



FORTUNE WEEKLY DIGEST



› Child Marriage: SC Ruling

› Livestock Census

› Stem Cell Therapy

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EDITOR'S NOTE

As UPSC aspirants, it is essential to stay updated on current affairs to excel in the examination. This **Fortune Weekly Digest (ForWarD)** brings you the latest news and developments from around the world, carefully curated and analyzed to help you prepare for the Civil Services (Main) Examination.

We understand that time is precious, and we have made sure to present the information in a concise and easy-to-understand manner.

The magazine is divided into different sections. Mains relevant topics have been covered in detail with a UPSC previous year question perspective. The jot downs are examples and interesting facts to enrich your answer writing. Cherrypicks has some key words from the week, helpful again in answer writing and essay. We have also included essay topics and sample questions to help you gauge your preparation.

We have designed this magazine to best supplement the daily current affairs notes we have launched by the name of **FIND (Fortune IAS News Daily)** and **FINDER (Fortune IAS News Daily Explainer)** and the **Fortune Prelims Precise** monthly compilation. This magazine will be explained in detail and your queries addressed in a live class we conduct.

At a time when there is no dearth of current affairs materials, our hope is help you get a one-stop solution for all your current affairs needs.

This magazine is a work in progress and your feedback will be appreciated.

We hope that this magazine will serve as a valuable resource for your exam preparation and contribute to your success in the UPSC examination.

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**FIRST ATTEMPT TOPPERS FROM
OUR PRELIMS CUM MAINS BATCH**



WOMEN IN POWER

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CONVENTION ON BIOLOGICAL DIVERSITY COP 16: KEY TAKEAWAYS

Syllabus: GS III - Conservation, environmental pollution and degradation

PYQ MAPPING

Q) Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? (2021)

WHY IN NEWS

The 16th Convention of Biological Diversity (CBD) in Cali, Colombia, involving nearly 190 countries, extended negotiations beyond its November 1 deadline, as representatives worked to reach a conclusive agreement on biodiversity conservation.

INTRODUCTION

The 16th Conference of the Parties (COP16) to the Convention on Biological Diversity (CBD) marks a significant milestone as it is the first meeting after the landmark Kunming-Montreal Global Biodiversity Framework was finalised at COP15 in Montreal in 2022.

SHORT TAKES

- **Convention on Biological Diversity (CBD):** An international treaty ratified by 196 nations, seeks to conserve biodiversity, promote sustainable resource use, and ensure fair distribution of benefits from genetic resources. Established during the 1992 Rio Earth Summit alongside the UNFCCC, the CBD is governed by the Conference of the Parties (COP) and coordinated by a Secretariat in Montreal, Canada, to support its global implementation.
- India signed the CBD in 1992 and ratified in 1994.

CONVENTION ON BIOLOGICAL DIVERSITY (CBD) - KEY POINTS

- **Objective of COP16:** The convention aims to create actionable frameworks and financing mechanisms to implement the 23 global biodiversity targets set in 2022 under the **Kunming-Montreal Global Biodiversity Framework (KMGBF)**.
- **30-by-30 Agreement:** Countries agreed in 2022 to **protect 30% of land and water by 2030**, expanding conservation from the current levels (less than 17% of land and 10% of marine areas protected).
- **Specific Targets for 2030:**
 - **Invasive Species:** Reduce the introduction of invasive alien species by 50% and mitigate their impact.
- **Pollution Reduction:** Minimise pollution risks from all sources to sustainable levels.
- **Digital Sequence Information (DSI):** Establish mechanisms for benefit-sharing from the use of DSI on genetic resources and traditional knowledge.
- **Integration of Biodiversity:** The framework stresses integrating biodiversity into national policies, regulations, planning, and development processes.
- **Funding Requirement:** Implementing these targets requires approximately \$200 billion annually, but currently, only a fraction of this funding is secured.

DECISIONS FROM COP-16 NEGOTIATIONS

- **Cali Fund for Digital Genetic Information:** A global fund to ensure fair sharing of benefits from digital sequence information (DSI) on genetic resources. Large companies benefiting from DSI will contribute to the fund, with allocations for developing countries, indigenous peoples, and local communities.
- **Digital Sequence Information (DSI)** refers to genetic data encoded in digital formats, such as DNA or RNA sequences, that can be analysed, shared, and used in biotechnology and research applications.
- Companies using such genetic data are required to contribute 1% of profits or 0.1% of revenues to the fund, which could potentially generate billions of dollars annually. Half of the funds raised will be directed to Indigenous peoples and local communities, who are often the custodians of these genetic resources
- **Strengthening Indigenous Peoples' Role:** A new Programme of Work was adopted to enhance the contributions of Indigenous peoples and local communities in biodiversity conservation, sustainable

use, and benefit-sharing.

- o A **subsidiary body** will be established to ensure indigenous groups and local communities are included in discussions on conservation and biodiversity.
- Q **Resource Mobilisation Strategy:** Discussions will continue on securing \$200 billion annually for biodiversity by 2030. A new financing instrument for biodiversity may be created, and existing funds like the Global Biodiversity Framework Fund and Kunming Biodiversity Fund were highlighted.
- Q **Implementation of the Kunming-Montreal Global Biodiversity Framework (KMGBF):** Significant progress was made, with 119 countries submitting national biodiversity targets and 44 submitting National Biodiversity Strategies and Action Plans (NBSAPs).
- Q **Synthetic Biology:** A new thematic action plan was introduced to address capacity-building and technology transfer in synthetic biology, aiming to balance innovation with biodiversity protection.
- Q **Invasive Alien Species:** A decision to strengthen international cooperation, capacity-building, and technical support for managing invasive species, including guidelines for e-commerce and cross-border trade.
- Q **Ecologically or Biologically Significant Marine Areas (EBSAs):** A new process was agreed to identify and update EBSAs, supporting the protection of critical marine areas and the 30x30 target for protected areas.
- Q **Sustainable Wildlife Management and Plant Conservation:** Emphasis on monitoring and capacity-building for wildlife management, with cooperation from CITES and FAO. Plant conservation efforts will align with the KMGBF monitoring framework.
- Q **Biodiversity and Health:** A Global Action Plan was approved to tackle zoonotic diseases and promote sustainable ecosystems, linking health and biodiversity with a “One Health” approach.
- Q **Risk Assessment for Living Modified Organisms (LMOs):** New voluntary guidance on assessing risks posed by engineered gene drives, strengthening protocols for biosafety in managing LMOs
- Q **Biodiversity and Climate Resilience:** COP 16 highlighted biodiversity’s role in climate resilience, emphasising that ecosystem protection is key to addressing climate impacts.

