," "renewable," "plastics-free," "plastic-positive," "climate-positive," and "net-zero"** must be supported by credible certification, reliable scientific evidence, or certificates from independent third-party verification.

9. The guidelines apply to all environmental **claims made by manufacturers, service providers, or traders in their advertisements**, as well as to advertising agencies or endorsers involved in promoting those goods or services.

10. The rules state, **"No person to whom these guidelines apply shall engage in greenwashing and misleading environmental claims."**

When did the Government start drafting these rules ?

1. The government began drafting these guidelines in **November 2023 by forming a committee.**

2. The committee held **3 meetings and submitted a draft earlier in 2024.**

3. After releasing the **draft for public comments, the government finalized the guidelines.**

About The Central Consumer Protection Authority (Ccpa):

1. The **CCPA has been established under the Consumer Protection Act, 2019.**

2. It has come into **force w.e.f 24th July 2020** to regulate matters r**elating to violation of rights of consumers, unfair trade practices** and false or misleading advertisements which are prejudicial to the interests of consumers as class and public at large.

POWERS OF CENTRAL CONSUMER PROTECTION AUTHORITY (CCPA) :

1. To protect, promote and enforce the rights of consumers as a class, and **prevent violation of consumers rights under this Act;**

2. To prevent unfair trade practices and ensure that no person engages himself in unfair trade practices;

3. To ensure that **no false or misleading advertisement is made of any goods or services** which contravenes the provisions of this Act or the rules or regulations made thereunder;

4. To ensure that no person takes part in the publication of any advertisement which is false or misleading.

UPSC Prelims 2022 Question:

Q. Which one of the following best describes the term "greenwashing"?

1. Conveying a false impression that a company's products are eco-friendly and environmentally sound

2. Non-inclusion of ecological/environmental costs in the Annual Financial Statements of a country

3. Ignoring the disastrous ecological consequences while undertaking infrastructure development

4. Making mandatory provisions for environmental costs in a government project/programme

Correct Answer: Option 1)

2. First Global Nature Conservation Index (NCI), 2024

In October 2024, the **World Wildlife Fund (WWF)** released its **1ˢᵗ-ever Global Nature Conservation Index (NCI) 2024**, ranking India **176ᵗʰ** with a low score of **45.5 out of 100**.

a. This places India among the five worst performers alongside: **Kiribati (180), Turkey (179), Iraq (178), Micronesia (177).**

About the Nature Conservation Index (NCI)

1. The **NCI** is a newly launched index that evaluates countries' conservation efforts based on **four key criteria**:
   a. **Land Management**
   b. **Biodiversity Threats**
   c. **Capacity and Governance**
   d. **Future Conservation Trends**
2. Developed collaboratively by the **Goldman Sonnenfeldt School of Sustainability and Climate Change** at **Ben-Gurion University of the Negev** and **BioDB.com**, a biodiversity-focused non-profit.
3. The NCI offers a **data-driven** approach for assessing conservation and development balance.
4. **Purpose of the NCI:** The **Nature Conservation Index** serves as an **objective tool** to:
   a. Assess **conservation performance** at the national level
   b. Aid **governments, researchers, and organizations** in identifying conservation issues
   c. Support efforts to **improve policies** for long-term **biodiversity protection**

Global Wildlife Decline: Key Findings

1. According to the **World Wildlife Fund (WWF)**, global wildlife populations have seen a drastic **73% decline** over the past 50 years. Human activities have pushed nature to an unprecedented crisis, with impacts on:
   a. **75% of Earth's land**
   b. **66% of marine environments** (IPBES report)

2. This significant biodiversity loss and climate change push humanity close to a critical threshold, raising serious concerns for the future.
3. **Performance of Major Economies:** The **US** ranked **37ᵗʰ** with a score of **60.13**, covering **13%** of its land as protected areas. However, **41% of ecosystems**, **40% of animal species**, and **34% of plant species** face serious extinction risks.
   a. **China** ranked **164ᵗʰ** with a score of **48.34**, reflecting the impact of rapid economic growth and urbanization on its environment.
   b. Despite this, China has set up **2,538 nature reserves** covering **15.13% of its land** to address biodiversity threats.
4. **Bhutan - A Regional Leader in Conservation:** **Bhutan**, a global biodiversity hotspot, ranks **15ᵗʰ** globally with a score of **63.1**.
   a. Over **51% of its land** is protected, the highest percentage in Asia, driven by Bhutan's **Gross National Happiness** philosophy that emphasizes environmental protection.
5. **Top Performers in Nature Conservation:** The **NCI 2024** reveals that **Europe** leads in conservation, with **seven countries** among the top performers. **Luxembourg** ranks highest, scoring **70.8 out of 100**.
6. **Challenges for Low-Performing Countries:** Countries in Oceania, the Middle East, Asia, and Africa face substantial biodiversity loss due to resource exploitation, pollution, and deforestation.

India's Status in Index

1. **Land Conversion Issues: 53% of land** in India is converted for urban, industrial, and agricultural uses, significantly impacting **natural habitats**.
2. **High Pesticide Use and Soil Pollution:** The report warns of **high pesticide usage** and **soil pollution**, reflected by a **Sustainable Nitrogen Index of 0.77**. This calls for urgent improvements in **soil health**.
3. **Limited Marine Conservation:** Only **0.2% of waterways** in India are protected, with **no protected areas in the Exclusive Economic Zone (EEZ)**, highlighting critical gaps in **marine conservation**.
   a. Although **7.5%** of India's terrestrial area is protected, marine conservation remains a pressing need.

4. **Habitat Loss and Fragmentation: Deforestation, urbanization, and infrastructure** development lead to severe **habitat fragmentation**. Between **2001 and 2019**, India lost **23,300 sq. km of tree cover**.

5. **Species Decline in Protected Areas: Protected Areas (PAs)** cover **40% of marine species** and **65% of terrestrial species**. However, **67.5% of marine** and **46.9% of terrestrial species** show a population decline despite this protection.

6. **Illegal Wildlife Trade:** India ranks as the **4th-largest illegal wildlife trader**, with an annual trade turnover of approximately **£15 billion**.

7. **India's Challenges in Meeting SDGs:** The report emphasizes India's struggle to meet **Sustainable Development Goals (SDG)**:
   a. **SDG 14 (Life below water)**
   b. **SDG 15 (Life on land)**

India's Domestic Legal Framework for Wildlife Conservation

Constitutional Provisions for Wildlife

1. **42nd Amendment Act, 1976**: Shifted **Forests** and **Protection of Wild Animals and Birds** from the **State List to the Concurrent List**, enabling both the central and state governments to legislate on these matters.

2. **Article 51A (g)**: Declares it a **fundamental duty** of every citizen to protect and improve the **natural environment**, including **forests and wildlife**.

3. **Article 48A**: Under the **Directive Principles of State Policy**, mandates that the **State** should work to protect and improve the **environment** and safeguard the **forests and wildlife**.

Legal Framework for Wildlife Conservation: India has established several laws to protect wildlife and promote biodiversity:

1. **Wildlife (Protection) Act, 1972**: Aims to protect wild animals, birds, and plants and their habitats.

2. **Environment Protection Act, 1986**: Provides measures to safeguard the environment against pollution and degradation.

3. **The Biological Diversity Act, 2002**: Focuses on the conservation of biological diversity and the sustainable use of its components.

India's Global Collaborations for Wildlife Conservation

India actively participates in global wildlife conservation through various international agreements:

1. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
2. Convention on the Conservation of Migratory Species of Wild Animals (CMS)
3. Convention on Biological Diversity (CBD)
4. World Heritage Convention
5. Ramsar Convention
6. Wildlife Trade Monitoring Network (TRAFFIC)
7. United Nations Forum on Forests (UNFF)
8. International Whaling Commission (IWC)
9. International Union for Conservation of Nature (IUCN)
10. Global Tiger Forum (GTF)

3. UNEP released the Emissions Gap Report 2024

1. In October 2024, the **United Nations Environment Programme (UNEP)** released the **Emissions Gap Report 2024** ahead of the COP 29 of the United Nations Framework Convention on Climate Change (UNFCCC) in Baku, Azerbaijan.

2. The deadline for countries to submit their updated **Nationally Determined Contributions (NDCs)** with **2035 mitigation targets** is approaching within a few months.
   a. The report tracks global progress on limiting warming well below 2°C and pursuing 1.5°C as per the Paris Agreement.
   b. Since 2010 (15th edition in 2024), it has offered a **science-based yearly assessment** of the gap between current greenhouse gas (GHG) emissions projections and levels needed to avert severe climate change impacts.
   c. Each report highlights **actionable opportunities** to close the emissions gap, focusing on a specific key issue each year.
   d. **Report Title: "No More Hot Air... Please!"**

Key Highlights of the Report

1. **Current Climate Trajectory**: If current environmental policies continue, **global temperatures** are **projected to increase by 3.1°C** above pre-industrial levels.

2. **Paris Agreement at Risk**: Even with full implementation of all **Nationally Determined Contributions (NDCs)**, warming could reach **2.6°C**, exceeding the **Paris Agreement's target** of keeping the temperature rise well **below 2°C,** with an **ideal limit of 1.5°C**.

   a. **Emission Reduction Requirements**: To keep global warming within 1.5°C, greenhouse gas emissions need to reach their **highest point before 2025** and then **drop by 43% by 2030**.

3. **Record High Emissions in 2023**: Global **Greenhouse gas emissions** reached an unprecedented **57.1 gigatons of CO_2 equivalent (tCO_2e) in 2023**.

   a. **India's Emissions Growth**: India's emissions **rose by 6.1%**, while global emissions saw an **overall increase of 1.3% compared to 2022**.

4. **Major Emitting Countries: G20 nations** (excluding the African Union) were responsible for **77% of total global emissions in 2023**.

   a. **Top Six Emitters**: The six largest emitters collectively contributed to **63% of global emissions**.

	Total GHG emissions in 2023	Change in total GHG emissions, 2022–2023	Per capita GHG emissions in 2023	Historical CO₂ emissions, 1850–2022
	MtCO₂e (% of total)	%	tCO₂e/capita	GtCO₂ (% of total)
China	16,000 (30)	+5.2	11	300 (12)
United States of America	5,970 (11)	-1.4	18	527 (20)
India	4,140 (8)	+6.1	2.9	83 (3)
European Union (27 countries)	3,230 (6)	-7.5	7.3	301 (12)
Russian Federation	2,660 (5)	+2	19	180 (7)
Brazil	1,300 (2)	+0.1	6.0	119 (5)
African Union (55 countries)	3,190 (6)	+0.7	2.2	174 (7)
Least developed countries (47 countries)	1,730 (3)	+1.2	1.5	115 (4)
G20 (excl. African Union)	40,900 (77)	+1.8	8.3	1,990 (77)

5. **India's Per Capita Emissions:** In 2022, India's per capita greenhouse gas emissions were **2.9 tCO₂e**, notably **lower than China's 11 tCO₂e** and the **United States' 18 tCO₂e**.

   a. **Developed Countries**: Per capita emissions in developed nations are approximately **three times the global average (6.6 tCO₂e)**, while India, the African Union, and least developed countries remain below this average.

6. **Required Emissions Reductions:** To align with the 1.5°C target, **annual emissions must be cut by at least 7.5%** each year until 2035.
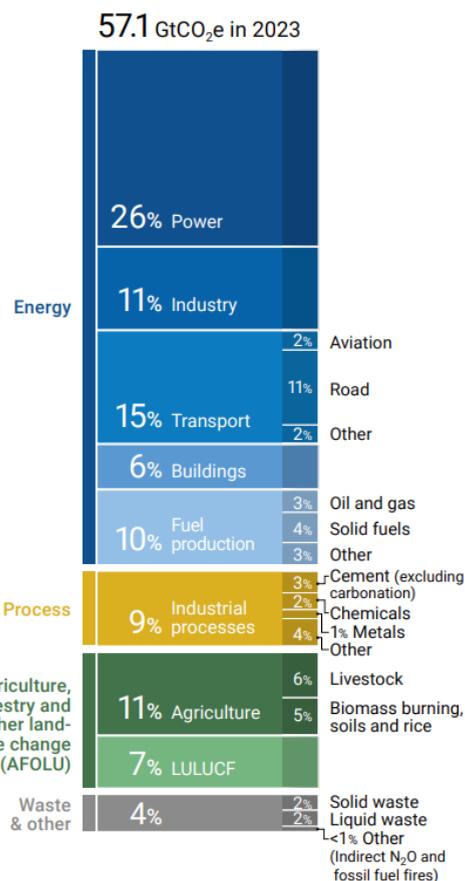
7. **Cost of Closing the Emissions Gap:** Achieving net-zero emissions by 2050 will require **annual funding of USD 900 billion to USD 2.1 trillion**, about **1% of global GDP**.

8. **Emission Reduction Pathways:** Expanding solar and wind energy could account for **27% of necessary emissions cuts by 2030**.

   a. **Forest conservation and restoration** could contribute around **20% to the required emissions reductions**.

About United Nations Environment Programme (UNEP)

1. **Established**: Formed in **1972** after the **United Nations Conference on the Human Environment** held in Stockholm.

2. **Headquarters**: Located in **Nairobi, Kenya**.

3. **Governing Body**: Governed by the **United Nations Environment Assembly (UNEA)**.

   a. It is **world's top decision-making body on environmental issues**, comprising all 193 UN Member States.

4. **Programs and Initiatives**: Leads significant programs such as:

   a. **Climate Action**: Focuses on reducing greenhouse gas emissions.

   b. **Ecosystem Restoration**: Works on restoring and protecting global ecosystems.

   c. **Clean Seas**: Aims to reduce plastic and other waste in oceans.

   d. **SDG Support**: Assists in achieving Sustainable Development Goals related to the environment.

5. **Reports**: Publishes key reports that shape global policies, including:

   a. **Emissions Gap Report**: Highlights gaps in current emissions targets.

   b. **Global Environment Outlook**: Provides a comprehensive analysis of environmental health and trends.

   c. **Adaptation Gap Report**: Evaluates progress and gaps in climate adaptation efforts globally.

Recommendations to Limit Global Warming to 1.5°C

1. **Collective Emission Reduction Target:** Nations must agree to collectively cut annual greenhouse gas (GHG) emissions by 42% by 2030 and 57% after that till 2035.

   a. These targets should be reflected in each country's next Nationally Determined Contributions (NDCs).

2. **Comprehensive NDC Coverage:** NDCs must include all gases specified in the Kyoto Protocol, cover all sectors and set clear and measurable targets

3. **Renewable Energy Deployment:** Expanding solar photovoltaic and wind energy technologies could achieve 38% of the emission reduction potential needed by 2035.

Nationally Determined Contributions (NDCs)

1. **Purpose of NDCs:** Each country's NDC is a climate action plan outlining strategies to reduce GHG emissions.

2. **NDC Timelines:** After original NDCs in 2015, and second round in 2020/2021, next round of NDCs – **"NDCs 3.0"** are **due in early 2025.**

4. 'New' India's ACs alone will consume more power than all of Mexico by 2035

1. India is **set to become a major player in the global energy scene,** with its energy use expected to rise significantly.

2. **In Oct 2024**, A report from the **International Energy Agency (IEA)** predicted that the **electricity consumed by air conditioners in India alone will be greater than the total power usage of Mexico by 2035.**

India's Energy Surge:

1. **Population and Economic Growth:**

   a. India is now the **world's most populous country** and is projected to become the **third-largest economy by 2028**.

   b. This rapid growth is **driving up energy demand across all sectors.**

2. **Energy Demand Projections:**

   a. The IEA's **World Energy Outlook 2024** predicts that **India will lead the world in energy demand growth** over the next decade.

   b. **Demand for oil, gas, coal, electricity, and renewable energy** is expected to **rise** sharply.

3. **Infrastructure Expansion:**

   a. Over **12,000 cars** are added to Indian roads **every day.**

   b. The built-up area is growing at a remarkable rate of more than **1 billion square meters annually**, equivalent to the total built space in **South Africa** today.

Power Demand from Air Conditioners

1. **Increase in AC Usage:**

   a. The number of air conditioners in India is expected to grow more than **4.5 times** by **2035**.

   b. This growth will lead to AC systems using more electricity than **Mexico's total power demand in the same year.**

2. **Drivers of Demand:**

   a. This rise reflects the growing middle class, urbanization, and improved living standards.

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Rise in Oil and Coal Demand:

1. **Oil Consumption:**
   a. India's oil demand is projected to increase by nearly **2 million barrels per day** by **2035**, making it a **central driver of global oil demand growth.**

2. **Coal's Continued Importance:**
   a. **Coal will remain a key energy source, especially** for **industries such as steel and cement production.**
   b. **Steel production** is set to increase by **70%** and cement output by **55%** by **2035**, both of **which rely heavily on coal.**

3. **Electricity Generation from Coal:**
   a. By **2030**, coal-fired power plants are expected to produce **over 15% more electricity** than they do today.
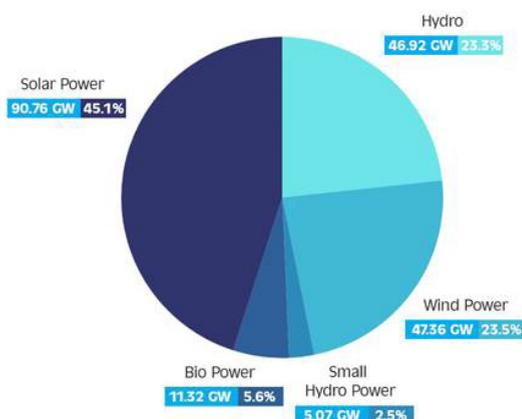
Renewable Energy and Net Zero Goals:

1. **Renewable energy now constitutes 46.3% of total capacity**

2. India has reached a significant milestone in its renewable energy journey**, with the country's total renewable energy capacity crossing the 200 GW (gigawatt) mark as of October 10, 2024.**

3. **According to the Central Electricity Authority, the** total renewable energy-based electricity generation capacity now stands at **201.45 GW.**

Renewable Energy Capacity in India

- Hydro: 46.92 GW 23.3%
- Solar Power: 90.76 GW 45.1%
- Wind Power: 47.36 GW 23.5%
- Bio Power: 11.32 GW 5.6%
- Small Hydro Power: 5.07 GW 2.5%

1. **Focus on Renewable Energy:**
   a. **Despite rising coal demand,** India is committed to achieving **net-zero carbon emissions by 2070**.

b. The country is expected to have the **third-largest battery storage capacity** in the world by 2030, helping to manage the **growing electricity from renewable sources.**

2. **Electricity Demand and Capacity:**
   a. Total energy demand is **expected to increase by nearly 35% by 2035.**
   b. Electricity generation capacity is forecasted to nearly **triple to 1,400 gigawatts (GW)**.

3. **Role of Solar Power:**
   a. **Solar energy** will play a major role in this expansion, although **coal will still provide a significant portion of the energy mix** due to its reliability and lower costs compared to solar.