INDIA'S CONTRIBUTION TO BIODIVERSITY CONSERVATION

- Q **Enhanced Financial Commitment:** India announced an increased biodiversity expenditure plan, projecting around **Rs. 81,664 crore from 2025-30**, significantly up from the ₹32,207 crore spent between FY 2018-22.
- Q **Call for International Financing:** India highlighted the need for global financial support to meet biodiversity targets, aligning with Target 19 of the Kunming-Montreal Global Biodiversity Framework, which seeks \$200 billion annually for biodiversity.
- Q **Establishment of the International Big Cat Alliance:** India launched this alliance focused on protecting seven major big cat species globally, promoting healthy ecosystems and biodiversity conservation.
- Q **Expansion of Ramsar Sites:** India raised its Ramsar sites from **26 to 85 since 2014, with plans to reach 100 soon**, marking significant progress in wetland conservation under the Ramsar Convention.
- Q **Presentation of an Updated National Biodiversity Plan:** India submitted a comprehensive **200-page assessment** that included its financial and conservation targets, emphasising the need for resources to implement the National Biodiversity Strategy and Action Plan (NBSAP).

WAY FORWARD

- ✿ **Global Biodiversity Fund:** Secure a dedicated funding mechanism with fair contributions from both developed and developing nations, ensuring equitable resource mobilisation.
- ✿ **Monitoring Framework:** Establish a unified and transparent system for tracking biodiversity conservation progress globally to ensure accountability.
- ✿ **Conservation and Climate Synergy:** Create policies that integrate biodiversity conservation with climate resilience, especially in vulnerable regions, to align future climate frameworks.
- ✿ **Strengthening Indigenous Rights:** Ensure full recognition of Indigenous knowledge systems and ensure Indigenous communities' meaningful representation in global biodiversity policy-making.
- ✿ **Climate-Resilient Conservation:** Prioritise the protection of ecosystems in climate-vulnerable regions to enhance overall climate resilience, influencing future climate policy discussions.

CONCLUSION

COP-16 underscores the urgency of collective action to protect biodiversity and ensure a sustainable future. As negotiations continue, successful implementation will depend on sustained global cooperation, robust funding, and inclusive approaches that integrate both scientific and Indigenous knowledge.

SAMPLE QUESTION

Q) "Discuss the significance of the Kunming-Montreal Global Biodiversity Framework as a global response to biodiversity loss. Highlight the challenges and prospects of achieving its targets by 2030." **(15marks)(250 words)**

GROWING ECONOMIC DIVIDE IN INDIA

Syllabus: GS III - Indian Economy

PYQ MAPPING

Q) Explain the rationale behind the Goods and Services Tax (Compensation to States) Act of 2017. How has COVID-19 impacted the GST compensation fund and created new federal tensions? **(2020)**

Q) "Investment in infrastructure is essential for more rapid and inclusive economic growth." Discuss in the light of India's experience **(2021)**

WHY IN NEWS

Recent data from the paper titled "Relative Economic Performance of Indian States: 1960-61 to 2023-24" reveals a widening economic gap, raising concerns about the state of federalism.

INTRODUCTION

The Economic Advisory Council to the Prime Minister (EAC-PM) released a paper titled "Relative Economic Performance of Indian States: 1960-61 to 2023-24," which provides insights into each state's contribution to the national income and compares state-wise per capita income to the all-India average, highlighting the economic significance and relative welfare of citizens across states.

KEY DATA FROM THE REPORT

➡ Regional Disparities:

- o The report highlights a consistent trend of stronger economic performance in India's western and southern regions, while eastern states like West Bengal and Assam have lagged behind.

➡ Post-Liberalization Shift:

- o Following economic liberalisation in 1991, the Southern States began to outperform others, although the report does not explore the specific causes.

➡ Underperformance in Northern States:

- o Northern states have shown weaker economic

outcomes, with the exceptions of Haryana and Delhi.

➡ Growing Economic Divide:

- o The report paints a picture of a widening economic gap across the country, raising concerns for India as a federal and diverse nation.

➡ Success of Coastal Regions:

- o Coastal areas, including Odisha in the east, show better economic performance.
- o Their strategic locations attract businesses by reducing import and export costs and providing port access.

FACTORS BEHIND BETTER ECONOMIC PERFORMANCE

➡ Investment as a Key Factor in Economic Performance

- o **Higher levels of investment** significantly contribute to economic growth, as seen in India's southern states, where effective governance, robust infrastructure, efficient logistics, and a skilled workforce create favourable conditions.
- o Investment is broadly categorised into public and private types.

• Public Investment:

- o Primarily undertaken by the government, public investments are often directed toward less developed areas to promote balanced growth, without immediate focus on profitability.

• Private Investment:

- o Private investments are typically made in

regions promising higher returns, often in already well-developed areas like the southern states.

- These investments are frequently incentivized by government concessions, such as tax benefits and reduced electricity rates, to enhance profitability.

◦ **Preference for Urban Centers:**

- » Private investments tend to favour established urban hubs with large consumer markets, making cities like Mumbai, Delhi, Chennai, Bengaluru, and Hyderabad attractive.
- » Haryana, especially Faridabad, benefits from its proximity to Delhi, while Kolkata is less preferred due to various location-specific factors.

◦ **Attraction of Coastal Areas:**

- Coastal regions are particularly appealing for their strategic access to export markets, enabling cost-effective trade.
- Additionally, they facilitate access to affordable imported raw materials, further supporting business profitability.

FACTORS CONTRIBUTING TO LOWER INVESTMENT IN CERTAIN STATES

♣ **Militancy and Insurgency Issues:**

- Border states in India receive lower public investment partly due to strategic considerations and have also seen reduced private sector interest due to insurgency-related risks, which discourage business operations.

♣ **Political Tensions:**

- Opposition-ruled states frequently allege that public investment is politically biased, citing concerns reflected in the slogan "Double Engine ki Sarkar."

♣ **Other Factors:**

◦ **Banking Preferences:**

- In states such as Bihar, residents save money by depositing it in banks. Despite significant deposits being available for lending, banks are often reluctant to extend loans in these regions, instead preferring to lend in wealthier, more developed states where returns are higher.

◦ **Public Sector's Evolving Role:**

- Since the introduction of the New Economic Policies (NEP) in 1991, the market has largely replaced the public sector as the main driver of the economy, directing investments toward wealthier states with greater profit potential.
- The NEP prioritises the organised sector, while poorer states remain more dependent on the unorganised sector, characterised by low productivity and income levels.

◦ **Infrastructure Enhancements:**

- Improvements in infrastructure, such as freight corridors and highways, have allowed the organised sector to expand into rural areas, accelerating growth in more affluent states.