4. **Investment in Clean Energy:**
   a. Clean power generation is anticipated to be nearly **20% higher** than in the (**Stated Policies Scenario)STEPS** by **2035**, supported by **large-scale investments in battery storage and electric vehicles (EVs).**
   b. EVs are expected to become more common**, contributing to a peak in oil consumption in the 2030s.**

5. **Impact on Carbon Emissions:**
   a. The **IEA** estimates that if India reaches **net-zero emissions by 2070, t**he country's annual CO2 emissions in **2035** will be **25% lower** than in the STEPS scenario.

6. **States driving India's renewable energy capacity:**

- Rajasthan: 29.98 GW
- Gujarat: 29.52 GW
- Tamil Nadu: 23.70 GW
- Karnataka: 22.37 GW
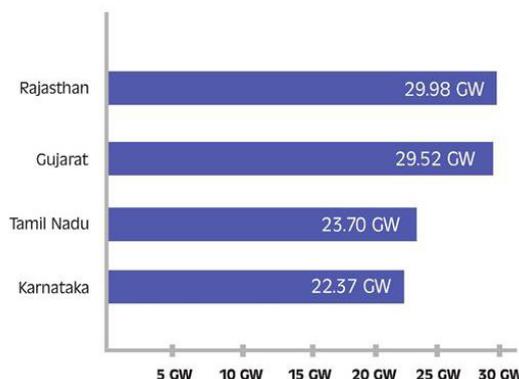
Key Schemes and Programmes

1. Accelerating renewable energy capacity across the nation, with an ambitious target of **achieving 500 GW of installed electric capacity from non-fossil sources by 2030.**

2. Key programs include the **National Green Hydrogen Mission, PM-KUSUM, PM Surya Ghar, and PLI schemes for solar PV modules**.
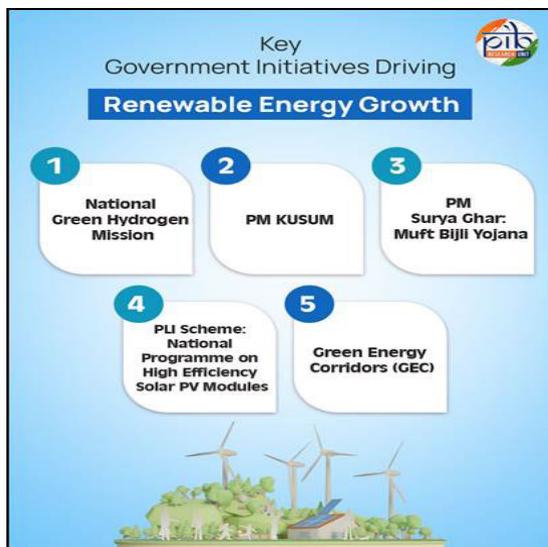
Some other ongoing key initiatives:

1. Notification of a trajectory for **renewable energy power bids** of **50 GW** per annum by **Renewable Energy Implementation Agencies (REIAs)** from **FY 2023-24** to **FY 2027-28**.

2. **Foreign Direct Investment** permitted up to **100 percent** under the **automatic route** to attract investments.

3. Waiver of **Inter-State Transmission System** charges for solar and wind power projects commissioned by **June 30, 2025**; green hydrogen projects until **December 2030**; and offshore wind projects until **December 2032**.

4. Announced **Renewable Purchase Obligation** trajectory until **2029-30**, including separate RPO for **Decentralized Renewable Energy**.

5. A **Project Development Cell** has been established to attract and facilitate investments in the renewable sector.

6. **Standard Bidding Guidelines** issued for **tariff-based competitive bidding** for procurement of power from **grid-connected solar**, **wind**, and **wind-solar projects**.

7. **Ultra Mega Renewable Energy Parks** are being set up to provide land and transmission for large-scale renewable energy projects.

8. Cabinet approval for a **Viability Gap Funding** scheme for offshore wind energy projects, facilitating the installation and commissioning of **1 GW** of offshore wind energy capacity along the coasts of **Gujarat** and **Tamil Nadu**.

9. Issued **Electricity (Rights of Consumers) Rules, 2020**, for **net-metering** up to **500 kilowatts** or the electrical sanctioned load, whichever is lower.

10. The "**National Repowering and Life Extension Policy for Wind Power Projects, 2023**" has been released.

11. "**Strategy for Establishment of Offshore Wind Energy Projects**" outlines a bidding trajectory of **37 GW** by **2030**.

12. **Offshore Wind Energy Lease Rules, 2023**, notified to regulate the grant of leases for offshore wind energy development.

13. Procedure for **Uniform Renewable Energy Tariff (URET)** has been established.

14. **Standard & Labelling (S&L)** programs for **Solar Photovoltaic modules** and **grid-connected solar inverters** have been launched.

15. A **transmission plan** has been prepared to augment transmission infrastructure until **2030**.

16. The **Electricity (Late Payment Surcharge and Related Matters) Rules** have been notified.

17. **Green Energy Open Access Rules 2022** have been issued to promote renewable energy.

18. Launched the **Green Term Ahead Market (GTAM)** to facilitate the sale of renewable energy power through exchanges.

19. Orders issued to ensure that power is dispatched against **Letters of Credit** or **advance payment** for timely payments to renewable energy generators.

Conclusion:

India's energy future is important not just for its economy but also for global energy trends. Balancing the demand for traditional energy sources with a move toward renewables will be essential for sustainable growth. Careful planning, investment, and policy changes will be needed to ensure India meets its energy needs while working towards its environmental goals.

5. Kutch Royal Family Donates Land for Wildlife Conservation

In Oct 2024, The royal family of the former princely state of Kutch handed over **4,900 hectares** of land, known as **Chadva Rakhal**, to the **state government for wildlife conservation.** This area is home to diverse species, including **242 types of birds**.

a. **Chief Minister also** announced the establishment of a **caracal conservation breeding center** in **Chadva Rakhal, with an investment of Rs 10 crore**.

Location: The **4,900 hectares** of land is situated **30 km** west of **Bhuj**, the district headquarters of Kutch.

About Chadva Rakhal : Chadva Rakhal is **protected forest reserve owned by erstwhile rulers of Kutch State (**Cutch State)

What is the Historical Significance ?

1. The area was declared a **reserved forest** in **1880** by **Pragmalji II**, the then ruler of Kutch, to protect nature.

2. **Mandhatasinh Jadeja**, a member of the royal family, mentioned that the **family has been safeguarding this land for generations.**

Biodiversity in Chadva Rakhal

1. The area features:
   a. **44 species** of trees
   b. **53 species** of shrubs
   c. **114 species** of herbs
   d. **9 species** of climbing plants

2. It supports **242 bird species**, **26 mammal species** (including leopards and rare caracals), and **28 reptile species** (including marsh crocodiles).

What are the Future Plans ?

1. **The land will be officially designated as a forest and managed by the forest department.**

Important facts for Prelims

About the Caracal:

1. he caracal is a nocturnal animal known for its agility and ability to catch birds mid-flight. In India, it's called **siya gosh**, meaning **"black ear."**

2. **Habitat**: Caracals live in woodlands, savannahs, and scrub forests, often using abandoned burrows or rock crevices for shelter.

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3. **Distribution**: They can be found in various regions of **Rajasthan**, **Gujarat**, and **Madhya Pradesh**, as well as several countries across **Africa**, the **Middle East**, and **Asia**.

4. **Threats**: Major threats to caracals include hunting, illegal trade, and habitat loss.

5. **Conservation Status**:
   a. **IUCN**: Least concern
   b. **Wild Life (Protection) Act, 1972**: Schedule I **About the Aravalli Range :**The **Aravalli Range** is one of the world's oldest mountain ranges, extending approximately **670 km** across northwestern India, from near **Delhi** through **Rajasthan** to **Gujarat**.

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6. Greening of Antarctica and its Implications

In Oct 2024, **Research showed** a big increase in plant cover across the **Antarctic Peninsula due to rising temperatures**.

This change is **raising concerns among scientists about potential effects on the environment.**

Key Findings:

1. **Vegetation Increase**: A study published in *Nature Geoscience* indicates that **plant cover has grown more than 10 times in recent decades.** Researchers found that **plants, mostly mosses and lichen, grew from less than 1 sq km in 1986 to nearly 12 sq km by 2021.**

2. **Rapid Growth**: The **rate of this growth increased by over 30% from 2016 to 2021**, marking a significant change in the landscape.

Warming Trends

1. **Rate of Warming**: The Antarctic Peninsula is warming **5 times faster** than the global average, with current rates between **0.22 to 0.32 degrees Celsius per decade**.
   a. In comparison, the global average is about **0.14 to 0.18 degrees Celsius per decade**.

2. **Extreme Weather (Heat Waves)**: The continent has faced record heat, including a rise of **39 degrees Celsius** above normal in March 2022.

a. In July 2023, some areas recorded temperatures **10 degrees Celsius** higher than usual.

Implications of Increased Vegetation

1. **Ecosystem Changes**: The **growth of mosses could help create soil, making it easier for non-native plants to grow,** which could harm local species.
2. **Impact on Light Reflection**: More plants **might reduce the Peninsula's ability to reflect sunlight**, leading to higher ground temperatures and worsening climate change.

Environmental Concerns

1. **Ice Loss**: Antarctica has lost **280% more ice mass** in the **2000s** and 2010s compared to earlier decades.
   ○ Continued warming will speed up ice loss, contributing to rising sea levels.
2. **Invasive Species Risk**: The increase in plant life raises worries about foreign species arriving, possibly brought by visitors to the continent.

IMPORTANT FACTS FOR PRELIMS

Antarctica:

Antarctica, the **coldest, driest, and windiest continent on Earth**, is a land of extremes.

Geographical Facts

1. **Location:** Situated entirely within the Antarctic Circle, it's the **southernmost continent.**
2. **Size:** The **fifth-largest continent,** covering approximately **14 million square kilometers.**
3. **Ice Sheet:** The continent is covered by the **largest ice sheet on Earth, holding about 70% of the world's freshwater.**
4. **Climate: Extremely cold, with temperatures often below -60°C.**
5. **Precipitation:** A polar desert, receiving very little precipitation, mostly in the form of snow.

Unique Features

1. **Ice Shelves:** Large platforms of **ice that float on the ocean, often breaking off to form icebergs.**
2. **Icebergs:** Large pieces of ice that have broken off from a glacier or ice shelf.
3. **Volcanoes:** There are several active and extinct volcanoes in Antarctica, including Mount Erebus.
4. **Wildlife:** Home to unique species like penguins, seals, whales, and seabirds.

International Treaties

1. **Antarctic Treaty:** Antarctic Treaty was **signed in 1959 and came into force in 1961,** and it prohibits military activities and sets aside Antarctica for peaceful scientific cooperation.
2. **Protocol on Environmental Protection: A 1991 agreement that designates Antarctica as a natural reserve devoted to peace and science.**

Current Issues

1. **Climate Change:** Rising global temperatures are causing the Antarctic ice sheet to melt, contributing to sea-level rise.
2. **Fishing and Tourism:** Overfishing and unregulated tourism pose threats to the continent's fragile ecosystem.
3. **Scientific Res**earch: Antarctica is a valuable location for scientific research, particularly in fields like astronomy, geology, and climate science.

7. What are melanistic tigers?

1. A **tigress from the Tadoba-Andhari Tiger Reserve in Maharashtra was moved to the Similipal Tiger Reserve in Odisha on October 28, 2024.**
2. This move is part of a **plan by the Odisha government to improve the genetic diversity of the tiger population in the region,** which has been **affected by inbreeding and an increase in pseudo-melanistic tigers, often called black tigers.**
   a. Inbreeding is the **mating of individuals who are closely related genetically, such as siblings or parent-offspring pairs.**
   b. This practice can **lead to a higher chance of offspring inheriting genetic disorders or unfavorable traits** because there is a greater likelihood that **both parents carry the same harmful recessive genes.**
   c. Inbreeding is often a **concern in animal breeding and conservation, as well as in human populations, where it can impact genetic diversity and health.**

The Tigress:

1. **Age**: She is 2 years and 7 months old.
2. **Observation**: After her arrival, **she will be kept in a special enclosure for observation before being released into the South Division of Similipal.**

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3. **Genetic Benefits**: Experts believe that introducing this **tigress will help reduce the issues caused by inbreeding in the local tiger population.**

What are Pseudo-Melanistic Tigers?

1. Pseudo-melanistic tigers have a **dark coat with black fur, where the usual white and orange stripes are less visible.** Their look can appear almost like a reversal of a normal tiger's colors.

2. **Historical Background**: For a long time, **these tigers were thought to be mythical.** The **first evidence of their existence was a painting from the 1700s.** Sightings were rare until **a cub with unusual markings was born in a zoo in 1970.**

3. **Recent Sightings**: The last known sighting of a **pseudo-melanistic tiger was in 2017-2018 in the Similipal Tiger Reserve.**

How Do They Get Their Color?
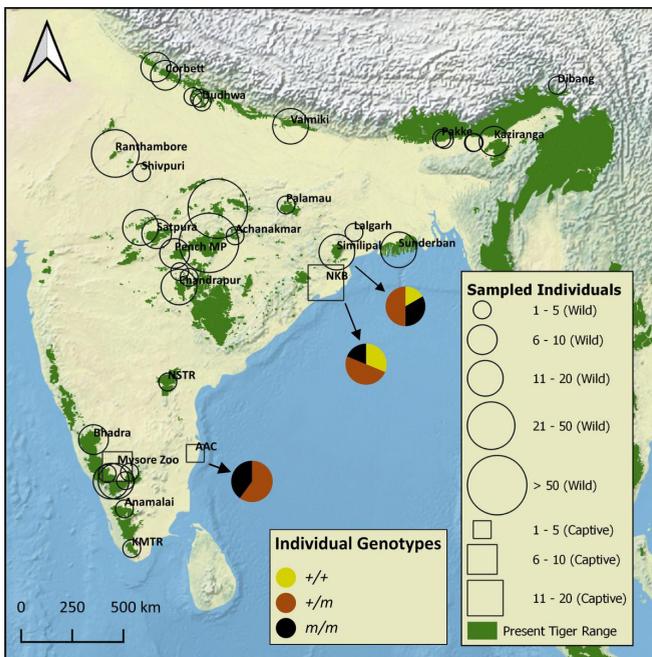
1. **Pseudo-melanistic tigers are a color variant of Bengal tigers, caused by a genetic mutation.**

2. This **mutation affects how their stripes appear, causing them to spread and sometimes making the tiger look almost completely black.**

3. **Where They Are Found**: This mutation is **mostly found in the Similipal population. Other black tigers have been seen only in zoos** and are related to the Similipal lineage.

The Mutated Gene:

1. A study from 2021 identified the specific gene responsible for the darker coloration.

2. This gene is called **Taqpep**, which is involved in **determining fur patterns in various cat species.**

3. The mutation changes a specific part of the Taqpep gene, which affects how stripes are formed.

4. In Similipal, **a significant number of tigers carry this mutated gene, with studies showing a 60%** chance that a tiger born there will have it.

Why Are Mutations Common in Similipal?

1. Most of Odisha's tigers live in Similipal. **A recent count showed that out of 30 tigers in Odisha, 27 are in Similipal.**

2. **High Rates of Pseudo-Melanistic Tigers**: Out of the **27 tigers, at least 13 (seven females and six males) are pseudo-melanistic.** This **unique trait is not found in other wild habitats worldwide.**

3. Scientists found that the **high number of these mutations comes from the tigers being isolated from other groups.**

4. This isolation leads to inbreeding, increasing the chance of passing down the mutated gene.

5. **Random chance also plays a role in why certain mutations can become more common in a population.**

About Similipal Tiger Reserve

Location:

1. Situated in the **Mayurbhanj District, Northern Odisha.**

2. Covers an area of 2,750 sq km.

3. Notable waterfalls: **Joranda and Barehipani.**

History and Current Status:

1. Designated a **tiger reserve under Project Tiger in May 1973.**

2. Declared a **wildlife sanctuary by the Government of Orissa in 1979.**

3. **Proposed as a National Park in 1980 (303 sq km).**

4. Added to **UNESCO's list of Biosphere Reserves in May 2009.**

5. **Part of the Mayurbhanj Elephant Reserve, including Hadgarh and Kuldiha Wildlife Sanctuaries.**

Geography:

1. Surrounded by high plateaus and hills, with the **highest peaks being Khairiburu and Meghashini (1,515 m above sea level).**
2. **Terrain:** Mostly undulating and hilly**, interspersed with grasslands and wooded areas.**

Vegetation: Diverse forest types with **Northern tropical moist deciduous forests dominating, alongside semi-evergreen patches.**

Fauna:

1. **Notable species:** Tigers, elephants, hill mynahs.
2. Highest tiger population in Odisha.
3. Biodiversity includes:
a. 55 species of mammals
b. 304 species of birds
c. 60 species of reptiles
d. 21 species of frogs
e. 38 species of fish
f. 164 species of butterflies

Flora: Over 1,078 species of plants, including 94 species of orchids.

8. Kodo Millet (Varagu) and its Poisonous Effects on Elephants

1. In November 2024, **10 elephants from a herd of 13 died in just 3 days in the Bandhavgarh Tiger Reserve** in **Madhya Pradesh**.
2. Forest officials believe the deaths were caused by **mycotoxins (poisons produced by fungi)** found in **Kodo millet (Paspalum scrobiculatum)**, a grain commonly grown in the area.
3. Kodo millet, also known as **Varagu**, is a **staple food for many tribal communities but can become deadly under certain conditions.**

What is Kodo Millet?

1. Kodo millet is a type of **grain** that is grown in many parts of **India**, as well as in other countries in **Asia** and **Africa**.
2. It is a hardy, **drought-resistant** crop that can survive in dry areas and is widely cultivated in **Madhya Pradesh**.

Why is Kodo Millet Important?

1. **Nutritional Benefits**: Kodo millet is rich in **vitamins** and **minerals**, making it a healthy food option.

2. **Gluten-Free**: It is suitable for people with **gluten intolerance**.
    a. **Gluten** is a group of **proteins** found in certain grains, primarily **wheat**, **barley**, **rye**, and their related species.
3. **Easily Digestible**: It is **easy on the stomach and is often used in traditional dishes** like **porridge**, **upma**, and **roti**.
4. **Antioxidants**: It contains **antioxidants**, which are good for health.

How Does Kodo Millet Become Toxic?

1. Kodo millet becomes poisonous mainly due to **fungus (a type of mold)** that grows on the grain under **humid or wet conditions**.
2. This fungus produces a harmful chemical called **cyclopiazonic acid (CPA)**, which is the main cause of poisoning.

Fungal Contamination and Poison:

1. **Cyclopiazonic Acid (CPA)**: This is the **main poison found in contaminated Kodo millet**. When the **grain gets infected by fungus, it becomes dangerous.**
2. **Local Names**: In some parts of India, this infected millet is called **"Matawna Kodoo"** or **"Matona Kodo"**.

    Even after the millet is harvested and processed, the poison remains because it **cannot be removed by heating or washing.**

History of Kodo Millet Poisoning

1. Kodo millet poisoning has been **known for a long time.**
2. The first case was reported in **1922** in **Uttar Pradesh** when **some people were poisoned by the grain.**
3. Over the years, there have been several cases of poisoning, mostly affecting animals, including elephants.