♣ **Effects of Cronyism:**

- Increasing cronyism creates a biased investment environment where connected individuals face lower risks compared to others.
- This imbalance reduces overall investment rates and particularly impacts economically weaker states.

♣ **Parallel Black Economy:**

- A significant black economy, especially prevalent in poorer states, undermines the investment climate due to policy gaps and weak governance, thereby reducing these regions' attractiveness for investment and limiting their growth potential.

IMPACT OF ECONOMIC DIVIDE ON FEDERALISM AND GOVERNANCE IN INDIA

♣ **Undermining Federal Equality:**

- Economic disparities disrupt fair resource distribution, fostering dissatisfaction among wealthier states that feel they are not adequately compensated for their contributions.

♣ **Shift Toward Centralised Power:**

- Greater central government control reduces state

autonomy, limiting states' ability to address their own regional economic needs effectively.

♣ **Uneven Investment Patterns:**

- Prosperous states attract significantly more private investment, while poorer states, facing infrastructure challenges, struggle to attract investors, deepening economic imbalances.

❖ **Governance Strains:**

- o Less affluent states grapple with higher corruption

levels and weaker institutions, obstructing effective policy implementation and perpetuating cycles of poverty.

Government Initiatives to Address Regional Disparities

- ❖ **Aspirational Districts Programme (ADP):** Launched in 2018 to boost development in 112 lagging districts by improving health, education, and infrastructure.
- ❖ **Special Economic Zones (SEZs):** Established to attract investment and drive industrial growth in underdeveloped regions.
- ❖ **Pradhan Mantri Gram Sadak Yojana:** Aimed at improving rural road connectivity to foster economic development in remote areas.
- ❖ **Finance Commission Recommendations:** Suggested increasing tax revenue share for states with higher needs to reduce regional inequalities.

WAY FORWARD

❖ Enhancing Governance and Infrastructure:

- o Focus on improving governance, reducing corruption, checking the black economy, and enhancing educational facilities at the grassroots level to address disparities in economic performance across states.

in the unorganised sector, to improve livelihoods and create a conducive environment for private investment.

❖ Strengthening Centre-State Cooperation:

- o Foster stronger collaboration between the Centre and States, with an emphasis on improving governance and reducing corruption at the state level to enable equitable development.

❖ Targeted Support for Underdeveloped States:

- o Provide special financial assistance, grants, and incentives to BIMARU and other low-income states to reduce regional imbalances and promote inclusive growth.

❖ Increasing Public Expenditure on Social Sectors:

- o Significantly boost public spending on health, education, and welfare in poorer states, especially

❖ Promoting Cooperative Federalism:

- o Strengthen the role of NITI Aayog and the Inter-State Council in fostering cooperative federalism, ensuring collaborative policymaking on fiscal matters, and improving resource-sharing mechanisms between the Centre and States.

CONCLUSION

The report underscores that to reinforce India's federal unity, regional disparities must be addressed. Without this, the economic divide will continue to widen. Implementing the required policy reforms will not slow growth in the more prosperous states but will help reduce inequalities, promote inclusive development, strengthen federalism, and maintain national unity.

SAMPLE QUESTION

Q) Analyse the impact of economic disparity among Indian states on cooperative federalism, with particular reference to the widening gap between developed and developing states. **(15 marks) (250 words)**

LIVESTOCK CENSUS

Syllabus: GS III - Agriculture; Animal Husbandry

PYQ MAPPING

Q) Livestock rearing has a big potential for providing non-farm employment and income in rural areas. Discuss suggesting suitable measures to promote this sectors in India. (2015)

WHY IN NEWS

Recently, the Union Minister of Fisheries, Animal Husbandry and Dairying launched the 21st Livestock Census in New Delhi

INTRODUCTION

- The livestock census in India, conducted **every five years since 1919**, records detailed data on domesticated animals, poultry, and strays, including species, breed, age, sex, and ownership.
- So far 19 such censuses have been conducted by the Ministry of Fisheries, Animal Husbandry and Dairying, in participation with State Governments and UT Administrations.

ABOUT 21st LIVESTOCK CENSUS IN INDIA

Timeline and Enumeration:

- The 21st Livestock Census will be conducted from October 2024 to February 2025.
- Around 87,000 enumerators will collect data by visiting independent households, apartments, businesses, and various institutions (e.g., gaushalas, dairy and poultry farms, veterinary colleges, and defence establishments).

Information will be collected on **sixteen species** of animals:

- Cattle, buffalo, mithun, yak, sheep, goat, pig, camel, horse, ponies, mule, donkey, dog, rabbit, and elephant.

Additionally, poultry birds, including **fowl, chicken, duck, turkey, geese, quail, ostrich, and emu**, will also be counted.

Coverage:

- The census aims to cover approximately 30 crore households across India.

Breed Data:

- The census will capture information on **219 indigenous breeds** of these sixteen species, as recognized by the ICAR-National Bureau of Animal Genetic Resources (NBAGR).

OBJECTIVE OF LIVESTOCK CENSUS

Economic Contribution Measurement:

- The census data enables accurate estimation of Gross Value Added (GVA) from the livestock sector, which is critical for understanding its contribution to India's economy.
- Currently, livestock contributes about **4.7% to the overall GVA** and approximately **30% to the agricultural GVA**.

policies for sustainable growth in the sector.

Tracking Sustainable Development Goals (SDGs):

- The livestock census helps track progress towards **SDG Goal 2 (Zero Hunger)** and **Target 2.5** (conserving genetic diversity).
- It specifically monitors **Indicator 2.5.2**, which is the percentage of local livestock breeds at risk of extinction, crucial for maintaining genetic diversity in food and nutrition.

Sustainable Growth of the Livestock Sector:

- According to Union Minister Singh, the census plays a vital role in ensuring the sustainable growth of India's livestock sector, addressing both productivity and conservation needs.

Employment and Rural Development:

- With the livestock sector providing significant employment in rural areas, the census helps assess livestock-based livelihoods, supporting policies that benefit rural communities.

Policy Formulation:

- It informs resource allocation and helps shape

2019 Livestock Census

- » The total Livestock population is 535.78 million in the country showing an increase of 4.6% over Livestock Census-2012.
- » West Bengal observed the highest increase of 23%, followed by Telangana (22%).
- » The total number of cattle in the country has shown an increase of 0.8 %.
- » Uttar Pradesh has observed a maximum decrease in cattle population though the state has taken several steps to save cattle.
- » 535.78 million was the total livestock population of India. This included:
 - o 192.9 million cattle
 - o 148.88 million goats
 - o 109.85 million buffaloes
 - o 74.26 million sheep
 - o 9.06 million pigs

All other animals taken together contributed just 0.23% of the total livestock population in India.