Key Incidents:

1. In **1983**, the first **elephant deaths** linked to Kodo millet poisoning were reported.
2. In **1985**, scientists confirmed that **cyclopiazonic acid (CPA)** was the poison responsible for these deaths.

How Does Kodo Millet Poisoning Work?

When elephants (or other animals) eat contaminated Kodo millet, the poison affects their **nervous system**, **heart**, and **digestive system**. The symptoms of poisoning can appear quickly.

Symptoms of Poisoning:

1. **Vomiting**
2. **Unconsciousness**
3. **Shaking** and **tremors**
4. **Fast heartbeat**
5. **Weakness** and **loss of movement** (elephants may have difficulty moving and become depressed)

The poison affects the **liver** and **heart**, and also causes problems in the **stomach** and intestines.

How Was Kodo Millet Poisoning Treated in the Past?

1. In the early 20th century, **tamarind water** or **buttermilk** was believed to help treat the poisoning.
2. A report from **1934** by R.C. Morris, a zoologist, suggested that these liquids, when given in large amounts, could help animals recover from the poison.
   a. **Tamarind water** and **buttermilk** were thought to help flush the toxins out of the body.
   b. **Local knowledge**: People in rural areas often tested the safety of Kodo millet by cooking small amounts and observing how livestock reacted.

      However, in large-scale poisonings, like the one in Madhya Pradesh, these remedies might not be enough to save animals, especially when the toxin is spread over a large area.

Why Are Elephants Affected?

1. Elephants are **particularly vulnerable to Kodo millet poisoning because they consume large amounts of food.**
2. They often eat grains like millet, and if the grain is contaminated with **CPA**, it can quickly poison them.
3. **Due to their size and the large quantities of food they eat, elephants are more likely to ingest enough of the contaminated grain to cause serious harm or death.**

About Bandhavgarh Tiger Reserve:

Location and Significance

1. **Location**: Bandhavgarh Tiger Reserve is situated in the **Umaria district** of **Madhya Pradesh**, between the **Vindhyan** and **Satpura mountain ranges**.
2. **Establishment**: It was initially declared a **national park** in **1968** and later became a **Tiger Reserve** in **1993**. The reserve plays a key role in tiger conservation and is one of India's most important protected areas for wildlife.

Geography and Landscape

The landscape of Bandhavgarh Tiger Reserve is marked by a mix of **valleys**, **hills**, and **plains**. The **Bandhavgarh fort** is a major landmark within the reserve, which is both historically significant and a popular tourist attraction.

1. **Bandhavgarh Fort**: The fort is believed to have been given to **Lakshmana**, the brother of the Hindu god **Lord Rama**, to keep a watch on the island of **Lanka**.
2. The name **Bandhavgarh** comes from the Sanskrit word **"Bandhav"**, meaning brother, and **"Garh"**, meaning fort—thus, **Bandhavgarh** translates to **"Brother's Fort"**.

Vegetation

Bandhavgarh's vegetation is mainly **tropical moist, deciduous forests**. The area's plant life is diverse, with different types of forests and grasslands supporting a variety of species.

1. **Sal Forests**: The reserve is home to **Sal trees** (Shorea robusta), which are dominant in the higher regions.
2. **Bamboo Groves**: These are found in the lower slopes of the reserve and are an important resource for the local wildlife.
3. **Mixed Forests and Grasslands**: Along with Sal forests, there are areas of **mixed forests** and **grasslands** that offer a variety of habitats for different species.

Flora

Some of the key plant species found in the reserve include:

1. **Saj** (Terminalia tomentosa)
2. **Dhaora** (Anogeissus latifolia)
3. **Tendu** (Diospyros lotus)
4. **Arjun** (Terminalia arjuna)
5. **Amla** (Emblica officinalis)
6. **Palas** (Butea monosperma)

These plants are important not only for the local ecosystem but also for sustaining the herbivores and other wildlife in the park.

Fauna

1. Bandhavgarh Tiger Reserve is most famous for its **Royal Bengal Tigers**, and it has the **highest density of tigers** not just in India, but globally.
2. The reserve plays a critical role in tiger conservation and is a part of India's larger network of **tiger reserves** under Project Tiger.

Key Wildlife Species

Tigers: Bandhavgarh has the highest density of Royal Bengal Tigers in the world.

Leopard: Bandhavgarh is also home to a significant population of **leopards**.

Wild Dog: Known for its hunting skills, the **wild dog** is another important predator in the reserve.

Wolf: A smaller predator species, **wolves** are also found in the area.

Jackal: The **jackal** is a scavenger and an important part of the food chain in the reserve.

Herbivores and Other Species

Chital (Spotted Deer): The **chital** is one of the most common herbivores in Bandhavgarh.

Sambhar: A large deer species, **sambhar** are found in the reserve's forests.

Barking Deer: These small deer are often seen in the reserve's grasslands and forested areas.

Nilgai: Also known as the **blue bull**, the **nilgai** is a large herbivore in the region.

Chinkara: The **chinkara**, or **Indian gazelle**, is another herbivore found here.

Wild Pig: The **wild pig** is an important part of the food chain, serving as prey for carnivores.

Chowsingha: The **chowsingha** or **four-horned antelope** is also found in the reserve.

Conclusion

The deaths of the elephants in **Bandhavgarh Tiger Reserve** are a tragic reminder of the dangers posed by **toxic millet** when it is contaminated by **mycotoxins**. While **Kodo millet** is a healthy and important food for many people, its potential to become poisonous under certain conditions is a major concern, especially for wildlife.

9. New Damselfly Species Discovered in Kerala

In Oct 2024, A team of researchers discovered a new species of damselfly in Manjadininnavila, located in the Thiruvananthapuram district of Kerala.

a. This species has been named **Agasthyamalai Bambootail** (or **Agasthyamala Mulavalan** in Malayalam) due to its unique characteristics and the region it was found in.

Details of the Discovery:

1. **Location**: Manjadininnavila is part of the **Aryanad grama panchayat** and is situated near the **Peppara Wildlife Sanctuary**, with the **Karamana River** running through the area.
2. **Naming**: The name reflects its discovery in the **Agasthyamalai landscape** of the **Western Ghats**. The only other species in this group is the **Malabar Bambootail** (Melanoneura bilineata), found in the **Coorg-Wayanad** area of the Ghats.

What are the Characteristics ?

1. **Appearance**: The Agasthyamalai Bambootail has a long, cylindrical body that resembles a bamboo stalk, leading to its nickname, **Bambootail** or **Mulavalan Thumbikal**.
2. **Differences**: This **species can be distinguished from the Malabar Bambootail by differences in wing structure** and **reproductive organs.** Researchers found a genetic difference of over **7%** in a **specific gene (cytochrome oxidase-I) between the two species.**

Habitat:

1. The new damselfly was first observed in **small streams flowing into the Karamana River.**

2. This finding emphasizes the **importance of protecting habitats outside reserved forests for biodiversity conservation.**

3. The species has also been recorded in **Ponmudi hills** and **Bonacaud**.

Key Facts About Damselflies

1. Damselflies are slender, predatory insects in the order **Odonata**, often found near shallow, freshwater areas.

2. **Appearance**: They are generally smaller and more delicate than dragonflies, with long, thin bodies and net-veined wings.

3. **Eyes**: **Unlike dragonflies, damselflies have widely separated eyes.**

4. **Colors**: Many species display vibrant colors.

5. **Wingspan**: Wingspans range from **18 mm** (0.71 inch) to **19 cm** (7.5 inches) in some large species.

Comparison with Dragonflies

1. Dragonflies belong to the suborder **Anisoptera** and include around **3,000 species**.

2. **Wings**: Dragonflies have two pairs of differently shaped wings, while damselflies have wings that are similar in shape.

3. **Habitat**: Both types of insects are **commonly found near freshwater but have different flight and body characteristics.**

Conclusion

The discovery of the **Agasthyamalai Bambootail** damselfly highlights the rich biodiversity of Kerala's ecosystems and the importance of preserving both protected and unprotected habitats. This finding contributes to our understanding of insect diversity in the Western Ghats and emphasizes the need for conservation efforts.

10. Nine Captive-Bred Pygmy Hogs Released in Assam National Park

On October 1, 2024, nine captive-bred pygmy hogs were released into Manas National Park, located in western Assam. This marks the 5th reintroduction exercise by the **Pygmy Hog Conservation Programme (PHCP)** since 2020.

Key Details:

1. **Species Information**: The **pygmy hog (*Porcula salvania*) is recognized as the world's smallest and rarest wild pig, currently facing a significant risk of extinction.**

2. **Release Event**: The release event was attended by **Principal Chief Conservator of Forest and Head of the Forest Force in Assam,** who commended the effort to stabilize the pygmy hog population in the national park.

Conservation Efforts

1. **Previous Releases**: A total of **27 pygmy hogs** have been released at the **Kanchanbari grassland** within the national park since the program's inception. A recent camera trap study indicated successful breeding in the area, with a notable first-time capture of a pregnant female hog in the wild.

2. **Collaborating Organizations**: The conservation initiative involves multiple stakeholders, including:

   a. **Assam Forest Department**

   b. **Durrell Wildlife Conservation Trust (U.K.)**

   c. **International Union for Conservation of Nature (IUCN) Species Survival Commission's Wild Pig Specialist Group**

   d. **Union Environment Ministry**

   e. **Ecosystems-India**

   f. **Aaranyak (Assam-based biodiversity conservation group)**

Background of the Pygmy Hog Conservation Programme (PHCP)

1. **Inception**: The PHCP commenced in **1996** with four individuals captured from the **Bansbari Range** of Manas National Park. The first successful release into the wild occurred in **2008**.

2. **Success Metrics**: As of now, the program has successfully bred and reintroduced **179 pygmy hogs** in Assam's protected areas.

Habitat and Characteristics of the Pygmy Hog

1. **Habitat Preference**: Pygmy hogs thrive in undisturbed tall grasslands characterized by riverine communities with dense grass, herbs, shrubs, and young trees.

2. **Ecological Role**: As an **indicator species**, their presence reflects the health of their primary habitat, highlighting the importance of tall, wet grasslands.

Conservation Status

1. **IUCN Classification**: Critically Endangered
2. **Legal Protection**: Listed under Schedule I of the **Wildlife Protection Act, 1972**.

About Manas National Park

1. **Location**: Situated in Assam, it is **contiguous with Bhutan's Royal Manas National Park.**
2. **Designations**: Recognized as a **UNESCO Natural World Heritage site, Project Tiger reserve, elephant reserve, and biosphere reserve.**
3. **Flora and Fauna**: Home to some of the largest remaining **grassland habitats** in sub-Himalayan ecosystems, it houses rare wildlife, including the Assam roofed turtle, hispid hare, golden langur, and pygmy hog.

About Captive Breeding

1. Captive breeding involves capturing wild species, breeding them in controlled facilities, and raising them under expert care.
2. It is a recognized conservation tool aimed at preventing extinction and promoting species recovery.

Conclusion

The successful release of pygmy hogs into Manas National Park demonstrates ongoing efforts to conserve one of the world's rarest species. Through collaboration among various stakeholders and continued focus on habitat restoration, the Pygmy Hog Conservation Programme aims to stabilize and grow the population of this critically endangered species.

11. Hyperlocal Weather Forecasting

Why in the News?

Recently, the Cos-it-FloWs, a new system that collects hyper-local data for flood forecast launched in the flood-prone Periyar and Chalakudi river basins was launched in Kerala.

About CoS-it-FloWS

- **CoS-it-FloWS** (Community-Sourced Impact-based Flood Forecast and Early Warning System) is a project run by Equinoct, a Kochi-based **community-sourced modelling solution provider.**

- **Recognized by UNICEF's Climate Tech Cohort,** it **uses 100 rain gauges** installed across Ernakulam, Idukki, and Thrissur.

- **Data** on rainfall, river, tidal and groundwater levels that are **collected primarily by students, women, and youth** at the household level is then analyzed and visualized through Insight Gather, a web portal to host the impact-based forecasts in the pilot basins.

- The idea is to **plug gaps in government data** and to scale up the project with greater community participation by **collecting hyper-local data for fighting natural disasters.**

About hyperlocal weather forecasting

- **Definition:** Hyperlocal weather forecasting is a specialized form of meteorology that **pinpoints weather conditions to extremely localized areas.**

- **Current forecasting level**: Currently the **Indian Meteorology Department (IMD)** issues weather **forecasting for district level.**
  - o The forecast and warnings issued from National Weather Forecasting Centre (NWFC) are in the **subdivisional scale for the country** as a whole whereas the same from State WFC (SWFC) are in the **district scale for the state concerned.**

- **Need for Hyperlocal forecasting:** In tropical countries like India, weather variability is inherently higher. Hence hyperlocalized weather forecasting is needed for better utility.

Significance of Hyperlocalised Weather Forecasts

Disaster preparedness
Hyperlocal weather data will **enhance disaster preparedness** against extreme weather events (including those induced by climate change), thereby reducing **disaster-led mortality.**

Safeguard agricultural livelihoods
Empower farmers to optimize agricultural activities like sowing, irrigation, and harvesting through **precise weather data.**

Underscores India's role in global climate resilience
India's IMD serves as **UN Early Warning for All advisor** to five developing nations, demonstrating leadership in global climate resilience.

Better Traffic Management in Urban areas
Hyperlocal weather forecasting offers **precise insights into specific routes and microclimates,** enabling more efficient route planning and proactive decision-making.

Key Challenges in hyperlocal weather forecasting

- **Outdated prediction models:** Currently, most of the prediction software used in forecasting are based on the **Global Forecasting System (GFS) and Weather Research and Forecasting (WRF) Models,** both of which are not the most modern.

- **Lack of weather monitoring ground stations:** Currently, IMD operates around 800 automatic weather stations (AWS), 1,500 automatic rain gauges (ARG) and 37 doppler weather radars (DWR).
  - o This is against the total **requirements of more than 3,00,000 ground stations (AWS/ARG) and around 70 DWRs.**

- **Underutilized data from ground stations:** Although state governments and private companies manage over 20,000 ground stations, much of this data is inaccessible to the India Meteorological Department (IMD) due to issues with data-sharing and reliability.

- **Difficulty in predicting small-scale events:** Large systems like monsoons or cyclones are easier to forecast, but sudden, localized events like cloudbursts remain challenging due to their erratic and dynamic nature.
  - o Increasing climate volatility leads to frequent and rapid system changes, complicating predictions even further.

Key initiatives taken to facilitate hyperlocal weather forecasting

- **Gram Panchayat (GP)-Level Weather Forecasting:** A joint program of the Ministry of Panchayati Raj Ministry, Ministry of Earth Sciences and IMD for providing hourly forecasts at GP level.

- **Mission Mausam:** It was unveiled recently to Enhance India's Weather and Climate Forecasting by 2026 by installing a wider network of radars, wind profilers, and radiometers for better observations.

- **Weather information network and data system (WINDS):** To install system of AWS and ARG across India to generate long-term, hyper-local weather data.

- **IFLOWS-Mumbai:** Integrated Flood Warning System for Mumbai (IFLOWS-Mumbai) **developed by Ministry of Earth Sciences** in coordination with Municipal Corporation of Greater Mumbai for providing **early warning for flooding** specially during high rainfall events and cyclones.

- **Mumbai Flood App:** It is a rainfall forecasting and flood monitoring system **predicting rain hourly and daily for Mumbai.**
  - o It is developed by **IIT Bombay,** with funding from **HDFC ERGO,** in collaboration with the MCGM Centre for Municipal Capacity Building and Research (MCMCR).

Conclusion

India needs a comprehensive approach to enhance hyperlocal weather forecasting. This includes **upgrading to advanced models**, **expanding the monitoring network**, **fostering data-sharing**, and **developing robust real-time data systems**. By addressing these areas, India can improve accuracy, especially for localized events, and better prepare for extreme weather.

G. SOCIETY AND CULTURE

1. New rules of Rights of Persons with Disabilities (RPwD) 2024 notified

1. In October 2024, the Union Ministry of Social Justice and Empowerment notified the **amended Rights of Persons with Disabilities (RPwD) Rules, 2024** under Rights of Persons with Disabilities Act, 2016 that make it harder to get a disability certificate.

Background of the Changes:

1. The RPwD Rules, 2024, have come in the wake of the IAS probationer Puja Khedkar controversy.
2. Khedekar was dismissed from service earlier in September due to alleged forgery in her disability and caste certificates.

Key Changes in the New Rules

1. **Required Documents**: Individuals must now provide **proof of identity**, a recent **photo (not older than six months), and** an **Aadhaar card** when applying for a disability certificate.
2. **Only Medical Authorities**: **Only approved medical authorities** can handle applications for disability certificates.
   - **NPRD suggested that experts from non-profits should also be allowed to conduct assessments.**
3. Introduction of **color-coded Unique Disability Identity (UDID) cards:**
   a. **White:** Disability below 40%.
   b. **Yellow:** Disability between 40% and 80%.
   c. **Blue:** Disability of 80% or above.
4. **Longer Processing Time**: The **time to process each application** has increased from **1 month to 3 months**.
5. **Application Expiry**: If a **medical authority does not decide** on an application within **two years**, the **application will expire, and the person will need to reapply or request reactivation.**

Specific Issues with the New Rules

1. **Online Applications Required**: The new regulations **mandate that applications for disability certificates be submitted online**.
   - NPRD noted that **many individuals lack access to the internet** or smartphones, creating a barrier.
2. **Use of Technical Language**: During the online application process, applicants must specify their disabilities using technical terms, **which many may not understand.**
3. **Extended Time Limit**: The time limit for issuing certificates has been increased from **one month to three months**, which NPRD views as unnecessary.
4. **Reapplication After Two Years**: If no action is taken on an application for **two years**, the individual must reapply, which **NPRD argues unfairly punishes those affected by the system's delays.**

Concerns from NPRD:

1. **National Platform for the Rights of the Disabled (NPRD)**, a cross-disability rights organization, called for a rollback.
   a. They argue that the **new rules make it harder and more complicated** to obtain disability certificates.
2. The NPRD said the new rules are "**regressive**" and **will create more problems for people with disabilities who need certificates for identification** and access to services.
3. **NPRD** has expressed strong opposition, stating that the new rules make it more difficult for genuine individuals with disabilities to obtain necessary certificates for identification and accessing services.
4. They believe that the **updated rules will not resolve the systemic issues exposed by the Khedkar case, which highlighted problems like a lack of accountability** and transparency.

About Rights of Persons with Disabilities Act, 2016:

A person is **considered to have a disability if they have a physical, mental, intellectual, or sensory impairment.**

1. **Enactment and Enforcement**: Enacted in 2016; **effective from April 19, 2017.**
2. **Replacement of Previous Legislation**: Replaced the Persons with Disabilities (**Equal Opportunities, Protection of Rights and Full Participation) Act, 1995.**
3. **Objective**: Ensure dignity, non-discrimination, and equal opportunities for all persons with disabilities.
4. **Recognizes 21 types of disabilities,** including blindness, low vision, dwarfism, thalassemia, and acid attack victims.
5. **Benchmark Disability Definition**: **Defined as having at least 40% disability**; includes those certified by relevant authorities for measurable disabilities.
6. **Alignment with International Standards**: Incorporates rights under the **UN Convention on the Rights of Persons with Disabilities (UNCRPD)**, promoting and protecting the rights and dignity of persons with disabilities.