Limitations of the 2019 Livestock Census in India

- » **Inaccurate Stray Animal Data:** Difficulty in tracking stray animals, especially in urban areas.
- » **Underreporting in Remote Areas:** Livestock holdings in hard-to-reach regions were often missed.
- » **Limited Focus on Animal Welfare:** Lacked data on health and welfare conditions of animals.
- » **Data Collection Errors:** Some manual data led to inaccuracies, especially on breed and ownership.



HOW WILL THE 21st LIVESTOCK CENSUS BE DIFFERENT FROM THE PREVIOUS EXERCISES?

- » **Digital Process:** Data collection will be fully digital with mobile apps, location tracking, digital dashboards, and automated reporting.
- » **New Data on Pastoralists:** For the first time, data will include pastoral animals and the socio-economic status and livestock holdings of pastoralists.
- » **Detailed Insights:** The census will gather more granular data, including households reliant on livestock for income and gender-specific data on stray cattle.

ISSUES WITH LIVESTOCK FARMING IN INDIA

▼ Low Productivity:

- o Despite the largest livestock population and being the top milk producer, India's livestock productivity, especially of ruminants, remains low.

▼ Economic Losses from Animal Diseases:

- o Livestock diseases, including preventable ones like Foot and Mouth Disease and Haemorrhagic Septicaemia, cause annual losses of nearly Rs. 50,000 crores due to inadequate vaccination and reporting.

▼ Inadequate Infrastructure & Human Resources:

- o The sector faces a shortage of veterinary institutions and professionals, leading to poor veterinary services and suboptimal breeding practices.

▼ Feed and Fodder Shortage:

- o With only 5% of cultivable land dedicated to fodder production, there is a significant shortage, affecting livestock productivity.

▼ Lack of Public Institution Support:

- o The livestock sector receives insufficient financial and policy attention, with only 12% of agricultural expenditure directed towards it.

▼ Marketing Issues:

- o The livestock market is largely informal and lacks transparency, with many products sold through unorganised sectors, hindering market development.

▼ Neglected Small Ruminants:

- Small ruminants like sheep and goats are often neglected in terms of support services, despite growing meat demand.

GOVERNMENT INITIATIVES

Animal Husbandry Infrastructure Development Fund (AHIDF):

- The Central Government offers 3% interest subvention and a 25% credit guarantee on total borrowing to support animal husbandry infrastructure development.

National Livestock Mission (NLM):

- Restructured for 2021-22 to 2025-26, this scheme promotes entrepreneurship and breed improvement in poultry, sheep, goats, and pigs, along with feed and fodder development.

Weak Extension Services:

- There is a lack of focus on educating farmers about modern livestock management practices, impacting productivity and sustainability.

Livestock Health and Disease Control (LH&DC):

- Aimed at supporting State/UT governments in preventing and controlling animal diseases, particularly those with economic and zoonotic significance, through vaccination.

National Animal Disease Control Programme (NADCP):

- Focuses on eradicating Foot & Mouth Disease and Brucellosis by vaccinating cattle, buffalo, sheep, goats, and pigs, along with bovine female calves (4-8 months) against brucellosis.

WAY FORWARD

Integrated Farming:

- Combining livestock farming with other agricultural practices reduces costs and improves productivity.

Disease Risk & Processing:

- Increased use of technology to improve the living environment of animals and monitoring and treatment of diseases should be motivated.
- Prevention through increased vaccination coverage should be targeted.

Investment & Partnerships:

- Public-private partnerships are essential to increase investment, boost infrastructure, and improve market linkages.

Technology & Insurance:

- Promote sex-sorted semen for cattle, improve herd management technology,

Expand livestock insurance coverage:

- Currently, less than 1% of cattle in the nation are insured, and the average monthly premium is 4.5% of the insured sum.
- Low enrolment in animal Insurance is due to high premium rates and farmers' overall economic difficulties

Targeted Policies & Support:

- Policies should be area-specific, supporting poultry in suitable areas and livestock farming in rainfed regions, along with formal credit access for farmers.

CONCLUSION

Livestock census data is crucial for fostering rural employment, driving economic growth, and informing effective policy decisions. It provides valuable insights for improving the livestock sector, ensuring sustainable development, and meeting global sustainability goals.

SAMPLE QUESTION

Q) "Livestock farming is a critical component of India's agrarian economy, contributing significantly to rural employment and food security. However, it faces challenges related to low productivity, inadequate infrastructure, and disease management. In this context, discuss the current state of livestock farming in India, the key challenges it faces, and suggest measures to enhance its productivity and sustainability." (15 marks)(250 words)

initiative, to raise awareness and reduce cases.

- o **Online Reporting Portal:** Advised the Home Ministry to create a dedicated online platform for reporting child marriages.
- o **Compensation Scheme:** Suggested the Ministry

of Women and Child Development introduce a compensation scheme for girls who leave child marriages.

- o **Annual Budget Allocation:** Recommended an annual budget to prevent child marriages and provide support for those affected.

KEY STATISTICS ON CHILD MARRIAGE IN INDIA

- o **Child Brides in India:** India has one-third of the world's child brides — 223 million — of which 102 million were married before age 15.
- o **Decline in Child Marriage Rates:** The percentage of women aged 20-24 married before 18 dropped from 47.4% in 2005 to 26.8% in 2016, and further to 23.3% in 2021 (National Family Health Survey data).
- o **Ambitious SDG Target:** The United Nations Sustainable Development Goal aims to **eliminate child marriage by 2030**, though current progress suggests this is challenging.
- o **Focus on Prevention and Prosecution:** Institutional response has primarily concentrated on preventive measures, with recent actions involving mass arrests, such as in Assam, where men were arrested for marrying minors.
- o **State Prevalence:** Despite improvements, states like West Bengal, Bihar, and Tripura have child marriage rates exceeding 40%.
- o **Urban vs. Rural:** Rural areas report higher prevalence at 56%, compared to 29% in urban settings.
- o **Prevalence of Self-Initiated Marriages:** A study by Enfold Proactive Health Trust and Civic Data Lab found that 49.4% of 174 examined child marriage cases from Assam, Maharashtra, and Tamil Nadu were self-initiated.
- o **Higher Criminal Provisions for Self-Initiated Cases:** Partners for Law in Development found criminal provisions under the PCMA applied twice as frequently to self-initiated marriages compared to arranged ones (study period 2008-2017).