Other Initiatives in India for Supporting Persons with Disabilities

1. **Accessible India Campaign (Sugamya Bharat Abhiyan)**: Launched in 2015 to make public spaces, transportation, and ICT accessible.
2. **Divyang Sarathi App**: A mobile app providing information on policies and schemes for persons with disabilities to improve awareness and access to government resources.
3. **Deendayal Disabled Rehabilitation Scheme (DDRS)**: Central Sector Scheme offering financial assistance to organizations for the education and rehabilitation of persons with disabilities.
4. **PM Daksh Portal**: A digital platform by DEPwD to empower persons with disabilities with skill training and job opportunities, featuring UDID registration and location-based training options.

5. **Samarth and Gharaunda Schemes**:
   a. **Samarth**: Provides respite care for families of persons with disabilities.
   b. **Gharaunda**: Offers group homes for lifelong care and support.
   c. **Samarth-cum-Gharaunda**: Residential care for orphans and those from low-income households.

International Efforts for Supporting Persons with Disabilities

1. **Sustainable Development Goals (SDGs)**: The 2030 Agenda includes targets for persons with disabilities, particularly in education, employment, reducing inequalities, and promoting inclusive communities.
2. **Biwako Millennium Framework**: A regional action framework for an inclusive, barrier-free society for persons with disabilities in Asia and the Pacific.
3. **Rehabilitation 2030 (WHO)**: Initiative to promote disability-inclusive healthcare and strengthen global rehabilitation services.
4. **International Labour Organization (ILO) Standards**: Promotes inclusive employment through Convention No. 159 and other initiatives.
5. **Global Accessibility Awareness Day (GAAD)**: Celebrated annually to raise awareness about digital accessibility and inclusive technology.
6. **Marrakesh Treaty (WIPO)**: Aims to improve access to published works for individuals with visual impairments, addressing the "book famine."
7. **Global Action on Disability (GLAD) Network**: Connects donors and organizations to support disability-inclusive development and humanitarian efforts globally.

2. Supreme Court Ruling on Child Betrothals

1. **On October 18, 2024, The Supreme Court of India ruled that child betrothals are often used to avoid punishment under the Prohibition of Child Marriage Act (PCMA) 2006.**

2. **Child betrothals violate a child's "free choice" and "childhood."**

3. The Court urged Parliament to consider banning these practices by amending the Prohibition of Child Marriage Act **(PCMA), 2006 and and declared it will override all personal laws.**

4. This judgment **aims to tackle the ongoing issue of child marriage** and the cultural practices that support it.

What are Child betrothals ?

1. Child betrothals refer to the **practice of arranging a marriage for a child, typically before they reach the legal age of marriage.**

2. In many cultures, this **involves formal agreements between families to promise a child in marriage,** even if the **child is not yet mature enough to understand** or consent to the marriage.

3. This practice can **often lead to child marriage, where the child is forced to marry at a young age**, which can have serious implications for their **health, education, and personal freedom.**

Key Points of the Judgment

1. **The Supreme Court, led by Chief Justice D.Y. Chandrachud, said that the current anti-child marriage law (Prohibition of Child Marriage Act (PCMA) is not clear regarding child betrothals.**

2. The Court said that **child betrothals are often misused to bypass legal repercussions associated with child marriage.**

3. The Court **urged Parliament to ban child betrothals and classify any child whose marriage is arranged as "a minor in need of care and protection"** under the **Juvenile Justice Act 2015.**

4. The judges said that **India has not adequately addressed the issue of child betrothals, despite international recognition of the problem since the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) in 1977.**

5. The **PCMA defines girls under 18 and boys under 21 as children,** making child marriage a criminal offense and a social issue.

Background on Prohibition of Child Marriage Act (PCMA):

1. **Under PCMA, girls below 18 and boys under 21 are considered children**.

2. The act criminalizes **child marriage and recognizes it as a social evil.**

3. The government's recent note **aimed to clarify that PCMA should take precedence over conflicting personal laws** but has **yet to be formally adopted.**

Impacts on Boys and Girls:

1. **The Court pointed out that boys also suffer due to societal pressures**, often **leading to violence against child brides.**

2. The judgment highlighted the **need to consider the rights and experiences of boys alongside girls** in the context of child marriage.

Progress and Challenges:

1. The **Court said that since the PCMA was enacted,** the **rate of child marriages in India has decreased from 47% to 23.3%.**

2. However, **challenges remain in effectively preventing child marriages.**

3. The **existing programs are helpful but not comprehensive enough** to tackle the issue fully.

Concerns Raised by the Court:

1. The Court **linked child marriage to the increased risk of sexual exploitation, particularly for girls,** emphasizing that it **fundamentally undermines their rights and dignity.**

2. Child marriage **means that children are forced to get married, which forces them to take on adult responsibilities,** like **running a household or having children.**

3. This **takes away their chance to enjoy being kids and experiencing a normal childhood**, such as going to school, playing, and growing up without pressure.

4. It can harm their physical and **emotional well-being, preventing them from living a carefree childhood.**

Recommendations and Guidelines:

1. **Sexuality Education**: The Court **recommended implementing age-appropriate and culturally sensitive sexuality education** in schools.

2. **Community Initiatives**: Suggested initiatives like a **'Child Marriage Free Village'** campaign to raise awareness and combat child marriage at the community level.

3. **Online Reporting Mechanism**: The **establishment of a portal for reporting child marriages,** aimed at facilitating timely intervention.

4. **Compensation Schemes**: Proposed the **Ministry of Women and Child Development create a compensation scheme** for girls opting out of child marriages.

5. **Annual Budget Allocation**: Suggested that an **annual budget be allocated to prevent child marriages and support affected individuals.**

Child Marriages in India :

1. Child marriage is a **significant social issue in India,** with the government taking steps to curb the practice through various legislative and awareness measures.

2. The **Prohibition of Child Marriage Act (PCMA), 2006** aims to prevent child marriages and protect the rights of minors.

3. The **Act was enacted to replace the Child Marriage Restraint Act of 1929. It was notified on November 1, 2007.**

Key Statistics

1. **Data from NCRB**: The National Crime Records Bureau **(NCRB) reports the number of child marriage cases registered under PCMA**, with an increasing trend over the years:
   a. **2017: 395 cases**
   b. **2018: 501 cases**
   c. **2019: 523 cases**
   d. **2020: 785 cases**
   e. **2021: 1,050 cases**

Prohibition of Child Marriage Act (PCMA), 2006

1. **Objective**: The Act aims to prohibit child marriages and **punish those involved.**

2. **Child Marriage Prohibition Officers (CMPOs)**:
   a. Appointed by **State Governments** to oversee and enforce the Act.
   b. Responsibilities include **preventing child marriages, collecting evidence for prosecutions**, and raising awareness about the negative impacts of child marriage.

State vs. Central Jurisdiction

1. **Constitutional Framework**:
   a. **State Subject**: Law and order, **including child marriage, falls under the State List of the Seventh Schedule of the Constitution.**
   b. **Implementation**: The responsibility for enforcement lies with State Governments, which are given the task of maintaining law and order and protecting citizens' rights.

Central Government Initiatives:

1. **Awareness Drives**: The Central Government conducts media campaigns and outreach programs to educate the public about the harmful effects of child marriages.

2. **Beti Bachao Beti Padhao (BBBP)**: A government scheme focusing on gender equality and discouraging child marriage.

3. **National Commission for Protection of Child Rights (NCPCR)**: Engages in awareness programs and consultations to address child marriage issues.

4. **CHILDLINE (1098)**: A 24/7 emergency service for children in crisis, providing immediate assistance and interventions related to child marriage.

Challenges:

1. **Cultural Resistance**: Certain communities may resist the prohibition of child marriage, citing customs or religious beliefs. **Some have even challenged the Act in court based on personal laws.**

Geographic Disparities: **Certain states like Andhra Pradesh, Assam, Bihar, Jharkhand, Rajasthan, Telangana, Tripura, and West Bengal** report higher instances of child marriage compared to the national average.

Prohibition of Child Marriage (Amendment) Bill, 2021:

Introduced in Parliament on December 21, 2021.

Aims to raise the legal marriage age for women to 21 years, aligning it with that of men.

Proposes consequential **amendments across various personal laws, including:**

The Indian Christian Marriage Act, 1872

The Parsi Marriage and Divorce Act, 1936

The Muslim Personal Law (Shariat) Application Act, 1937

The Special Marriage Act, 1954

The Hindu Marriage Act, 1955

The Foreign Marriage Act, 1969

The Bill has been referred to the **Department Related Parliamentary Standing Committee on Education, Women, Children, Youth and Sports** for examination.

Impact of the Prohibition of Child Marriage Act:

Prevalence Reduction: Since the enactment of the PCMA, the prevalence of child marriage has significantly **decreased from 47% in 2006 to 23.3% during the NFHS-5 (2019-21).**

Focus on High-Prevalence States: Continued efforts are required in states with higher rates of child marriage to further reduce the prevalence.

3. Supreme Court Hearing on Marital Rape

1. **On 17 oct, 2024,** The Supreme Court of India heard the petitions (a significant case regarding the **marital rape exception (MRE)** in Indian law).

2. This **exception allows husbands** to have sexual intercourse **with their wives without consent, as long as the wife is above 18 years old.**

3. This provision exists in **Section 375 of the Indian Penal Code (IPC)** and the new **Bharatiya Nyaya Sanhita (BNS)**.

Historical Context

1. The issue gained attention in **2017** when **Hrishikesh Sahoo** was **accused of rape and cruelty by his wife.**

2. He **used the MRE as a defense**, but the **Karnataka High Court** rejected this argument, **calling the exception "regressive" and "discriminatory."**

3. This led to further appeals and **new petitions in the Supreme Court,** especially after a divided ruling by the **Delhi High Court** in **2022.**

Key Questions from the Court in recent hearing :

1. Chief Justice of India **(CJI) D Y Chandrachud raised an important question: If the court removes this law (the exception for husbands), would it create a new legal offense?**

2. He also asked **whether the court has the authority to review** the validity of this law.

Arguments from Petitioners:

1. Senior advocate **Karuna Nundy**, representing some of the petitioners, mentioned that **there are outdated ideas in the law**, like the **Hale's principle**, which suggests that a **husband cannot be charged with raping his wife.**

2. This principle is **based on old beliefs** that a **wife gives perpetual consent when she gets married.**

Government's Change of Position:

1. The government has acknowledged that **it no longer supports Hale's principle.**

2. They agree that **just because someone is married does not mean they automatically consent to sex**.

3. However, they argue that **there are other laws (like those dealing with domestic violence)** that already address issues in marriages.

Concerns about Marriage:

1. The court mentioned that the **government believes making non-consensual intercourse within marriage a crime could harm the institution of marriage.**

2. Nundy countered this by saying that **marriage is a personal relationship.**

3. A law should not threaten marriage unless it makes marriage itself illegal.

Legal References

1. **Section 67 of the BNS:** The court referred to another law, **Section 67**, which states that **if a husband has sex with his wife who is living separately without her consent, it is punishable.**

2. This shows that the **law recognizes some rights regarding consent, even in a marriage.**

Next Steps

1. The hearing will continue on **October 22**. During this time, the **court will explore what removing the marital rape exception would mean for the law and society**.

2. The discussions will focus on the importance of consent in marriage and how the law can protect individuals' rights.

The Supreme Court's decision will revolve around 3 key questions:

1. **Right to Equality: Does the MRE violate a married woman's right to equality** by denying her the same protections **as unmarried women?**

2. Keeping this exception **creates two classes of victims,** which goes against the principle of "**substantive equality."**

   a. substantive equality is about **creating a just and equitable society** where everyone has the **opportunity to reach their full potential,** regardless of their background.

3. The court could draw upon the idea of **"transformative constitutionalism,"** which promotes social change through legal interpretation.

4. **Transformative constitutionalism** is a powerful tool for **promoting social change and ensuring** that **constitutions remain relevant in a rapidly evolving world.**

5. However, it is important to note that it is not without its critics, **who argue that it can lead to judicial overreach** and **undermine the principles of democracy** and the rule of law.

6. **Examples of transformative constitutionalism in action:**

   a. **India:** The Indian Supreme Court has played a significant role in **upholding human rights and protecting the rights of marginalized groups**.

   b. **Brazil:** The Brazilian Supreme Court has been instrumental in **advancing social justice and economic equality.**

7. **Constitutional Morality:** The court must **consider whether the MRE is outdated and incompatible** with modern values.

8. Previous landmark judgments, such as **Vishaka v State of Rajasthan (1997)** and **Independent Thought v Union of India (2017)**, have advanced women's rights in India. The court can build on this **jurisprudence**.

9. **Right to Privacy:** The MRE could also infringe on a woman's right to privacy under **Article 21 of the Constitution**.

10. The Supreme Court has previously recognized that privacy includes bodily autonomy and the right to refuse sex.

11. This principle was established in cases like **K S Puttaswamy (2017)**, which deemed privacy a fundamental right.

Current Legal Framework

1. While there are laws like the **Protection of Women from Domestic Violence Act (2005)** to provide some remedies for women, **they do not specifically address marital rape** as a crime.

2. This upcoming review in the Supreme Court **provides a chance to change this outdated law** that violates women's rights under the **Indian Constitution**.

Effects of Marital Rape:

1. **Data on marital rape is limited** due to societal stigma, fear, and shame.

2. However, existing statistics are alarming.

3. The **National Family Health Survey (NFHS-5)** indicates that about **one-third of married women** aged **18-49 have faced physical or sexual violence** from their husbands.

4. Marital rape **denies women their autonomy, treating them as objects** rather than equal partners in marriage.

   a. **Psychological Effects:** Victims **may suffer from chronic depression,** anxiety, post-traumatic stress disorder **(PTSD)**, and suicidal thoughts.

   b. **Physical Effects:** They may experience **chronic pain, reproductive health issues,** and injuries that often go untreated due to fear of further violence.

   c. **Support Systems:** Over **90% of women** who experience **sexual violence do not seek help** because they **do not recognize it as a crime;** they often see it as a husband's "right."

Societal Impact:

1. **Abusive marriages** create **toxic environments not just for the partners** but also for children, who may **experience anxiety** and aggression, affecting their long-term emotional and social development.

   Arguments Against Criminalization

   a. Some opponents, including government representatives, argue that **criminalizing marital rape could harm family life and lead to false allegations.**

   b. However, **this perspective overlooks the realities faced by many women.**

   c. True **marital harmony is based on respect and consent**, not fear or coercion.

Global Context

1. India's current stance on marital rape is an outlier compared to international norms.

2. Most advanced countries have already criminalized marital rape, with about **150 countries** recognizing it as a crime. The marital rape exception has been abolished in various countries:

   a. **UK:** Overturned in 1991.

   b. **Canada:** Criminalized in 1983.

   c. **South Africa:** Criminalized in 1993.

   d. **Australia:** Criminalized starting in 1981.

   e. **India's retention of the MRE contradicts** international human rights standards.

4. International Day of the Girl Child

The **International Day of the Girl Child is observed annually on October 11**. This day serves as a critical reminder of the need to empower and protect girls worldwide.

   a. It shows the importance of gender equality, access to education, and opportunities for young girls.

   b. **The day aims to create an environment where girls can thrive, equipping them with the tools to lead and shape their futures.**

Historical Context

1995 Beijing Conference:

1. The World Conference on Women held in Beijing marked a significant turning point for advancing the rights of women and girls globally.

2. During this conference, the **Beijing Declaration and Platform for Action** was unanimously adopted by countries, establishing one of the most progressive frameworks for promoting gender equality.

3. For the first time, it specifically recognized the distinct rights of girls and called for global action to address their unique needs.

UN Resolution 66/170:

1. Building on the momentum from the Beijing Conference, the United Nations General Assembly passed Resolution **66/170 on December 19, 2011, designating October 11 as the International Day of the Girl Child.**

2. This resolution focuses on recognizing the rights of girls and raising awareness about the obstacles they face, emphasizing the urgent need for empowerment and protection.

Importance of Empowering Girls

1. Empowering girls is not merely an act of charity; it is a societal imperative.

2. When girls are given equal opportunities for education, safety, and **healthcare**, they can transform into **future leaders, workers, and change-makers.**

3. This empowerment is essential for social and economic development, **not just for individuals** but for communities and nations as a whole.

Theme for 2024: Girls' Vision for the Future

1. The theme for this year's celebration, **"Girls' Vision for the Future,"** highlights the aspirations and hopes that girls possess despite the challenges they face.

2. Research by **UNICEF indicates that girls are determined to create a better future for themselves** and their communities.

3. However, to realize this vision, girls need **allies— governments, communities**, and individuals who actively listen to and respond to their needs.

4. When adequately supported, girls can **unleash their full potential, leading to positive impacts** that extend beyond themselves to their families, communities, and economies.

Why Advocate for Girls' Rights?

1. The simple fact of being born a girl should not limit one's potential.

2. **Unfortunately, many girls worldwide still face restrictions that affect their choices and opportunities.**

3. The statistics on gender inequality are alarming, revealing the numerous challenges girls encounter, such as limited access to education and healthcare.

   However, these challenges are not insurmountable. With effective initiatives and collective efforts, progress can be made toward a future where every girl has access to the resources they need to succeed.

Gender Equality in the Indian Constitution

The Indian Constitution embodies the principle of gender equality. It guarantees fundamental rights to women and empowers the state to **take affirmative action against historical socio-economic and political discrimination.**

   a. Key provisions ensure that women are protected from discrimination based on sex and gender.

   b. Empowerment of women transcends policy; it is a transformative process that enables women to claim equal opportunities across economic, cultural, social, and political spheres.

   c. This includes the ability to make informed decisions both inside and outside the home, influencing societal change for a better future.

Government Initiatives for Girl Child Empowerment

1. In India, the total population of women is **approximately 58.75 crore, according to the 2011 Census.**

2. Empowering and protecting girls is critical for sustainable development and societal advancement.

3. Recognizing and upholding girls' rights is essential for building an equitable future.

Key Government Schemes:

1. **Beti Bachao, Beti Padhao:** Aimed at promoting gender equality and ensuring the survival, education, and empowerment of girls.

2. **Sukanya Samriddhi Yojana:** Launched in 2015, this scheme encourages parents to save for their daughters' education and marriage, ensuring financial security.

3. **Scheme for Adolescent Girls (SAG):** Addresses health and nutritional needs for adolescent girls.

4. **Udaan:** An initiative launched in 2014 to increase enrollment of girl students in prestigious engineering institutions.

5. **National Scheme of Incentive to Girls for Secondary Education (NSIGSE):** Launched in 2008, it aims to improve educational opportunities for girls, particularly from marginalized communities.

Legal Measures for Protection

India has implemented several legal measures to empower and protect girls:

1. **Prohibition of Child Marriage Act, 2006:** This act aims to eliminate child marriage by penalizing those involved.