PROHIBITION OF CHILD MARRIAGE ACT, 2006 (PCMA)

- o **Definition of Child Marriage:** Under PCMA, a marriage qualifies as a "child marriage" if either the **husband is under 21 years, or the wife is under 18 years of age**.
- o **Voidable Marriages:** Child marriages are considered "voidable" under PCMA, meaning the **underage party can choose to annul the marriage**.
 - o Until annulled, the marriage is considered legally valid and subsists.
- o **State Amendments:** States like **Karnataka and Haryana** have introduced amendments to automatically declare all child marriages void from the start, differing from the general "voidable" status under PCMA.
- o **Annulment vs. Divorce:**
 - o **Annulment:** Legally treated as if the marriage never happened, with individuals considered unmarried.
 - o **Divorce:** Recognises the marriage existed and formally ends it, leaving the individuals with the status of divorcees.
- o **Grounds for Annulment:** Annulment under PCMA requires proof that a child marriage took place and that the applicant was within the legal age limit to seek nullification. No other grounds are needed.
- o **Civil Remedies:** PCMA offers civil remedies for individuals in child marriages, including rights to maintenance, residence orders, and the return of wedding gifts.

GOVERNMENT INITIATIVES TO END CHILD MARRIAGE

Laws and Policies

- **Prohibition of Child Marriage Act, 2006:** Criminalises child marriage in India.
- **Protection of Children from Sexual Offences (POCSO) Act, 2012:** Protects children from sexual abuse and exploitation.
- **Age of Marriage:** A proposal to raise the minimum age for marriage to 21 for women is under parliamentary review.

Schemes

- **Beti Bachao Beti Padhao:** Introduced in 2015, it aims to generate awareness and improve the efficiency of welfare services intended for girls.
- **Sukanya Samridhi Yojana (SSY):** A part of the Beti Bachao, Beti Padhao Yojana and can be opened by the parents of a girl child below the age of 10. SSY accounts can be opened at designated banks or post offices and are designed to ensure financial empowerment of the girl child.

- **Kanyashree Scheme (West Bengal):** Offers financial support for girls pursuing higher education to delay marriage.
- **Bicycle Schemes:** States like Bihar provide cycles to girls to ensure safe travel to school, reducing dropout rates.
- **Child Marriage Prohibition Officers:** States like Karnataka have thousands of officers and trained gram panchayat members to spread awareness and enforce laws against child marriage.

Community-Level Efforts

- **Child Protection Committees:** Formed at gram panchayat levels, engaging local communities to monitor and prevent child marriages.
- **Child Marriage Free Villages (Odisha):** Over 12,000 villages are declared child marriage-free, supported by community engagement and monitoring.

WAY FORWARD

- ✿ **Effective Implementation of Supreme Court Guidelines:** The SC guidelines emphasise prevention first, then protection, and penalisation as a last resort.
- ✿ **Prioritise Women's Education:** Ensure girls complete at least 12 years of education to enable informed choices, delay marriage, and improve personal and social outcomes.
- ✿ **Skill Development and Economic Support:** Providing vocational training and economic stability programs for child marriage survivors can help them reclaim their lives.
- **Example:** Programs like the Skill India Mission

could include a targeted focus on equipping young women with market-relevant skills.

- ✿ **Legal Clarity:** Standardising approaches across states on the void or voidable nature of child marriages can prevent contradictions in legal interpretations.
- ✿ **Comprehensive Support Systems:** Holistic support, including rehabilitation and victim compensation schemes, can help survivors reintegrate into society.
- ✿ **Awareness Campaigns:** Promoting awareness on the social and legal impacts of child marriage, especially in rural areas, could contribute to further reducing rates.

CONCLUSION

Addressing child marriage requires a balanced approach focused on prevention, protection, and limited penalisation, as outlined by recent Supreme Court guidelines. Empowering girls through education and economic support can help shift norms and reduce child marriage rates. With strong implementation, India can make significant progress toward ending this practice.

SAMPLE QUESTION

Q) How does the practice of child marriage impede progress towards gender equality in India? Discuss the necessary social, legal, and policy measures to bridge this gap in line with the Sustainable Development Goals. (10 Marks, 150 Words)

STEM CELL THERAPY

Syllabus: GS III - Science and Technology

PYQ MAPPING

Q) What are the research and developmental achievements in applied biotechnology/? How will these achievements help to uplift the poorer sections of society? **(2021)**

Q) Stem cell therapy is gaining popularity in India to treat a wide variety of medical conditions including Leukaemia, Thalassemia, damaged cornea and several burns. Describe briefly what stem cell therapy is and what advantages it has over other treatments? **(2017)**

WHY IN NEWS

For the first time, scientists have tracked what happens to stem cells decades after a transplant, lifting the lid on the procedure that has been a medical mystery for over 50 years. This discovery, published in **Nature**, could help improve donor selection and increase transplant success, making the process safer and more effective.

INTRODUCTION

- » Stem cells are undifferentiated biological cells capable of transforming into specialised cells and replicating to generate additional stem cells.
- » Treatments or therapies utilising stem cells to prevent or treat diseases are referred to as stem cell therapy. This therapy supports the regenerative treatment of damaged, diseased, or injured tissues.

KEY HIGHLIGHTS OF NEW RESEARCH

➤ Long-Term Tracking of Stem Cells:

- Using advanced genome sequencing, researchers analysed blood samples from ten sibling donor-recipient pairs over a period of up to 31 years post-transplant.
- By tracking mutations in stem cells of both donors and recipients, scientists could see how many stem cells survived the transplant and continued to function over time.

the risk of disease relapse in recipients.

➤ Impact of Donor Age on Transplant Success:

- The study revealed that stem cell transplants from older donors are often less successful because they result in significantly fewer stem cells surviving the process — only about 1,000 to 3,000 cells, compared to around 30,000 from younger donors.
 - This lower number of surviving stem cells can lead to a weaker immune system and increase

➤ Aging Effect of Transplants:

- Researchers found that the transplant process seems to "age" the blood system in recipients.
- Recipients' blood systems aged by about 10 to 15 years more than those of the matched donors, due to a decrease in stem cell diversity.
- This loss in diversity could weaken immunity, making it harder for the body to fight off infections and diseases over time.

These findings open new avenues for research on improving stem cell transplant outcomes. With a better understanding of how donor age and stem cell diversity impact long-term health, doctors may be able to make more informed choices about donor selection and develop strategies to enhance stem cell survival and immune resilience in transplant patients.

WHAT ARE STEM CELLS?

- Stem cells are essential, unspecialized cells in the body that can transform into various specialised cell types, such as those found in bone, blood, brain, or heart muscle.
- Under suitable conditions, they divide to produce "daughter cells," which have two main paths: they can either retain their identity as stem cells for future cell production or differentiate into cells with specific functions.
- This self-renewing and adaptive capability is unique to stem cells, setting them apart from other cells that are fixed in function.