2. **Protection of Children from Sexual Offences (POCSO) Act, 2012:** This legislation addresses child abuse and includes updated rules to enhance its effectiveness.

3. **Juvenile Justice Act, 2015:** Ensures care and protection for children in need.

4. **Mission Vatsalya:** Focuses on child development and protection, offering services such as the Child Helpline and the Track Child portal.

5. **PM CARES for Children Scheme:** Provides support for children orphaned due to COVID-19.

   These initiatives create a supportive environment that promotes the rights and well-being of girls in India.

Call to Action

The need for urgent action to support girls cannot be overstated. Investing in girls' futures is a direct investment in the collective future of our global society. On this International Day of the Girl Child, let us reaffirm our commitment to championing the rights of every girl and helping them realize their full potential. The time to act is now—when girls thrive, society thrives!

5. Food Safety Laws in States

1. In October 2024, the Uttar Pradesh (UP) government mandated food establishments to clearly display the names of their operators, proprietors, managers, and other key personnel.

2. This step was taken in response to reports of food adulteration, such as incidents where food items were contaminated with human waste or other harmful substances.

3. This move aims to **improve accountability in food safety.**

Food Safety Requirements under the Food Safety and Standards Act, 2006 (FSSA)

1. **Registration or Licence**: According to the FSSA, all food business operators **must either register or obtain a licence** from the **Food Safety and Standards Authority of India (FSSAI)**.

   a. The **registration certificate or licence**, which includes the owner's identity and the establishment's location, **must be displayed prominently** at the food business premises.

2. **Penalties for Operating Without a Licence**: As per **Section 63 of the FSSA**, any food business operator without a valid licence can face up to **six months in jail** and a **fine of up to Rs 5 lakh**.

3. **Non-Compliance with FSSA Regulations**: If a food business operator does not comply with FSSA regulations, an **"Improvement Notice"** may be issued under **Section 31**.

   a. **Failure to comply** with this notice can result in the **suspension or cancellation of the operator's licence**.

   b. **Penalties for Violations**: Under **Section 58**, **penalties of up to Rs 2 lakh** can be imposed for violations where no specific penalty is defined.

State Governments' Power to Make Rules Under the FSSA

1. **State Authority: Section 94(1)** of the **Food Safety and Standards Act (FSSA)** empowers state governments **to create rules**, but this requires **prior approval from the Food Safety and Standards Authority of India (FSSAI)**.

2. **Assignment of Additional Functions:** Under **Section 94(2)**, State governments are allowed to **assign extra duties and responsibilities** to the **Commissioner of Food Safety**, as per **Section 30 of the FSSA**.

   a. This includes creating rules related to food safety within the state's jurisdiction, although subject to the central government's oversight.

3. **Process of Rulemaking by States:** As per **Section 94(3) of the FSSA**, any rules formulated by state governments **must be published** and must also **receive approval from the state legislature**.

Supreme Court's Stand on Such Orders

1. The Supreme Court intervened in 2024 when similar orders were issued by police authorities in Uttar Pradesh and Uttarakhand for the **Kanwar Yatra**, requiring food vendors to display their identities.

2. The Court ruled that while the FSSA grants powers to a "**competent authority**" to issue such orders, the police cannot take over this responsibility.

Legal Challenges to State Directives

1. **Violation of Article 15:** Critics contend that these directives force individuals to disclose their religious and caste identities.

   a. This practice could lead to **discrimination based on religion and caste**, which is prohibited under **Article 15(1)** of the Constitution.

   b. **Article 15(1)** ensures that the State does not discriminate against any citizen based on **religion, race, caste, sex, place of birth**, or any combination thereof.

2. **Violation of Article 17:** The directives may **indirectly promote the practice of untouchability**, which was formally abolished by **Article 17** of the Constitution.

   a. **Article 17** prohibits untouchability and mandates its complete abolition.

3. **Violation of Article 19:** Critics argue that these directives could result in the **economic exclusion of specific communitie**s.

   a. This violates **Article 19(1)(g)**, which guarantees the **right of individuals to practice any profession** or **carry on any trade or business**.

Government's Justification

1. The UP government justified its **recent directives, including the installation of CCTV cameras in food establishments**, by citing **public health concerns and incidents** of **food adulteration.**

2. This reflects an **increased focus on securing food safety**.

General Provisions to Prevent Food Adulteration under the FSS Act, 2006

1. **Use of Food Additives:** Food additives or processing aids can only be used if they comply with the provisions of the FSS Act and its related regulations.

2. **Toxic Substances and Heavy Metals:** Food must not contain any harmful contaminants, toxic substances, toxins, hormones, or heavy metals in amounts exceeding the limits prescribed by regulations.

3. **Pesticide and Veterinary Drug Residues:** Food products should not have residues of pesticides, insecticides, veterinary drugs, antibiotics, or microbiological counts above the prescribed limits.
   a. Insecticides can only be used on food articles if they are fumigants registered and approved under the **Insecticides Act, 1968**.

4. **Genetically Modified Foods:** The FSS Act places restrictions on the production, distribution, sale, or import of genetically modified foods, novel foods, irradiated foods, organic foods, health supplements, etc., unless specifically allowed by the Act and its regulations.

5. **Packaging and Labelling:** Food products must adhere to specified packaging and labelling requirements.
   a. Labels should not include false or misleading claims regarding the food's quality, quantity, nutritional value, or any medicinal or therapeutic benefits.

6. **Unfair Trade Practices:** Engaging in unfair trade practices, such as falsely representing the quality, standard, or usefulness of food products, is prohibited under the Act.

About the Food Safety and Standards Authority of India (FSSAI)

1. FSSAI is an **autonomous statutory body** formed under the **Food Safety and Standards Act (FSSA), 2006**.

2. The FSSA, 2006 integrates various earlier laws related to food safety, including: **Prevention of Food Adulteration Act, 1954; Fruit Products Order, 1955; Meat Food Products Order, 1973**

3. **Ensures public health protection** by supervising and regulating food safety and quality in India.

4. **Objective:** Operates under the **Ministry of Health and Family Welfare**.

5. **Key Initiatives by FSSAI:** World Food Safety Day, Eat Right India, State Food Safety Index, RUCO (Repurpose Used Cooking Oil), Food Safety Mitra

6. Global Hunger Index 2024

1. In October 2024, the **Global Hunger Index (GHI) 2024** has been released by **Concern Worldwide** and **Welthungerhilfe**. It shows that **India faces a 'serious' hunger situation**, ranking **105th out of 127 countries**.

What is the Global Hunger Index?

1. The **Food and Agriculture Organization (FAO)** defines hunger as **food deprivation** or **undernourishment**, where an individual regularly consumes fewer calories than needed for basic energy requirements.

2. These requirements are affected by factors like **gender**, **age**, **height**, and **physical activity**, which all determine the necessary energy for maintaining a healthy and productive life.

3. Its main aim of the **Global Hunger Index (GHI)** is to **monitor** and **measure hunger** at **global**, **regional**, and **national levels**.
   a. The GHI also seeks to **raise awareness** about the **fight against hunger** and draw attention to regions where hunger is most severe, urging for **increased action**.

What are the Indicators of Hunger?

The GHI uses a formula based on four key indicators to calculate hunger:

1. **Undernourishment**: This measures the percentage of the population that does not get enough calories to meet their basic dietary needs.

2. **Child Stunting**: This indicates the percentage of **children under five** who are **shorter than the average height for their age**, which suggests **chronic** (very severe) **undernutrition**.

3. **Child Wasting**: This measures the percentage of **children under five** who are **underweight for their height**, reflecting **acute undernutrition**.
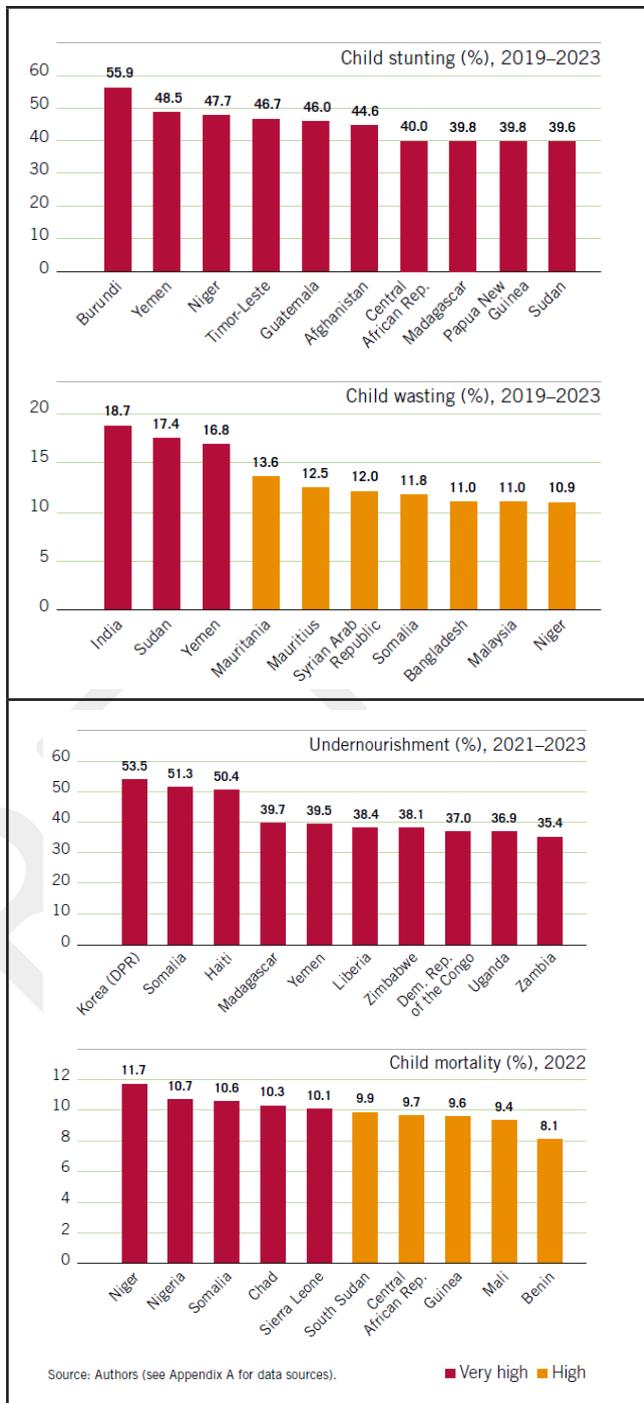
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4. **Child Mortality**: This represents the percentage of **children who die before the age of five**, which partially reflects the effects of **poor nutrition** and **unhealthy living conditions**.

Highlights of the Global Hunger Index: World

1. **Global GHI Score (2024):** The **GHI score for 2024 is 18.3**, indicating **moderate hunger**. This is a **slight improvement from the 2016 score of 18.8**, showing **slow progress** in addressing hunger.

2. **Child Malnutrition:**

   a. **Stunting**: **148 million children under five** are affected by **stunting (low height for age)**, which points to **chronic malnutrition**.

   b. **Wasting**: **45 million children under five** are suffering from **wasting (low weight for height)**, a sign of **acute malnutrition**.

   c. **Child Mortality**: Nearly **5 million children die before turning five** due to hunger-related causes.

   d. **Undernourishment**: **733 million people** worldwide face **undernourishment**, while **2.8 billion people struggle to afford a healthy diet** due to rising food prices and the ongoing cost-of-living crisis.

3. **Food Insecurity and Crises:** In 2023, **280 million people across 59 countries faced acute food insecurity**. By the end of 2024, 120–130 million people will likely need humanitarian food aid.

4. **Most Affected Regions:**

   a. **Regions with Severe Hunger**: **Sub-Saharan Africa** and **South Asia** are the most affected regions.

   b. **Countries with Alarming Hunger Levels**: Six countries—**Somalia, Yemen, Chad, Madagascar, Burundi**, and **South Sudan**—are facing extreme hunger levels.

   - **Somalia**: The hunger crisis in Somalia is prolonged due to ongoing conflicts, economic challenges, and climate shocks.

   - **51.3%** of the population does not get enough calories, ranking it as the 2nd-highest globally in terms of calorie deficiency.

Child stunting (%), 2019–2023

Child wasting (%), 2019–2023

Undernourishment (%), 2021–2023

Child mortality (%), 2022

Source: Authors (see Appendix A for data sources). ■ Very high ■ High

5. **Projections for Global Hunger: Global hunger will not be eradicated by 2030**. At the current rate of progress, the world might not see **low hunger levels until 2160**, which is **more than 130 years away**.

6. **Hunger Levels in Countries:** Six countries face alarming hunger levels - **Burundi, Chad, Madagascar, Somalia, South Sudan**, and **Yemen**. **Thirty-six countries** are experiencing **serious hunger levels**.

7. **Stagnation in Key Areas:** Progress in addressing hunger indicators is insufficient. **The four key indicators**—undernourishment, child stunting, child wasting, and child mortality—are **not improving fast enough** to meet global targets.

8. **Countries in Decline: Hunger has worsened in 22 countries** since 2016. These countries have moderate, serious, or alarming hunger levels. **Progress has stalled in 20 countries**, with improvements of less than 5%.

9. **Success Stories:** Some countries have shown improvement in their GHI scores. **Bangladesh, Mozambique, Nepal**, **Somalia**, and **Togo** have made notable progress, though hunger levels remain high.

10. **Compounding Challenges:** The **2024 GHI results** highlight several challenges that worsen hunger, particularly in the poorest countries:

    a. **Armed Conflicts: Conflicts continue to disrupt food production** and cause displacement, worsening food crises. Recent **conflicts in Gaza and Sudan** have intensified the situation.

    b. **Climate Change: Climate change is negatively affecting agriculture**, reducing yields and increasing food insecurity. Since 1961, **agricultural productivity in Sub-Saharan Africa has fallen by 34%** due to climate change.

    c. **High Food Prices and Market Disruptions: Rising food prices** are making it harder for people to access food, further deepening the hunger crisis.

    d. **Economic Challenges and Debt Crises: Economic downturns** and **high debt levels in low-income nations** are restricting their ability to invest in food security.

11. **Displacement and Inequality:** More than 115 million people have been displaced internally or forced to migrate due to conflicts, persecution, and climate-related disasters.

    a. **Rising inequality:** While extreme poverty has decreased in middle-income countries, income inequality remains high, especially in the poorest nations affected by conflict and instability.

    • Poverty levels in these regions are worse than before the pandemic.

Highlights of the Global Hunger Index: India

1. **GHI Score and Severity:** India's **Global Hunger Index (GHI)** score for 2024 is **27.3**, placing it in the **serious category**. Despite some improvements, **hunger levels** in India **remain high**.

2. **Child Malnutrition:**

    a. **Child Wasting**: India has one of the **highest child wasting rates** worldwide, which signifies **acute malnutrition**. The report states that **18.7%** of children **under five suffer from wasting**.

    b. **Child Stunting**: India faces a major issue with **child stunting** highlighting widespread chronic malnutrition. According to the report, around **35.5%** of children are stunted.

    c. **Undernourishment**: Approximately **13.7%** of India›s population is undernourished, indicating a significant problem with **food access**.

    d. **Child Mortality**: The report reveals that **2.9%** of children in India die before their 5th birthday, largely due to poor nutrition and unhealthy living conditions that **contribute to high death rates** for children under five.

3. **Food Security Challenges:** India's severe hunger problem is driven by multiple factors, including: **Poor diet quality**, **Income inequality**, **Rapid urbanization**, **Climate change**, and **Inadequate access to nutritious foods**.

    a. The **poor nutritional status of mothers** contributes directly to **child malnutrition**, resulting in an **intergenerational cycle of undernutrition**.

4. **Regional Comparisons: South Asia**, with India as a major contributor, has the highest rates of **child wasting** globally.

    a. With **281 million** undernourished people, South Asia makes up nearly **40%** of the global total of undernourished individuals.

5. **Government Initiatives:** India has demonstrated **significant political will** to address food and nutrition issues through initiatives such as: National Food Security Act (2013), Poshan Abhiyan (National Nutrition Mission), PM Garib Kalyan Yojana (PMGKAY), National Mission for Natural Farming, Eat Right India Movement, Mid-day Meal (MDM) scheme, Pradhan Mantri Matru Vandana Yojana, Mission Indradhanush

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Challenges vs Solutions

Challenges	Way Forward
Inefficient Public Distribution System (PDS): The NFSA covers 67% of the population, but over 90 million eligible individuals are excluded under the **Targeted Public Distribution System (TDPS).**	**PDS Enhancement:** Revamp the PDS to improve transparency, reliability, and affordability.
Income Inequality and Poverty: India has made progress in poverty reduction, with 24.82 crore people escaping multidimensional poverty in the last 9 years. However, income disparities persist, affecting access to food.	**Investment in Agriculture:** Promote diversified and nutritious food production, including millets. Focus on reducing food wastage by improving warehousing and cold storage infrastructure to cut post-harvest losses.
Nutritional Challenges and Dietary Diversity: Food security often focuses on calorie sufficiency rather than nutritional adequacy, leading to imbalanced diets.	**Social Audit and Awareness:** Implement audits and community-driven nutrition education programs.
Urbanization and Changing Food Systems: Rapid urbanization is altering food systems and consumption patterns.	**Complementing with SDGs:** Align efforts with SDGs 12 (Responsible Consumption) and 2 (Zero Hunger).
Gender-Based Nutritional Gap: Women and girls face unequal access to food, resulting in smaller portions or lower-quality meals.	**Health Investments:** Focus on maternal and child health with better sanitation and hygiene practices.

7. How India's temples are run

Recently, Supreme Court heard petitions regarding the alleged adulteration of ghee in Lord Venkateswara's laddu prasadam.

a. This has raised the debate around **government control of temples in India** has resurfaced.

b. Hindu organizations, including the **Vishwa Hindu Parishad (VHP)**, are calling for greater autonomy for temples from state oversight.

c. Andhra Pradesh Deputy Chief Minister Pawan Kalyan has called for a "**Sanatana Dharma Rakshana Board**" to look into all issues relating to temples.

Historical Background of State Regulation of Temples

1. **Colonial Legislation:** During **1810-1817**, the **East India Company** introduced laws in **Bengal**, **Madras**, and **Bombay** to regulate temple administration and prevent the misappropriation of temple income.

2. **Religious Endowments Act (1863):** The British government aimed to secularize the management of temples by transferring control to committees.

a. Despite this shift, the government continued to exert influence over temple affairs through legal structures such as the **Civil Procedure Code and the Charitable and Religious Trusts Act (1920)**.

3. **Madras Hindu Religious Endowments Act (1925)**: This Act created the **Hindu Religious and Charitable Endowments Board**, a statutory body to oversee temple administration.

a. The Act allowed provincial governments to enact laws related to temple affairs and provided for the oversight of a board of commissioners.

4. **Post-Independence Developments:**

a. **Law Commission Recommendations (1950)**: The Law Commission suggested legislation to prevent the misuse of temple funds, leading to the creation of the **Tamil Nadu Hindu Religious and Charitable Endowments (TN HR&CE) Act, 1951**.

b. This Act established a dedicated Department of Hindu Religious and Charitable Endowments to manage, protect, and preserve temples and their assets.

c. **Bihar Hindu Religious Trusts Act (1950)**: Simultaneously, Bihar passed its own legislation to regulate religious institutions within the state.