Stem cells are present inside different types of tissue. Scientists have found stem cells in tissues, including:

Type of Stem Cells:

Embryonic Stem Cells (ESCs):

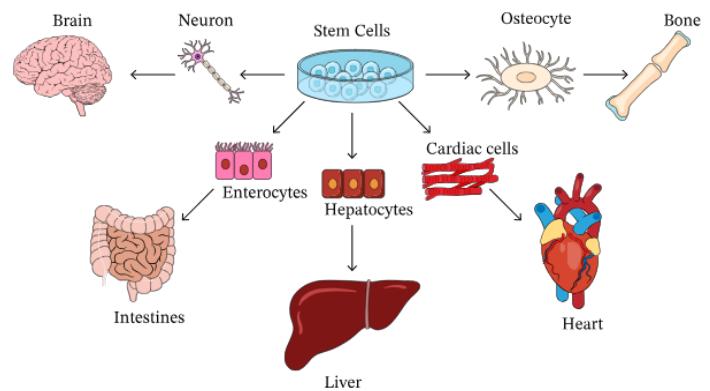
- These are derived from early-stage embryos and have the potential to become any cell type in the body.
- However, their use is ethically controversial and strictly regulated in many countries.

Adult Stem Cells:

- These are found in specific tissues and organs throughout the body and play a role in tissue maintenance and repair.
- The umbilical cord, placenta, bone marrow, muscle, brain, adipose tissue, skin, and stomach are just a few of the body components that contain ASCs..

Induced Pluripotent Stem Cells (iPSCs):

- Induced pluripotent stem (iPS) cells are pluripotent cells generated from adult somatic cells, reprogrammed to behave like embryonic stem (ES) cells.
- Created from skin or blood cells, iPS cells offer an unlimited source of any human cell type needed for therapies.
- For example, they can be directed to form neurons for neurological disorders, blood cells for leukaemia treatment, or insulin-producing cells to address diabetes.



Hierarchy of Cell Potency

- (Cell potency refers to the varying ability of stem cells to differentiate into specialised cell types.
 - Cells with the greatest potency can generate more cell types than those with lower potency)

Totipotent stem cells (High Potency)

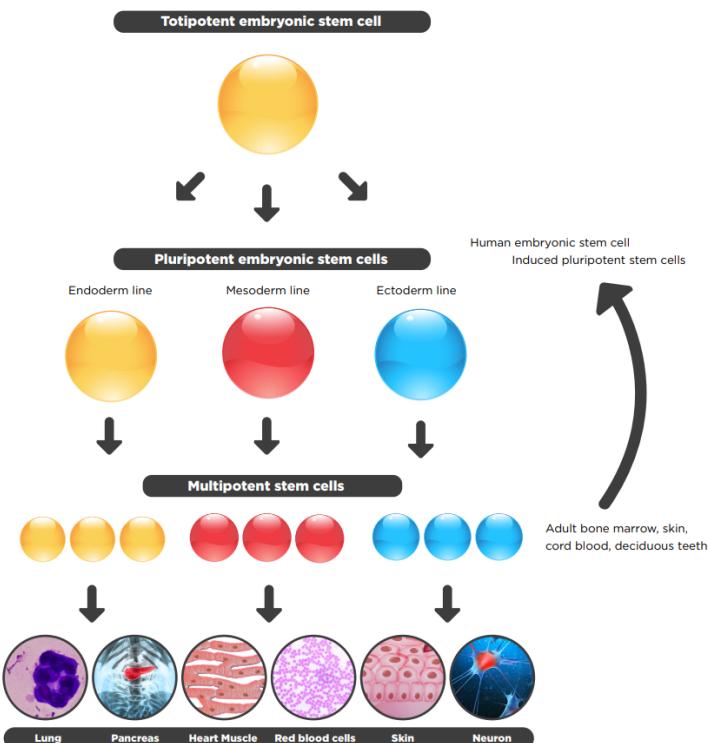
- Totipotent (omnipotent) stem cells can give rise to any of the 220 cell types found in an embryo as well as extra-embryonic cells (placenta).

Pluripotent stem cells (Medium Potency)

- Pluripotent stem cells can give rise to all cell types of the body (but not the placenta).

Multipotent stem cells (Low Potency)

- Multipotent stem cells can develop into a limited number of cell types in a particular lineage.



HOW STEM CELL THERAPY WORKS

- ⌚ **Stem Cell Extraction:** The process begins with extracting stem cells, typically from bone marrow, which are then processed in a lab.
- ⌚ **Specialisation:** The extracted stem cells are manipulated to develop into specific types of mature

cells, such as heart muscle cells, blood cells, or nerve cells, based on therapeutic needs.

- ⌚ **Implantation:** These specialised cells are then implanted to replace or repair damaged tissues affected by disease or injury.

APPLICATIONS

- ♣ **Regenerative Medicine:** Repairing or replacing damaged tissues and organs, such as heart muscle, cartilage, or nerve cells.
- ♣ **Treatment of Chronic Diseases:** Exploring potential treatments for conditions like diabetes, Parkinson's disease, Alzheimer's disease, and spinal cord injuries.
- ♣ **Immune Disorders:** Modifying or enhancing the

immune system to fight cancer or autoimmune diseases.

- ♣ **Orthopaedics:** Treating orthopaedic injuries and conditions like osteoarthritis.
- ♣ **Cosmetic Procedures:** Using stem cells for procedures like facial rejuvenation.

ADVANTAGE OF STEM CELL THERAPY OVER OTHER TREATMENTS

- ★ **Disease Reversal Potential:** Stem cells can be directed to form specialised cells, providing a renewable source of healthy cells for treating various diseases.
- ★ **Minimally Invasive:** Unlike traditional surgeries, stem cell therapy is non-surgical, leaving no scars and requiring little recovery time.
- ★ **Quick Recovery:** This procedure allows for a fast

return to daily activities, often within a day.

- ★ **Natural Healing:** Stem cells promote self-repair by stimulating new cell growth at injury sites, aiding natural recovery.
- ★ **Low Risk of Complications:** Stem cell therapy generally has no side effects, minimising infection risks and other complications.

CONCERNS ABOUT THE USE OF STEM CELLS

- ⌚ **Ethical Debate:** The use of embryonic stem cells remains a central ethical concern in stem cell research and therapy.
- ⌚ **Unregulated Treatments:** Unproven stem cell therapies may cause negative side effects for patients.
- ⌚ **Under Regulated IVF Clinics:** IVF clinics, although reliable sources for embryos, face minimal regulation.
- ⌚ **Lack of Oversight:** In some countries, insufficient

legislation allows stem cell therapy to be commercialised without proper regulation or transparency.

- ⌚ **Financial Issues:** High treatment costs, patient debt, and underreporting of negative effects are common consequences.
- ⌚ **Weak International Guidelines:** Current international guidelines for stem cell research are voluntary and lack the legal or political authority to enforce laws.

Stem Cell Therapy in India

- ⌚ In India, only hematopoietic (blood-forming) stem cells derived from bone marrow or umbilical cord blood are commonly used to treat blood diseases and blood cancers.
- ⌚ Ongoing research is exploring the potential clinical use of stem cells for other diseases and types of stem cells, but these therapies are not yet widely applied.
- ⌚ Despite the growing interest in stem cell therapies, only hematopoietic stem cell transplants (HSCT) or bone marrow transplants (BMT) are regularly used to treat various blood-related conditions.
- ⌚ According to the National Guidelines for Stem Cell Research (NGSR 2017), making commercial claims about stem cell therapy as a cure for other illnesses is considered unethical, malpractice, and a violation of existing regulations.

↳ Stem Cell – Regulations in India

- o India lacks a specific "stem cell law," but stem cell use is regulated by guidelines from the Indian Council of Medical Research (ICMR) and the Department of Biotechnology (DBT).
- o **Stem cell therapy for commercial use is banned**, while research and clinical trials are governed by existing medical regulations.

↳ Stem Cell Banking regulation in India:

- o India currently lacks laws governing stem cell banking once a laboratory is approved.
 - There are no regulations on the storage conditions or temperature control during transportation of stem cells.
- o **No Consumer Protection:** If a consumer has complaints against a stem cell bank, the government has no authority to intervene or take action.

CONCLUSION

Stem cell therapy is a groundbreaking medical innovation both globally and in India, providing hope for many patients. Despite challenges such as ethical issues and the need for standardisation, its potential benefits—such as precision, reduced side effects, and regenerative capabilities—make it a significant advancement in healthcare.

SAMPLE QUESTION

Q) Discuss the current status of stem cell therapy in India. Highlight its potential benefits, challenges, and ethical concerns. What measures should be taken to regulate stem cell research and its clinical applications effectively?

(15 marks) (250 words)



OUR FIRST ATTEMPT TOPPERS



ETHICS - CASE STUDY

Q1 As a labour enforcement officer conducting a routine inspection, you observe that an entrepreneur who has established multiple sanitary ware factories in rural areas is contributing to local employment and supplying affordable sanitary products for toilet construction. However, you've also noted instances of wage underpayment and some cases of child labour involving children under 14 years old.

In this context, answer the following questions:

- What are the options available to you?
- Discuss the pros and cons of each option and finally choose the option which you consider best with suitable justifications.

ETHICS - EXAMPLES

- Lack of Accountability:** The Jawaharlal Nehru University Students' Union (JNUSU) raised concerns over the handling of a sexual harassment complaint filed by 47 female students, accusing the Internal Complaints Committee (ICC) of diluting the case and attempting to intimidate the complainant during deposition.
- Ethics in Technology:** In the first quarter of this year, Indians lost Rs 120.30 crore in "digital arrest" scams, where fraudsters posing as authorities falsely accused victims of involvement in crimes to extort money. According to the Ministry of Home Affairs, 46% of cyber frauds in this period originated from Myanmar, Laos, and Cambodia, with total losses amounting to Rs 1,776 crore.
- Environmental Ethics:** Ittisha Sarah, through the Northeast Waste Collective, is spearheading a community-driven waste management initiative in Sangti village, aiming to transform it into a zero-waste model. By integrating local traditions and fostering collective action, the village is making strides in sustainability, despite challenges like increased tourism and waste generation.
- Social Justice:** Pensioners in Rajasthan, including elderly, disabled, and widowed individuals, have faced pension suspensions due to administrative errors, such as being marked "out of state" or "dead," leading to deprivation of benefits. The Rajasthan government has acknowledged these issues and is working to reinstate pensions cancelled due to incorrect information.
- Innovation:** Ba Nong, frontman of the Chinese band Varihnaz, combines his music career with farming, emphasising the connection between the two. The band's music, which blends folk, rock, and blues, highlights rural life and organic farming, offering a counterpoint to modern, commercialised culture.
- Women Empowerment:** The Nainital district administration has launched measures to improve girls' safety, including securing 480 vulnerable locations, conducting workshops, and cracking down on harassment. The initiative has led to arrests, increased patrols, street lighting improvements, and awareness of helpline numbers.
- Gender Inequality:** The ILO report states that 53% of women in India are outside the labour force due to care responsibilities, underscoring the need for more investment in the care economy, especially in early childhood care. In comparison, only 1.1% of men are excluded for similar reasons, highlighting the disproportionate caregiving burden on women.
- Social Responsibility:** Rajwinder Kaur, a 28-year-old educator in Balloch, Punjab, is transforming the lives of elderly villagers by helping them move from thumbprints to signatures, empowering them with literacy skills and fostering a culture of education.



MODEL ESSAY

"Truth never damages a cause that is just"

Introduction

- Quote by Mahatma Gandhi
- Brief explanation of justice as fairness and truth as accuracy or honesty in action or belief.
- Highlight how truth is the foundation for fair decisions, moral integrity, and just outcomes in society.

Role of Truth in Establishing Justice

- **Building Credibility:** Truth ensures the credibility of a cause, gaining public trust and support.
- **Transparency and Fairness:** Honest practices create a transparent environment where justice can flourish without corruption.
- **Moral Authority:** Truth lends moral authority to a cause, making it resonate ethically and deeply with others.
- **Correction of Misconceptions:** Truth helps eliminate false narratives or misunderstandings, solidifying a just cause's foundation.
- **Accountability Mechanism:** Truth acts as a corrective tool, aligning actions and goals with justice and accountability.

Examples Illustrating the Power of Truth in Just Causes

- Figures like **Nelson Mandela and Desmond Tutu** exposed the brutality of the apartheid regime and advocated for human rights.
- Environmental activists, such as **Greenpeace and Sierra Club**, leverage truth through **scientific data** and investigative journalism to expose environmental degradation.
- Human rights organisations like **Amnesty International and Human Rights Watch** use

truthful investigations and documentation to expose human rights abuses and demand accountability

Challenges in Upholding Truth

- **Manipulation and Falsehoods:** Challenges of misinformation and propaganda that may obscure the truth.
- **Sacrifices for Truth:** Often, revealing the truth may demand sacrifices, such as personal or political costs
- **Resistance from Opposing Forces:** Opposition to truth can arise from those whose interests are threatened by a just cause.
- **Personal and Professional Risks:** Speaking truth to power can lead to personal and professional risks, such as harassment, intimidation, and job loss.
- **Cultural and Social Barriers:** Cultural and social norms may hinder the pursuit of truth, particularly in societies where conformity is valued over critical thinking.

Conclusion

- Truth is a powerful ally in the pursuit of justice, as it supports integrity and trust.
- Truth may face challenges in the short term, but ultimately, it aligns with and reinforces justice.