Management of Places of Worship in India

Hindu Temples:

1. **Government Control**: Most Hindu temples in India are regulated by state laws. Several states have passed laws granting the government authority over temple management.

    a. In **Tamil Nadu**, the **Hindu Religious and Charitable Endowments (HR&CE) department** manages temple affairs, including finances and the appointment of temple heads.

    b. The **Andhra Pradesh** government oversees the administration of the **Tirumala Tirupati Devasthanams (TTD)** and appoints its head, responsible for managing the **Tirupati Temple**.

    c. Hindu temples constitute the majority of the estimated 30 lakh places of worship in India, according to the 2011 Census.

2. **Utilisation of Income**: Revenue from major temples is often used for the upkeep of smaller temples and various social welfare activities, such as hospitals, orphanages, and educational institutions.

3. **Legal Framework**: State intervention in temple affairs is supported by **Article 25(2)** of the Indian Constitution, which allows regulation of religious practices to ensure accountability.

Muslim and Christian Places of Worship:

1. Places of worship for **Muslims and Christians** are generally **managed by community-based boards or trusts**, which operate independently of government control. This ensures **decentralised management**.

Sikh, Jain, and Buddhist Temples:

1. The administration of Sikh, Jain, and Buddhist temples **varies depending on the state**. However, **community involvement** is essential in their governance, often alongside **some level of government regulation**.

State Legislation and Intervention:

1. Religious endowments and institutions are included in the **Concurrent List of the Seventh Schedule** of the Indian Constitution, which allows both the Centre and states to legislate on this matter.

2. This framework has resulted in **diverse management approaches** across different regions.

3. States, such as **Jammu and Kashmir** with the **Shri Mata Vaishno Devi Shrine Act, 1988**, have enacted specific legislation for individual temples. This outlines their administration and funding.

Constitutional Provisions for State Regulation of Religion

1. **Article 25(1)** guarantees individuals the freedom to practice, profess, and propagate their religion, subject to restrictions for public order, morality, and health.

2. **Article 25(2)** authorizes the state to regulate the economic, financial, political, or secular activities associated with religious practices. It also allows the government to enact laws aimed at social welfare, reforms, and ensuring that Hindu religious institutions are accessible to all Hindu castes.

Legal Perspectives on Government Control

1. **Supreme Court Rulings**: The courts have been cautious about interfering in matters of religious administration, often upholding the state's right to regulate.

2. **Shirur Mutt Case (1954)**: The Supreme Court affirmed that while religious bodies have the right to administer their properties, the state can also impose regulations.

3. **Ratilal Panachand Gandhi Case (1954)**: The court recognized the fundamental rights of religious bodies but allowed for state regulation.

4. **Pannalal Bansilal Pitti Case (1996)**: The court upheld a law that altered hereditary rights in temple administration, affirming that laws need not apply uniformly to all religions.

5. **2022 Petition**: A recent petition to free temples from state control was withdrawn after the Supreme Court emphasized that existing regulations serve broader societal needs.

The Demand for Autonomy

1. **1959**: The **Rashtriya Swayamsevak Sangh (RSS)** first demanded the return of temple management to Hindu devotees.

2. **1988**: The **Akhil Bharatiya Karyakari Mandal** urged state governments to cede control over temples.

3. **2021**: The VHP reiterated its demand for a central law to free temples from government oversight.

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4. **Recent Developments**: In recent years, some state governments have initiated steps to relax control over temples, including those in **Madhya Pradesh** and **Karnataka**.

Tirupati Laddu Prasadam Controversy

1. **N. Chandrababu Naidu**, the Chief Minister of Andhra Pradesh, has accused the previous **YSRCP government** of using animal fat in the preparation of the Tirupati laddu prasadam at Tirumala.

2. The **Tirumala Tirupati Devasthanams (TTD)** clarified that purification rituals were conducted at the **Sri Venkateswara temple** to eliminate any ill effects and restore the sanctity of the laddoo prasadam.

Key Facts about Tirupati Laddu

1. **Historical Significance**: The **Tirupati laddu prasadam**, offered to **Lord Venkateswara**, is over **300 years old**, with its origins dating back to **1715**.

2. **Preparation Process**: The laddu is made in a special kitchen called **Potu** by skilled makers with proper hygiene from a dedicated community that has been involved in this tradition for centuries.

3. **Distribution**: The **first laddu** of each batch is offered to the Lord, after which it is mixed with the rest and distributed to devotees.
   a. **One free laddu** is provided to every visitor, while additional laddus are sold for **Rs 50 each**.

4. **Ingredients**: The laddu is prepared using **high-quality ghee**, **chickpea flour**, **sugar**, **small sugar cubes**, **cashew nuts**, **cardamom**, **camphor**, and **raisins**.
   a. Each laddu contain specific quantities of **cashew**, **sugar**, and **cardamom**, and weigh exactly **175 grams**.

5. **Quality Control:** The **Tirumala Tirupati Devasthanams (TTD)**, which manages the Sri Venkateswara Temple, has a **state-of-the-art food testing laboratory** that conducts quality checks on each laddu batch.

6. **Geographical Indication (GI) Tag: Tirupati laddu** received its **GI tag in 2009**, which was renewed in **2018** and is valid until **2028**.

Sri Venkateswara Temple

1. **Dravidian Architecture of Sri Venkateswara Temple**: The **Sri Venkateswara Temple** is built in the **Dravidian style** of architecture, which is common in **Karnataka**, **Andhra Pradesh**, and northern **Tamil Nadu**.

2. Characteristics of Dravidian Temple Architecture are:
   a. The temple is enclosed within a compound wall. The front wall has an entrance gateway in its center, which is known as a **gopuram**.
   b. The shape of the main temple tower, **vimana**, is like a stepped pyramid that rises up geometrically.
   c. The word '**shikhara'** is used only for the crowning element at the top of the temple which is usually shaped like a small stupika or an octagonal cupola.
   d. **Large water reservoir** or a temple tank is enclosed within the complex.
   e. The **subsidiary shrines** are either incorporated within the main temple tower or located as distinct, separate small shrines beside the main temple.

8. Weather Forecasts at Panchayat Level

1. On **October 24, 2024**, the Indian government launched the **Gram Panchayat-Level Weather Forecasting** initiative, which offers five-day weather forecasts updated every hour.

2. This marks a significant step towards localized forecasting across the country, aimed at empowering rural communities and enhancing disaster preparedness.

About Gram Panchayat-Level Weather Forecasting initiative :

1. This initiative is a joint program of the **Panchayati Raj Ministry**, the **India Meteorological Department (IMD)**, and the **Ministry of Earth Sciences**.
   o **IMD was established in 1875.**
   o It is the **National Meteorological Service of the country** and the principal government agency in **all matters relating to meteorology and allied subjects.**.

2. **Objective**: It **aims to empower rural communities, enhance disaster preparedness** at the grassroots level, and benefit farmers and villagers.

3. The initiative is designed to strengthen grassroots governance and promote **sustainable agricultural practices,** making **rural populations more climate-resilient** and better equipped **to handle environmental challenges.**

Forecast Details:

1. **Weather forecasts will be accessible on:**
   a. **e-GramSwaraj** (already operational)
   b. **Gram Manchitra**
   c. **Meri Panchayat app**

2. **Users can access:**
   a. Current temperature
   b. Wind speed
   c. Cloud cover (percentage)
   d. Rainfall
   e. Relative humidity
   f. **5-day forecasts for:**
      i. **Minimum and maximum temperatures**
      ii. **Rainfall**
      iii. **Cloud cover**
      iv. **Wind direction**
      v. **Wind speed**
      vi. **Overall weather conditions**

Benefits to the Public:

1. This information will help farmers for better plan agricultural activities, including:
   a. **Sowing**
   b. **Irrigation**
   c. **Harvesting**

2. The introduction of localized weather forecasting will serve as a crucial tool to safeguard agricultural livelihoods and enhance rural preparedness **against natural disasters.**

3. **Daily updates on temperature,** rainfall, wind speed, and cloud cover will empower Gram Panchayats **to make informed decisions regarding agricultural practices.**

Importance of Localized Forecasting:

1. Despite advances in forecasting technology, **localized forecasts help to mitigate uncertainties** associated with predicting smaller-scale weather events.

2. The more precise a forecast is, the greater the inherent uncertainty, particularly for **localized events such as cloudbursts.**

3. The initiative will serve around **2.55 lakh village panchayats** across the country, each with **resident populations averaging a few thousand.**

Current Capabilities of IMD

1. Currently, **weather forecasting is available at the district and block levels.**

2. The IMD has developed the capability to forecast weather events over a **12 km x 12 km** area and is experimenting with forecasts for **3 km x 3 km** grids, aiming for hyper-local forecasts at a **1 km x 1 km** level.

Training and Capacity Building

1. The Panchayati Raj Ministry is organizing a training workshop on **"Weather Forecasts at the Gram Panchayat Level,"** which will be attended by over **200 participants**, including elected representatives of panchayati raj institutions and state officials.

2. This training will **equip panchayat representatives with the knowledge and skills** to effectively utilize weather forecasting tools, enabling informed decision-making and enhancing climate resilience in their communities.

Conclusion

The Gram Panchayat-Level Weather Forecasting initiative represents a transformative step in localized weather prediction in India. By providing timely and accurate weather information, it empowers rural communities, enhances agricultural productivity, and fosters resilience against climate change. This initiative not only supports farmers in making informed decisions but also strengthens grassroots governance amid environmental challenges.

H. ETHICS

## 1. Mahatma Gandhi and Compassion

1. Recently, Former **United Nations Secretary-General Ban Ki-Moon** emphasized the importance of Mahatma Gandhi's compassion.

2. He noted that Gandhi embodied and practiced the **principles of the UN Charter** long before its establishment and inspired global figures like **Nelson Mandela** and **Martin Luther King Jr.**

3. **Gandhi's core values** like **nonviolence, truth, peace, justice,** and **inclusion** are clear expressions of his compassion.

What is Compassion?

1. **Compassion** arises from recognizing the suffering of others and includes a desire to ease their pain or improve their conditions. It involves showing kindness, empathy, and a sense of moral responsibility towards individuals and communities.

2. It differs from: **Sympathy** (feeling pity or sorrow for another's suffering), **Empathy** (experiencing another person's feelings), **Compassion** (a blend of sympathy and empathy, combined with the intent to reduce suffering).

Gandhi's Quote on Kindness:

If anybody said that I should die if I don't take beef tea or mutton, even on medical advice, I would prefer death.
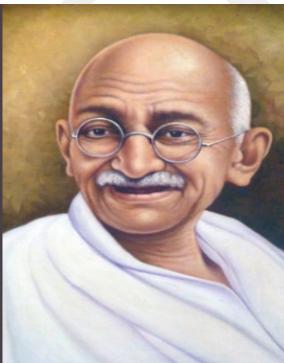
Role of Compassion in Public Service

1. **Human-Centered Approach**: Compassion helps civil servants focus on the well-being of citizens, ensuring their welfare is prioritized.

2. **Improving Service Delivery**: Compassionate policies and practices enhance the effectiveness and quality of public services.

3. **Engagement with Communities**: It involves understanding the needs and concerns of communities with a genuine sense of empathy.

Ethical Aspects of Compassion

1. **Social Justice**: Compassion **promotes fairness and equality**, ensuring policies and resource distribution address societal disparities.

2. **Ethical Leadership**: By putting **stakeholders' well-being before personal or organizational interests**, compassion nurtures ethical leadership.

3. **Inclusive Governance**: Compassion **encourages inclusivity and respect for diversity in decision-making** and service delivery.

Key Values of Mahatma Gandhi that Promotes Compassion

1. **Satyagraha:** It is a method to fight for one's rights without causing harm to others. Gandhi's **Champaran Satyagraha (1917)** was motivated by his **compassion for indigo farmers suffering exploitation** under British landlords.

2. **Equality:** Gandhi viewed **untouchability as a curse to society** and **worked tirelessly to end discrimination** against the lower castes.
   a. His compassion also extended to women, whom he regarded as **symbols of sacrifice and non-violence, advocating for their empowerment**.

3. **Respect for Humanity:** Gandhi demonstrated compassion even towards those who oppressed others, never promoting hatred towards the British people.

4. **Kindness:** As a dedicated vegetarian, Gandhi **opposed the slaughter of animals on moral grounds**.

5. **Sarvodaya (Welfare for All):** Gandhi believed that every individual has the divine presence of God within. He advocated that one can approach God through service to humanity, promoting welfare for all.

6. **Non-Violence:** Non-violence, or Ahimsa, was central to Gandhi's philosophy, viewed as a positive force for selfless action aimed at achieving Truth.

a. He considered truth as the supreme principle, to be pursued not only through words but also through thoughts and actions.

7. **Concern for Nature:** Gandhi spoke against the detrimental effects of large-scale urbanization, urging the need for conservation of nature and biodiversity.

8. **Altruism and Self-Sacrifice:** Gandhi's Talisman highlights his deep concern for others and his selfless attitude.

9. **Trusteeship:** Gandhi believed that wealthy individuals and landowners should view themselves as trustees of their wealth.

   a. He argued that they must hold their possessions on behalf of the community, with the responsibility to use their resources for the public good.

Gandhi's Quote on Nature:

The Earth has enough resources for our needs but not for our greed.

Gandhi's Quote on Self-Sacrifice:

Whenever you are in doubt, or when the self becomes too much, recall the face of the poorest and the weakest man you may have seen, and ask yourself, if the step you contemplate is going to be of any use to him

Examples and Case Studies

1. **Disaster Relief**: Compassionate approaches are essential in disaster management, helping in relief and rehabilitation efforts.

2. **Social Welfare Programs**: Compassionate policies that focus on marginalized communities help in the successful implementation of welfare programs.

3. **Healthcare and Education**: Compassionate initiatives that improve access to quality healthcare and education ensure better outcomes for all citizens.

Seven Deadly social sins identified by Mahatma Gandhi

1. **Wealth Without Work**: This refers to obtaining wealth without contributing through hard work or production, such as manipulating markets or assets for personal gain without adding value.

2. **Pleasure Without Conscience**: Enjoying pleasures without being mindful of one's responsibilities or the consequences of their actions.

3. **Knowledge Without Character**: Having too little or too much knowledge can be harmful if it is not accompanied by strong moral values and character.

4. **Commerce Without Morality**: This refers to running economic systems without ethical principles, which can lead to an immoral society.

5. **Science Without Humanity**: When scientific progress lacks understanding of its higher human purposes, it can lead to harmful consequences despite technological advancements.

6. **Religion Without Sacrifice**: Engaging with religion only for its social benefits, without addressing or attempting to solve social problems through self-sacrifice and effort.

7. **Politics Without Principle**: Politics becomes harmful when it lacks fundamental principles. Good politics is distinguished by its integrity and the people's genuine motives.

Example for Compassion

1. Mother Teresa was a Roman Catholic nun who dedicated her life to serving the poor and needy, and is known for her compassion. She believed that compassion was about preventing eternal suffering, and that it was best shown through service to others.

2. Baba Amte was a social activist who worked for the welfare of leprosy patients and the disabled, challenging societal prejudices.

Contemporary relevance of Mahatma Gandhi's Compassion

1. **Addressing the Climate Crisis**: Gandhi's philosophy of **living in harmony with nature** is crucial for tackling the ongoing climate crisis. His emphasis on sustainability aligns with current environmental challenges.

2. **Resolving Contemporary Conflict**: Gandhi's principle of "**hate the sin, not the sinner**" offers a way to engage with adversaries while preserving human dignity and fostering constructive dialogue.

3. **Dealing with Economic Crisis**: Gandhi's view of economics focuses on **social justice** and the **well-being of all**. He advocated for **self-sufficiency, decentralized production, and trusteeship**, promoting a **fair and inclusive economy**.

4. **Force for Social Change**: Gandhi's ideas continue to **inspire social movements**, such as the **Swachh Bharat Mission**, which focus on **improving public hygiene and promoting societal transformation**.

5. **Dealing with Modern Challenges**: Gandhi's principles of **compassion, non-violence, and truth** provide timeless solutions to modern challenges, **from social inequality to global peace efforts**.

Conclusion

Mahatma Gandhi's values remain a powerful force for change, shaping a generation of informed and empowered citizens. His principles continue to guide India and the world, helping address current challenges and promoting compassion, equality, and progress.

2. Personality In Focus: Ratan Naval Tata (1937-2024)

1. The demise of **Ratan Naval Tata**, the former chairman of the **Tata Group**, marked the end of a remarkable era in Indian industry.

2. Known for his transformative and charismatic leadership, he significantly influenced the global perception of Indian businesses.

3. His exemplary contributions earned him India's prestigious **Padma Vibhushan** (2008) and **Padma Bhushan** (2000).

4. The passing of Ratan Tata, one of India's most iconic business leaders, signifies the end of an era. At 86, he symbolized India's economic progress in the 21st century, representing growth, innovation, and ethical business practices.

Early Life of Ratan Naval Tata

1. **Birth**: Ratan Tata was born on **December 28, 1937**, in **Mumbai**.

2. **Education**: He studied **architecture and structural engineering** at **Cornell University** and later completed an **advanced management program** at **Harvard Business School**.

3. **Career**: Upon returning to India, Ratan Tata turned down a job offer from IBM. Instead, he joined **Tata Industries** in **1962**, influenced by J.R.D. Tata's encouragement.

4. **Transformational Leadership:** During his tenure, Ratan Tata steered the Tata Group to remarkable success, diversifying its portfolio across industries such as steel, automobiles, software, and telecommunications.
   a. His leadership transformed the conglomerate into a globally recognized entity.

Achievements of Ratan Tata

1. Ratan Tata's tenure as chairman, marked a period of transformation for the Tata Group. He introduced significant reforms, such as implementing retirement policies and nurturing young talent in leadership roles.

2. **Global Expansion Through Acquisitions:** Ratan Tata's visionary approach led to major international acquisitions, including:
   a. **Tetley Tea (2000)**: Marked Tata's entry into the global beverage industry.
   b. **VSNL (2002)**: Established Tata as a prominent player in telecommunications.
   c. **Corus Steel (2007)**: Strengthened Tata's position in the global steel market.
   d. **Jaguar and Land Rover (2008)**: Enhanced Tata's reputation in the luxury automobile segment.
   e. **Partnership with Starbucks (2012)**: Brought a globally recognized coffee brand to India.
   f. **Air India (2022)**: Reinforced Tata's commitment to revitalizing iconic Indian brands.

Key Values associated with the life of Ratan Tata

1. **Loves Simplicity:** Ratan Tata maintained a **low profile**, focusing on his work and avoiding unnecessary attention. In today's world which is driven by consumerism, he demonstrated simple living with deep thinking.

2. **Resilience and Perseverance:** Despite challenges, he successfully launched the **Tata Nano project** in **2008**, creating an affordable car for middle-class families in India.

3. **Visionary Leadership:** Under his leadership, the Tata Group expanded significantly, with revenues growing from $4 billion to $100 billion.

4. **Leadership with Humility:** Ratan Tata's leadership style was defined by **humility and hands-on involvement** (directly involved in doing something, rather than just talking about it). He began his career by working on the shop floor of Tata Steel to gain grassroots-level experience.

5. **Empathy and Social Responsibility:** He emphasized philanthropy through the **Tata Trust**, contributing to societal welfare. His organization played a leading role in providing **relief during natural disasters**.

6. **Spirit of Service:** As Chairman of the Tata Group, he led the restoration of the **Taj Hotel** after attacks and personally supported affected employees.

Key Lessons from the Life of Ratan Tata

1. **Compassionate Capitalism:** Ratan Tata embodied the spirit of "**compassionate capitalism**," significantly benefiting society and industries worldwide.

    a. He ensured that a substantial portion (60-65%) of Tata Sons' dividends supported charitable initiatives, focusing on health and education.

    b. **Compassionate capitalism** prioritizes social responsibility and sustainable practices. It recognizes that businesses have a responsibility to contribute to society's well-being and generate profits.

2. **Corporate Social Responsibility:** He championed a participative and inclusive approach to Corporate Social Responsibility (CSR), prioritizing disadvantaged communities and promoting a bottom-up approach.

3. **Contribution to Social Well-Being:** Beyond his business ventures, Ratan Tata made a lasting impact on social welfare. He pioneered the establishment of **India's 1st cancer hospital**, setting a benchmark in healthcare philanthropy.

4. **Business Ethics:** A firm believer in **ethical leadership**, he **prioritised strong ethical principles** and **upheld integrity and societal welfare** over short-term gains.

    a. Ratan Tata firmly believed business should focus on doing right for customers and stakeholders while adhering to ethical principles.

5. **Promoting Entrepreneurship:** He nurtured a culture of innovation by investing in startups like **CashKaro**, **Snapdeal**, **Ola Cabs**, **Dogspot**, and **Teabox**, thereby **encouraging entrepreneurship in India**.

6. **Commitment to Sustainability:** Under his leadership, the Tata Group aimed for **net zero emissions by 2045**, reinforcing sustainability as a core value.

    a. Tata Motors earned the **PETA India's Cow-Friendly Future Award** for its **use of vegan interiors** in the **AVINYA concept car**.

7. **Expanding Global Footprint:** Ratan Tata played a pivotal role in expanding the Tata Group internationally through key acquisitions like **Jaguar Land Rover** and **Corus**, solidifying its global presence.

Recognitions and Honors

1. **Assam Baibhav (2021):** Conferred by the **Government of Assam** for his impactful contributions.

2. **Honorary Officer of the Order of Australia (2023):** Recognized for strengthening ties between India and Australia.

3. **Honorary Doctor of Science (2008):** Awarded by **IIT Bombay** for his outstanding achievements.

4. **Honorary Knight Grand Cross of the Order of the British Empire (GBE) (2014):** Bestowed by **Queen Elizabeth II** for his exemplary work.

5. **Honorary Citizen Award (2008):** Given by the Government of Singapore.

6. **Padma Awards:** Honored with the **Padma Bhushan (2000)** and the **Padma Vibhushan (2008)**, two of India's highest civilian awards.

Conclusion

Ratan Tata's life serves as a shining example of ethical leadership, showcasing compassion, resilience, humility, and perseverance. His reforms within Tata companies—such as promoting equal opportunities for the LGBTQ community—stand as testaments to his inclusive vision. His legacy offers timeless lessons and inspiration for young people, businesses, and civil servants alike.

I. ESSAY

"From Dreams to Reality: The Stories of Visionaries Who Changed the World"

Science, innovation, and leadership have been the driving forces behind the growth of humanity. Many people, through their hard work and dedication, have made significant contributions to the world. These contributions have not only changed their fields but have also inspired millions of people around the world. This essay looks at the lives of four inspiring individuals—**Dr. APJ Abdul Kalam, Marie Curie, Albert Einstein, and Ratan Tata**—whose efforts and vision continue to motivate people today.

Dr. APJ Abdul Kalam: The Visionary Behind India's Space and Missile Programs

Dr. Avul Pakir Jainulabdeen Abdul Kalam, also known as Dr. APJ Abdul Kalam, is one of India's most famous scientists. Born on October 15, 1931, in the small town of **Rameswaram in Tamil Nadu**, he came from a modest family. Despite facing financial challenges, Kalam always dreamed big. He was passionate about flying and studied aerospace engineering to make his dream come true. Kalam worked for the Indian Space Research Organisation **(ISRO)** and the Defence Research and Development Organisation **(DRDO)**, where he helped develop **India's first satellite launch vehicle (SLV) and missiles like Agni and Prithvi.** His work earned him the title "**Missile Man of India**." But Dr. Kalam was not just focused on technology. He wanted to use science to improve India's future. **As President of India, he introduced the idea of "India 2020,"** a plan to make India a developed nation **through education, science,**

and technology. He believed that young people were the key to India's growth and encouraged them to dream big and work hard. His message continues to inspire millions of young Indians to contribute to the nation's success.

Marie Curie: The Pioneer in Radioactivity and Empowerment of Women

Marie Curie, **born Maria Skłodowska on November 7, 1867, in Warsaw, Poland**, made discoveries in the field of science. She was the **first woman to win a Nobel Prize and is the only person to win Nobel Prizes in two different fields—Physics (1903) and Chemistry (1911).** Curie is best known for her research on radioactivity, a term she herself created. Her **discoveries of the elements polonium and radium helped lead to important medical treatments**, like radiation therapy for **cancer, which continues to save lives today**. Despite facing many challenges as a woman in a male-dominated field, Curie never gave up. She worked tirelessly in the laboratory, even when it was dangerous for her health. Her life reminds us that with hard work and determination, we can overcome obstacles and achieve great things.

Albert Einstein: The Genius Who Changed Our Understanding of the Universe

Albert Einstein, born on March 14, 1879, in Ulm, Germany, is one of the most famous scientists of all time. His work changed the way we understand **space, time, and energy. Einstein's famous equation, $E=mc2E = mc^2E=mc2$,** shows how energy and mass are related and helped lead to important discoveries in physics. Einstein was not just a great scientist but also a thinker **who was not afraid to question the ideas of his time. His**

work on the photoelectric effect earned him the Nobel Prize in Physics in 1921 and helped open the door to the field of quantum mechanics. Even though Einstein was a genius, he faced challenges early in life. He struggled in school and was even considered a slow learner. But his love of learning and his curiosity about the world kept him going. His discoveries changed many areas of science and continue to influence modern technology, space exploration, and more. Einstein also used his fame to speak out for peace, civil rights, and justice. He believed that knowledge should be used to improve the world and make it a better place for everyone.

Ratan Tata: The Visionary Leader Who Transformed Indian Industry

Ratan Tata, one of the most respected business leaders in India, is known for transforming the Tata Group, one of India's largest and oldest companies. Born on December 28, 1937, into the Tata family, Ratan Tata took over the company in 1991. At the time, India was facing many economic challenges, but Tata's leadership helped the company grow and succeed in new ways. Under Ratan Tata, the Tata Group expanded into new industries, including automobiles, steel, and technology. He made bold decisions, like buying international companies such as Tetley Tea and Jaguar Land Rover, which brought global recognition to Indian businesses. What makes Ratan Tata stand out is not just his business success but his strong sense of ethics and social responsibility. He believed that businesses should not only focus on making money but also on helping society. Through the Tata Group, he supported many social causes, including education, healthcare, and rural development. Ratan Tata's leadership shows that business can be a force for good, improving people's lives and giving back to society.

The Common Thread: Hard Work, Vision, and Service to Society

While Dr. APJ Abdul Kalam, Marie Curie, Albert Einstein, and Ratan Tata came from different backgrounds—science, business, and technology—they all shared similar qualities: hard work, vision, and a desire to improve the world. They didn't just focus on their personal success; they used their knowledge and skills to help society. Kalam worked to make India self-reliant through science and technology. Curie's discoveries improved healthcare and saved lives. Einstein's theories changed our understanding of the universe and advanced many areas of science. Ratan Tata, as a businessman, not only helped grow India's economy but also focused on giving back to the community. These individuals remind us that true success is not just about personal achievements but about making a positive impact on society and using one's talents to solve problems and improve lives.

Dreaming Big for a Better Tomorrow

The lives of Dr. APJ Abdul Kalam, Marie Curie, Albert Einstein, and Ratan Tata offer us valuable lessons. They show that with hard work, determination, and a strong vision, anyone can achieve greatness and contribute to the betterment of the world. In today's world, where we face many challenges such as climate change, poverty, and disease, the examples set by these individuals are more important than ever. They remind us that we should not be afraid to dream big, work hard, and use our knowledge and skills for the greater good. As Ratan Tata once said, "Take the stones people throw at you, and use them to build a monument." The legacies of these great individuals inspire us to keep dreaming, learning, and contributing to make the world a better place for future generations.

J. SCHEME

PM Rashtriya Krishi Vikas Yojana (PM-RKVY) and Krishonnati Yojana (KY)

1. In October 2024, the Cabinet approved the consolidation of **Centrally Sponsored Schemes (CSS)** under the **Ministry of Agriculture and Farmers' Welfare** into two major programs:
   a. **PM-RKVY (cafeteria scheme)**: Focuses on promoting **sustainable agriculture**.
   b. **Krishonnati Yojana (KY)**: Aims to ensure **food security** and **agricultural self-sufficiency**.

Objectives

1. **Incentivize States**: Encourage states to increase public investment in agriculture and allied sectors.
2. **Autonomy and Flexibility for States**: Allow states to plan and implement schemes tailored to farmers' needs.
3. **Strengthen Farmer Support**: Develop **pre- and post-harvest agricultural infrastructure**, improving access to **quality inputs**, **storage**, and **market facilities** to enable informed decision-making for farmers.
4. **Promote Value Chain Addition**: Support **production models** that enhance **farmer income** and boost productivity.
5. **Empower Youth**: Encourage **skill development**, **innovation**, and **agribusiness models** to attract youth to agriculture and agri-entrepreneurship.

Key Features

1. **Nodal Ministry**: Ministry of Agriculture & Farmers Welfare
2. **Funding Pattern** (center:states): **90:10** for Northeastern and hilly states; **60:40** for other states; **100%** for Union Territories (UTs)
3. The RKVY program was launched in 2007-08 as a flagship initiative to encourage states to develop comprehensive agricultural plans, tailored to their local climate, resources, and technologies for all-round agricultural development.
4. In **2017-18**, the program evolved into **RKVY-RAFTAAR** (Remunerative Approaches for Agriculture and Allied Sector Rejuvenation), which focused on:
   a. Development of **pre- and post-harvest infrastructure**
   b. Promoting **agricultural entrepreneurship**, **innovation**, and **value addition**
5. From 2022-23, following recommendations from the **Expenditure Finance Committee**, the program was restructured into the **RKVY Cafeteria Scheme**, rationalizing several schemes under the **Department of Agriculture & Farmers Welfare**.
6. **State Level Sanctioning Committee (SLSC):** Chaired by the **Chief Secretary** of the concerned state, approves projects. **Funds** are released to **State Governments** and **UTs** based on the projects approved in the SLSC meetings.

7. **Focus of the Scheme:** The scheme emphasizes the inclusion of:
   a. Small and marginal farmers
   b. Scheduled Castes, Scheduled Tribes, women, and other weaker sections of society
   c. **State Governments** are responsible for ensuring adequate coverage of these groups in the program.

About Krishonnati Yojana (KY)

1. **Objectives:** Promote the development of the **agriculture and allied sectors** in a **holistic** and **scientific** way.
   a. Increase farmers' income by improving **production**, **productivity**, and ensuring better **returns** on agricultural produce.
2. **Key Features:**
   a. **Nodal Ministry**: Ministry of Agriculture & Farmers Welfare.
   b. **Background**: Launched as an **Umbrella Scheme** in **2016-17** to combine multiple agricultural schemes and missions under one framework.
3. **Major Sub-Schemes**
   a. Mission for Integrated Development of Horticulture (MIDH)
   b. National Mission on Oilseeds and Oil Palm (NMOOP)
   c. National Food Security Mission (NFSM)
   d. National Mission for Sustainable Agriculture (NMSA)
   e. Sub-Mission on Agriculture Extension (SMAE)
   f. Sub-Mission on Seeds & Planting Material (SMSP)
   g. Sub-Mission on Agricultural Mechanization (SMAM)
   h. Sub-Mission on Plant Protection and Plant Quarantine (SMPPQ)
   i. Integrated Scheme on Agricultural Census, Economics, and Statistics
   j. Integrated Scheme on Agricultural Cooperation
   k. Integrated Scheme on Agricultural Marketing (ISAM)
   l. National e-Governance Plan in Agriculture (NeGP-A)
   m. Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)

Benefits of the Scheme

1. The scheme aims to support **food security** in the country by boosting the production of **rice**, **wheat**, **pulses**, and **coarse grains**.
2. It will focus on identifying the most suitable **sustainable agricultural practices** for specific agro-ecological climates, with an emphasis on **integrated farming**.
3. Through its various missions, the scheme will contribute to the government's goal of **doubling farmers' income by 2022**.
4. The scheme will also strengthen **agrarian infrastructure**, including **warehousing**, **storehouses**, **watershed development**, **rural electrification**, **roads**, and **markets**.

K. NOBEL PRIZE 2024

1. 2024 Nobel Prize in Physiology or Medicine and The C. elegans

1. **In October 2024, the Nobel Prize for Medicine was awarded** to Victor **Ambros** and **Gary Ruvkun** for their **discovery of microRNA, tiny molecules that play a big role in controlling gene activity.**

2. This discovery has helped scientists to understand how genes work and how complex organisms, like humans, develop.

3. The **Nobel Committee recognized Ambros and Ruvkun for finding a key process that regulates gene activity**, which has been crucial for the **evolution of life over millions of years.**

4. MicroRNAs are a **critical part of gene regulation, shedding light on how cells function** in many organisms, including humans.

Why Did Ambros and Ruvkun Study MicroRNA?

1. Ambros and Ruvkun were awarded for discovering how genes are controlled.

2. Imagine **chromosomes, which hold genetic information in DNA, as a large toolbox**.

3. Every cell in the **body has the same toolbox with the same set of tools** (or genes).

4. But **different cells need to use different tools depending on their job**.
   a. **For example**, a **nerve cell might use a tool to send signals,** while a **muscle cell might use a tool to help with movement.**

5. This is **possible through gene regulation, a process that makes sure only the right set of genes is used in each type of cell.**

6. Ambros and Ruvkun **wanted to understand how this gene regulation works, leading to their discovery of microRNA**, which changed how scientists view gene control in complex organisms like humans.

Why is Gene Regulation Important?

1. **Genes in DNA are copied into a molecule called mRNA**, which carries instructions for making proteins.

2. These **proteins carry out essential tasks in the body, like helping muscles move or nerves send signals.**

3. **Different cells in the body make different proteins depending on what they need to do.**

4. Gene regulation controls which **genes are turned on or off in each cell,** helping it carry out its specific function.

5. **Problems in gene regulation can lead to serious diseases like cancer, diabetes, or autoimmune disorders.**

6. Understanding **how genes are regulated could help us understand and treat these conditions.**

7. **In the 1960s,** scientists discovered that **certain proteins, called transcription factors, could control gene activity** by binding to specific parts of DNA.

8. These **transcription factors acted like switches, turning genes on or off depending on the needs of the cell.**

9. **However, in 1993, Ambros and Ruvkun made a surprising discovery** that added a new layer to gene regulation: **microRNA**.

10. This **tiny molecule could also control genes,** but in a way no one expected.

How Was MicroRNA Discovered?

1. **In the late 1980s, Ambros and Ruvkun** were studying a tiny roundworm called *Caenorhabditis elegans* **(C. elegans), which is just 1 millimeter long but has many of the same types** of cells as larger animals.

2. This made it an ideal model for studying how cells and tissues develop.

3. The **scientists focused on two genes in C. elegans, called lin-4 and lin-14**, which control when cells mature.

4. They noticed that **certain mutant worms had problems with this timing.**
   a. In simple words, **certain Mutant worms had issues with the normal timing of when their cells should mature,** which helped lead to the **discovery of how certain genes (like lin-4) regulate this process.**

5. Ambros found that **lin-4 seemed to stop lin-14 from working, but the exact mechanism was unclear**.

6. **Ambros discovered that lin-4 produced a tiny RNA** molecule that **didn't make proteins like most genes, but instead blocked lin-14** from working.

7. **Meanwhile, Ruvkun found that lin-4 was not stopping the production of lin-14's mRNA, but rather preventing it from making the protein**.

8. As they compared their findings, they **realized that the small RNA from lin-4 could bind to a part of lin-14's mRNA, shutting down its protein production.**

9. This was a **completely new way of controlling genes, using tiny RNA molecules** that were later named microRNAs.

10. **At first, this discovery was not widely recognized**, as scientists believed it was **unique to *C. elegans*.**

11. **But in 2000, Ruvkun's team discovered another microRNA, called let-7,** in many species, including humans.

12. This opened the **door to finding hundreds of other microRNAs, and today we know they play a key role in regulating genes** in almost all multicellular organisms, including humans.

Caenorhabditis elegans (C. ELEGANS)

Simple microscopic worms, studying which has won scientists four Nobel Prizes so far

1. *C. elegans* is a **nematode worm, which is part of a large group of worms called Nematoda.**
   a. Nematodes are among the most common animals on Earth.
   b. They are found in many places, including soil, freshwater, oceans, and even in extreme environments (like deep cracks in the Earth).
   c. Some live freely, while others are parasites that can harm plants and animals.
   d. Nematodes have smooth skin, **are not divided into segments, and have a long, tube-like shape that narrows at both ends.**
   e. They can live on land or in water.
2. It **grows from a fertilized egg into a one-millimeter-long adult in just 3-5 days.**
3. *C. elegans* **has two sexes: a hermaphrodite (which can reproduce by itself) and a male.**
4. The **worm's body is mainly a tube-like structure** that includes an outer layer (called a cuticle), a mouth (pharynx), a gut, and a reproductive system.

5. **It ages over time, losing strength and eventually dying.**
6. Studying these processes helps scientists understand genetics and behavior.
7. *C. elegans* was the **first multicellular organism to have its entire genome sequenced (the complete set of its genes) and its nerve connections mapped.**
8. It is **widely used to study how nerves work and cell biology.**
9. This research has led to important discoveries about health and disease.

Four Nobels

1. The 1-millimeter nematode (**C. *elegans***) has helped scientists understand how healthy cells are instructed to kill themselves and how the process goes awry in AIDS, strokes, and degenerative diseases. (That work was the subject of the **2002 Nobel Prize** in physiology or medicine.)

2. Self-proclaimed **"worm people"** were recognised by the Nobel committee in 2006 for discovering gene silencing, which became the basis for an entirely new class of drugs.

3. Two years later, the **chemistry prize** went to scientists **who used nematodes** to help invent cellular **"lanterns"** to see the inner workings of a cell.