Sample Quotes

- *Integrity is doing the right thing, even when no one is watching - C S Lewis*
- *The best way to predict the future is to create it- Abraham Lincoln*
- *To deny people their human rights is to challenge their very humanity- Nelson Mandela*

MAINS JOT DOWN



GS- II - SOCIAL JUSTICE

- ➡ The **Ministry of Social Justice and Empowerment** has launched 'TULIP,' a digital platform aimed at empowering marginalised artisans, including Scheduled Castes (SCs), Other Backward Classes (OBCs), sanitation workers, and individuals with disabilities.
- ➡ This initiative provides artisans with an e-marketplace where they can showcase and sell their products, enabling access to global audiences and fostering economic independence.
- ➡ Through TULIP, artisans receive support for e-marketing, enhancing their reach and sales potential, while also promoting self-reliance and inclusive economic growth.



GS- I - IMPORTANT PERSONALITIES

- ➡ **Parliamentary Tribute to C.R. Das on His Birth Anniversary:**
 - » Born in Calcutta and educated at Presidency College and in London for law, C.R. Das made significant contributions to India's freedom movement.
 - » He famously defended **Aurobindo Ghosh** in the **1909 Alipore bomb case**, led the Non-Cooperation Movement in 1920, and served as **Congress President** in 1922.
 - » In 1923, he co-founded the **Swaraj Party** with Motilal Nehru and became the first elected mayor of Calcutta in 1924.
 - » He also established the National University at Dacca in 1921.



GS- III - ECONOMY

- ➡ **PM Vishwakarma Scheme:**
 - » Over two million applications have been registered under this Central Sector scheme, led by the Ministry of MSME.
 - » The scheme aims to support traditional artisans and craftspeople across rural and urban areas by recognizing them as 'Vishwakarmas,' enhancing their skills, and promoting their brands through market linkages for growth opportunities.



GS- III - AGRICULTURE AND FISHERIES

- ➡ The **Fisheries Department** has announced the development of **Tuna clusters in the Andaman & Nicobar Islands** under the **Pradhan Mantri Matsya Sampada Yojana**.
 - » Tuna are saltwater fish known for their streamlined bodies, strong swimming, and global presence in tropical and temperate oceans.
 - » Valued for protein-rich meat, they are pelagic, living in the open sea beyond the continental shelf.
- ➡ **Significance of Tuna Clusters:**
 - » These clusters aim to achieve economies of scale, boost fishery incomes, and support export infrastructure for better connectivity to Southeast Asia.



GS- III - SCIENCE & TECHNOLOGY

- ➡ **India's First Analog Space Mission:**
 - » ISRO has launched India's first analog space mission in **Leh, Ladakh**, aimed at planning **lunar mission experiments**.
 - » Developed in collaboration with ISRO's Human Space Flight Center, AAKA Space Studio, the University of Ladakh, and IIT Bombay, this mission tests technologies, robotic equipment, and **studies behavioural effects in Earth environments similar to space**.



GS- III -ENVIRONMENT CONSERVATION

→ A study published in **One Earth** journal highlights the benefits of well-managed **Marine Protected Areas (MPAs)** in conserving biodiversity and enhancing nutritional security.

→ Key Findings:

- » Sustainable-use MPAs contribute 13.6% of global catch, 14% of fisheries revenue, and 13.7% of nutrient supply.
- » 7% of global catches come from Exclusive Economic Zones (EEZs).
- » Establishing MPAs in nutritionally vulnerable coastal areas can improve health and nutrition.

→ Deforestation in Brazil's **Amazon** rainforests **drops by nearly 31%** compared to previous year.

→ Deforestation in Brazil's vast savannah, known as the **Cerrado**, **decreased by 25.7%, the first decline in five years.**

→ New MoEFCC Rules for Polluters:

- » Following a Supreme Court order, MoEFCC has introduced new rules for handling complaints and penalising environmental violators.
- » Complaints can now be initiated by bodies like CPCB, SPCBs, and Pollution Control Committees.
- » Cases may be transferred if jurisdictional issues arise. An adjudicating officer must start inquiries within 30 days under Section 15C of the Environment (Protection) Act, giving violators 15 days to respond, and the process should conclude within six months.



GS- II - INTERNATIONAL RELATIONS

→ The **5th edition of the Vietnam-India Bilateral Army Exercise (VINBAX)** has commenced in Ambala, **Haryana**.

→ This edition is notable for its expanded scope, featuring Bi-Service participation for the first time, with both Army and Air Force personnel from India and Vietnam taking part.

→ Seventh Annual Assembly of the International Solar Alliance (ISA): Key Outcomes

- » India was re-elected as ISA President (2024-2026) with France as Vice-President.
- » The third edition of the World Solar Report series was released, featuring four reports.

→ Major Findings from the Reports:

- » **World Solar Market Report 2024:**
 - **Global Solar Capacity:** Grew from 1.22 GW in 2000 to approximately 1,419 GW in 2023.
 - **Manufacturing vs. Demand:** Solar manufacturing expected to exceed 1,100 GW by 2024, leading to lower solar panel prices.
 - **Solar Jobs:** Clean energy jobs reached 16.2 million globally, with 7.1 million in solar (a 44% increase from 2022).

CHERRYPICKS OF THE WEEK

AGRIVOLTAIC FARMING

- This practice combines agriculture and solar energy by growing crops beneath solar panels, also known as agrisolar or dual-use solar.
- It offers benefits like diversified farmer income, minimised land competition, lower carbon footprint, and enhanced energy resilience.

SEA FOAM

- Formed by organic material, wind, and waves, sea foam consists of bubbles created by micelles—small spheres of surfactants around air.
- These surfactants, mainly proteins and fats from decaying marine life (like plankton), are also common in soaps and industrial processes.
- Algal blooms often contribute to thicker sea foams.

AGENTIC AI

- This type of AI operates autonomously, making independent decisions and performing tasks for users, unlike generative AI, which focuses on content creation.
- Applications include business, healthcare, and cybersecurity, offering enhanced problem-solving, adaptability, and scalability across various fields.

GRAVITY ENERGY STORAGE

- GES is a mechanical energy storage system that stores power by lifting heavy weights (e.g., water, concrete blocks) during excess energy production and releasing it to generate electricity when needed.
- It offers high efficiency, large storage capacity, low environmental impact, and durability, though it requires significant space and investment.
- Key applications include renewable energy integration and grid stabilisation.

NUTRACEUTICALS

- These products serve as food, supplements, and medicinal aids, offering physiological benefits and protection against chronic diseases.
- They are used to enhance health, delay ageing, prevent illness, and support body functions, gaining attention for their nutritional, safety, and therapeutic potential.