4. **For each prize**, a laureate made sure to **thank the worm** for its contributions, though perhaps the most famous nod came from **Sydney Brenner**, who won the **first "worm Nobel."**

5. **Without doubt, the fourth winner of the Nobel Prize this year is Caenorhabditis elegans.**

2. 2024 Nobel Prize in Physics

The **Nobel Prize in Physics 2024** has been awarded to **John Hopfield and Geoffrey Hinton.**

a. **Hopfield, 91, is an American scientist known for his work in biological physics, while Hinton, 76, is a British-Canadian recognized as the "godfather of Artificial Intelligence" (AI). He has previously** raised concerns about the dangers associated with **AI**.

b. John Hopfield created a structure that can **store and reconstruct information**, while Hinton invented a method that allows **machines to discover patterns in data**, **crucial for today's large artificial neural networks.**

*Interestingly, both the **Physics and Chemistry Nobel prizes** this year have been given to artificial intelligence related research.*

Discoveries that were awarded Nobel Prize

1. John Hopfield invented Hopfield network, a type of **recurrent neural network** that can **store and reconstruct information**.
   a. These networks work like a memory system, where they can **store patterns (like images) and retrieve them.**
   b. Network relies on **Donald Hebb's hypothesis** - when neurons act together, they can **enhance network's capability** to process and store information.
   c. Hopfield networks can be used for **tasks like image recognition and data** reconstruction, making them valuable for various applications in machine learning.

2. **Geoffrey Hinton** invented a method **(Boltzmann machine)** that can **independently discover properties in data** and has become important for large ANNs now in use.
   a. Boltzmann Machine is an **early example of a generative model**, which can create new patterns or examples based on what it has learned.
      i. A trained Boltzmann machine can **recognise familiar traits in information** it has not previously seen.

Artificial Neural Networks (ANNs)

1. **Definition:** ANN is a ML program or model that makes decisions in a manner similar to the human brain, by using processes that mimic the way biological neurons work together to identify phenomena, weigh options and arrive at conclusions.

2. **Working:** Human brain is the inspiration behind neural network architecture.
   a. Human brain cells, called neurons, form a complex, highly interconnected network and send electrical signals to each other to help humans process information.
   b. Similarly, an ANN is made of artificial neurons or nodes that work together to solve a problem.

3. **ANN Structure:** Basically, every neural network consists of layers of artificial neurons interconnected in three layers:

a. **Input Layer:** Process the data, analyze or categorize it, and pass it on to the next layer.
b. **Hidden Layer:** Analyzes output from input layer, processes it further, and passes it on to next layer.
   • ANNs can have a **large number of hidden** layers with each layer.
c. **Output Layer:** It **gives final result** of all data processed by ANN**.**

4. **Major types of ANN:**
   a. **Deep Neural Networks:** These are neural networks with many layers, each building on the previous layer to refine and optimize the prediction or categorization.
   b. **Convolutional Neural Networks (CNNs):** Used primarily in **computer vision and image classification** applications.
      • They can **detect features and patterns** within images and videos, enabling tasks such as object detection, image recognition, pattern recognition and face recognition.
   c. **Recurrent Neural Networks (RNNs):** Typically used in **natural language and speech recognition applications as they use sequential or time-series data.**
      • **Use-cases** include stock market predictions, image captioning, natural language processing etc.
   d. **Generative Adversarial Networks (GANs):** Used to create new data resembling the original training data.
      • These can include images appearing to be human faces—but are **generated, not taken of real people.**

> ### Machine Learning
>
> 1. Machine Learning is a component of AI that focuses on using data and algorithms to enable AI to imitate the way that humans learn, gradually improving its accuracy.
> 2. In machine learning, computer learns by example, enabling it to tackle problems that are too vague and complicated to be managed by step-by-step instructions.
>   a. One example is interpreting a picture to identify the objects in it.

3. **Working:** ML works by training algorithms on sets of data to achieve an expected outcome such as identifying a pattern or recognizing an object.

   a. Neural Networks or Artificial Neural Networks (ANNs) are commonly used, specific class of ML algorithms.

4. **Applications of ML:**

   a. **Research & Scientific Advancement:** Instrumental in discovery of higgs particle and search for exoplanets.

   b. **Natural Language Processing (NLP):** Automatic Speech Recognition or speech-to-text or Generative AI.

   c. **Computer Vision:** Deriving meaningful information from digital visual inputs like images, videos.

5. **Challenges and ethical issues:**

   a. **Explainability:** Understanding why a model does what it does is actually a very difficult question as it learns through examples instead of clear instructions.

   b. **Superintelligence:** It raises questions related to accountability and responsibility. For instance, who will be held liable in case of accident of a self-driving car.

      o **Bias and Discrimination: Machines are trained by humans, and human biases can be incorporated into algorithms, perpetuating forms of discrimination.**

      o **Other: Privacy concerns, regulation concerns, misuse etc.**

Do You Know?

In 2018, Hinton was awarded the Turing Prize, the most prestigious award in computer science.

This is not the first time that the Nobel Committee had picked a computer science breakthrough for the Nobel Prize in Physics. In 2007, the Physics Nobel was awarded for work that related to data storage devices like hard drives.

3. 2024 Nobel Prize in Chemistry

The Nobel Prize in Chemistry 2024 has been awarded to David Baker, Demis Hassabis and John M Jumper. While Baker (62) won **"for computational protein design"**, the American Jumper (39) and Briton Hassabis (48) were honoured for **"protein structure prediction".**

David Baker's work on computational protein design

1. **Computational protein design (CPD)** aims to create new proteins with novel functions or properties not found in nature.

   • The first successful design of a small protein via computation was published by **Dahiyat and Mayo** in 1997.

2. **David Baker** successfully created new proteins (synthetic proteins), starting with his **first designed protein 'Top7'** in 2003.

   • It was an entirely new protein, both **structurally and sequence-wise**, designed by automated computation.

3. **Rosetta software d**eveloped by **Baker and his team** in 1999, assembles proteins from short structural fragments, enhancing structure prediction and design.

Work of Demis Hassabis and John Jumper on Protein Structure Prediction

1. **Demis Hassabis and John Jumper,** who share one half of the prize**, are** co-creators of the revolutionary **Artificial Intelligence-**based tool **AlphaFold2**. **Their innovative tool has cracked a 50-year-old problem that has long puzzled scientists: predicting the complex structures of proteins.**

   a. The **AlphaFold2 predicts** the structures of proteins using known sequences of amino acids from the database. These predictions were then matched to catalogued protein structures in the other database.

   b. With training, the AI tool gained sufficient accuracy in predicting protein structures, given a particular sequence of amino acids.

   c. **Baker used similar computational tools** to create new proteins, which are not available in nature, but can perform many useful functions. Together, the trio managed to accomplish things that scientists have been striving to achieve for several decades.

Significance of discovery

Knowing protein shapes is key to **understanding cell function** and better structure prediction aids in areas like **drug design**, understanding **antibiotic resistance**, developing **enzymes to break down plastic**, crop resilience etc.

About Proteins

1. Proteins are one of the **four major types** of biomolecules (the other three being carbohydrates, lipids and nucleic acids).
2. They are **biopolymeric structures**, composed of linear chains of 20 naturally occurring amino acids, linked by peptide bonds (see infographic).
    a. Composition of amino acids and their order in proteins decide the structure of a protein.
    b. Peptide bond is formed when the carboxyl (-COOH) group of one amino acid reacts with the amino (-NH$_2$) group of the next amino acid with the elimination of a water moiety (process called dehydration).
3. Proteins are one of the most abundant macromolecules present in all cells from simplest bacteria to human beings and plants.
    a. Collagen is most abundant protein in animal world and Ribulose bisphosphate Carboxylase-Oxygenase (RuBisCO) is the most abundant protein in the whole of the biosphere.

Key Functions of proteins

1. **Structural Support:** Proteins provide structure and support for cells. **E.g.,** Actin, found in the filaments of muscle fibres, provides mechanical support and determines cell shape.
2. **Catalysts:** Proteins act as enzymes, facilitating biochemical reactions. **E.g.,** amylase breaks down starches into sugars during digestion.
3. **Hormones:** Some proteins function as chemical-signaling molecules called hormones. **E.g., Insulin plays a key role in regulating metabolism.**
4. **Antibody:** Antibodies bind to specific foreign particles, such as viruses and bacteria, to help protect the body. **E.g.,** Immunoglobulin G (IgG) etc.
5. **Transport/storage:** These proteins bind and carry atoms and small molecules within cells and throughout the body. **E.g.,** Ferritin stores iron in cells and GLUT-4 enables glucose transport into cells.

4. 2024 Nobel Prize in Literature

1. The Nobel Prize in Literature for 2024 has been awarded to South Korean author **Han Kang "for her intense poetic prose that confronts historical traumas and exposes the fragility of human life".**
2. **Interestingly, Han Kang is the first South Korean writer to win the award.**
3. The Nobel Prize in Literature is awarded by the **Swedish Academy**, Stockholm, Sweden. Only four times in the history of the literature prize has it been shared between multiple people.
4. Notable, **The Nobel Prize in Literature 2023 was awarded to Jon Fosse,** for his innovative plays and prose which give voice to the **unsayable**.
5. Previously, the prize has been awarded to French author Annie Ernaux (2022), Tanzanian novelist Abdulrazak Gurnah (2021), American poet and essayist Louise Glück (2020) and Austrian writer Peter Handke (2019).

5. 2024 Nobel Peace Prize

1. The **2024 Nobel Peace Prize has been awarded to the Japanese organisation Nihon Hidankyo.** This honor recognizes their efforts **to promote a world free of nuclear weapons and their commitment to sharing survivor testimonies to prevent the use of such weapons in the future.**
2. The members of Nihon Hidankyo are survivors of the atom bombings in Hiroshima and Nagasaki by the United States in 1945. Many of those who survived — the so-called "**Hibakusha**" or "bomb-affected people" — spearheaded the global movement to end nuclear weapons.
3. The Hibakusha has played an important role in a **global movement for nuclear disarmament**. Founded on **August 10, 1956**, Nihon Hidankyo describes itself as "the only nation-wide organisation of **A-bomb survivors of Hiroshima and Nagasaki**." Its main objectives are the welfare of the Hibakusha, the elimination of nuclear weapons and due compensation to the victims.

4. Amid widespread conflict across the globe, the Norwegian Nobel Committee asserted that this year's award signifies upholding of a norm known as **"the nuclear taboo".**

5. The work of organisations such as Nihon Hidankyo have helped establish the nuclear taboo, which has ensured that nuclear weapons have not been used since 1945. One of the reasons behind the Nobel Committee's decision this year is that this taboo is now "under pressure".

6. **Notably,** this year's recipients are the latest in a list of Nobel awardees who have worked for nuclear disarmament and arms control. At least 10 Nobel Peace Prizes have been awarded for the cause since 1901. For example,

   a. In 2017, the **International Campaign to Abolish Nuclear Weapons (ICAN)** was awarded the peace prize for drawing attention to the catastrophic humanitarian consequences of nuclear weapons and for its ground-breaking efforts to achieve a treaty-based prohibition of them.

   b. Latin America has been a **nuclear-weapons-free zone** since 1967. **Alfonso García Robles** played a defining role in shaping the **Treaty of Tlatlelolco signed by 14 countries** and was awarded the peace prize in 1982.

Do You Know?

1. **Mahatma Gandhi was nominated 5 times** for the Nobel Peace Prize but was **never awarded the prize.** In **1937, 1938, and 1939**, he was nominated by Ole Colbjørnsen, a Labour member of the Norwegian Storting (Parliament). In **1947,** Gandhi was nominated by B G Kher, G V Mavalankar and G B Pant. In January **1948**, there were six nominations on his behalf, including from the **1947 and 1946** Laureates, The Quakers and Emily Greene Balch.

2. India's **Kailash Satyarthi** received the Nobel Peace Prize in 2014 sharing it with Pakistan's Malala Yousafzai, the youngest-ever Nobel laureate, for their work on promoting child rights in the troubled sub-continent.

Little Boy and Fat Man

1. **On August 6, 1945**, the US dropped a bomb named **"Little Boy" on Hiroshima.** The destruction was unimaginable.
   - According to **Manhattan Project**, "Those closest to the explosion died instantly, their bodies turned to black char… Nearly every structure within one mile of ground zero was destroyed…" More than 70,000 people died instantly, with the death toll going beyond 100,000 later.

2. Then, **on August 9,** before the scale of the destruction could even be comprehended, the US dropped **"Fat Man" on Nagasaki,** killing at least 40,000 people instantly, and tens of thousands more in the days and weeks to come.

3. The United States' decision to drop the bombs has since been criticised from both strategic and ethical perspectives, given its immense human cost. But the bombings forever changed the world, as major powers went on a race to develop their own nuclear weapons as a deterrent to the American one. In response, a global movement for nuclear disarmament emerged.

6. 2024 Nobel Prize for Economics

1. **On 14 October,** the **2024 Nobel Prize for Economics** (Economic Sciences 2024) was awarded to three economists.

2. The winners are **Daron Acemoglu**, **Simon Johnson**, and **James A. Robinson** for their studies on why some countries succeed and others fail.

3. The research demonstrated the importance of **societal institutions for a country's prosperity.**

4. Research also highlighted that democracy developed in various colonies as the threat of revolution by the masses **could not be tackled through the promise of social reforms.**

   a. **In 2023, it was awarded to American economist Claudia Goldin** "for having advanced our understanding of women's labour market outcome."

5. The announcement was made by the **Royal Swedish Academy of Sciences** at a news conference in **Stockholm**.

6. This event marks the end of the **2024 Nobel season** after prizes for **medicine**, **physics**, **chemistry**, **literature**, and **peace** were awarded last week.

> **Do you know ?**
>
> **1.** **66 Nobel Prizes** have been **awarded to women between 1901 and 2024.**

Key Highlights of their research

1. **Colonial Impact on Prosperity**: Colonizers established systems from the 16th century that caused a "reversal of fortunes" - the poorest became the richest.

2. Factors influencing the type of institutions: Settler mortality rates, which were higher in disease-prone areas near the equator, and population density influenced the types of institutions established during colonization.

3. **Types of Institutions:**

a. **Extractive Institutions:** Formed in some colonies to exploit the indigenous population and extract natural resources to benefit the colonisers.

- In such environments, individuals face significant risks of confiscation, leading to a lack of motivation for long-term investment.

b. **Inclusive Institutions**: Colonisers built inclusive political and economic systems for the long-term benefit of European Settlers in colonies that were sparsely populated and supported more European settlers.

- These institutions offered individuals a strong incentive to work, save and invest in the long run.

E.g, The divided city of Nogales highlights differences created by the type of institution.

- On the north side (USA), residents have better economic conditions, secure property rights, and political freedoms.
- In contrast, the south side (Mexico) struggles with organized crime and corruption.
- The main difference lies in their institutional frameworks, showing how colonial legacies affect present-day living conditions.

4. **Institutional Traps:** The researchers explain that some societies are trapped in extractive institutions, limiting progress.

a. However, they emphasize that change is possible; reforms can lead to democracy and the rule of law, reducing poverty.

Role of Economic and Political Institutions in Shaping National Prosperity

1. **Resource Allocation and Property Rights:** Economic institutions dictate resource allocation and protection.

- **E.g.** Article 300A (Right to Property) ensures that no person shall be deprived of their property except by authority of law.
- **Niti Aayog:** It is the premier policy think tank of the Government.

2. **Incentives for Investment:** Inclusive institutions foster competition and entrepreneurship, promoting development.

o **E.g.** The National Innovation Foundation (NIF) promotes grassroots innovation.

3. **Sustainability:** Effective institutions ensure sustainable resource management. Poor institutions can lead to over-extraction, harming the environment and future growth.

o **E.g., Article 48A** (Directive Principles of State Policy) provides for the protection and improvement of the environment and the safeguarding of forests and wildlife

o **E.g.,** the National Green Tribunal a specialised judicial body equipped for the purpose of adjudicating environmental cases

4. **Regulations:** Good regulation promotes competition and innovation.

o **E.g.,** Competition Commission of India (CCI) promotes fair competition and prevents monopolies and anti-competitive practices.

5. **Governance and Rule of Law:** Political institutions ensure stable governance and the rule of law, reducing corruption and fostering a fair environment for investment.

o **E.g.,** Article 14 provides equality before the law.

o **E.g.,** The Central Vigilance Commission (CVC) for promoting integrity, transparency, and accountability in the country's public administration.

6. **Inclusiveness:** Democratic institutions promote participation in decision-making, leading to policies that meet the population's needs.
   - **E.g.,** Tribal Advisory Council (TAC) for the welfare and advancement of Scheduled tribes in states.
7. **Conflict Resolution:** Effective institutions that provide conflict resolution mechanisms promote political stability, attract investment, and support economic growth.
   - **E.g.,** National Legal Services Authority (NALSA), along with other legal Services Institutions , organizes Lok Adalats to resolve disputes efficiently and reduce legal bottlenecks

Steps Taken by India to Build Strong Economic Institutions	Steps Taken by India to Build Strong Political Institutions
1. **Nationalization of Banks:** In the late 1960s, India nationalized major banks to control credit and direct resources to key sectors like agriculture and small industries. 2. **LPG Reforms:** Since 1991, India has liberalized its economy by reducing bureaucratic barriers, lowering tariffs, and improving the ease of doing business, which has attracted foreign investment and stimulated growth. 3. **Enforcement Directorate (ED):** It combats economic crimes such as money laundering, enhancing transparency and accountability in financial transactions. 4. **Parliamentary Committees:** Committees like the Public Accounts Committee and the Estimate Committee review economic policies, ensuring accountability and fostering public debate to align reforms with national interests.	1. **India's democratic framework:** It feature regular elections and a multiparty system, promoting accountability and representation. 2. **Decentralization:** The 73rd and 74th Constitutional Amendments empowered local governments, improving grassroots governance and citizen involvement. 3. **Grievance Redressal:** Initiatives like fast-track courts and digital management aim to enhance the judicial system's efficiency and uphold justice. 4. **Anti-Corruption Measures:** Institutions like the Lokpal and the Comptroller and Auditor General of India promote government accountability and help reduce corruption. 5. **Civil Society Engagement:** Supporting NGOs and civil society enhances inclusivity and responsiveness to the needs of citizens.

About The Sveriges Riksbank Prize in Economic Sciences commonly known as Nobel Prize of economics
1. **Establishment:** In 1968 by Sveriges Riksbank (Sweden's central bank).   • It is **not one of the five Nobel Prizes** established by Alfred Nobel's will in 1895.   2. **First recipients:** To Ragnar Frisch and Jan Tinbergen in 1969.   • **Amartya Sen** was the first Indian to receive Nobel Prize for Economics in 1998 for his contributions to welfare economics and social choice theory.   3. **Prize consists:** A medal, a personal diploma, and a cash award.

Do you Know?
1. The Nobel Prize in Economic Sciences of 2019 was awarded to Abhijit Banerjee, Esther Duflo, and Michael Kremer "for their experimental approach to alleviating global poverty." Abhijit Banerjee was second after Amartya Sen to receive the recognition in economic sciences.   2. Amartya Sen won the 1998 Nobel Prize in Economic Sciences for his contributions to welfare economics, social choice theory, and his interest in the problems of society's poorest members.