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INSTITUTE FOR IAS & KAS STUDIES

DOWN TO EARTH

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JANUARY 2025

SUMMARY STRUCTURE DEDICATED TO UPSC EXAM PREPARATION

NEW PATHOGENS

INTRODUCTION

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CONTENT

[January, 2025]

Europe Faces Russian Natural Gas Supply Cuts

Context

- Recently, the Ukraine Prime Minister said that its gas transit agreement with Russia will expire on January 1, 2025, and will not be renewed.
    - The agreement was to allow transit of natural gas to Europe amid the Russia-Ukraine conflict.

More about the news

- For decades, Europe has relied heavily on Russian natural gas, with pipelines traversing Ukraine being a critical supply route.
- However, the ongoing conflict between Russia and Ukraine has led to a cessation of this vital energy flow.
- Ukraine's decision not to renew the transit agreement with Russia, which expires at the end of 2024, has effectively cut off a major source of natural gas to Europe.

Impact

- Countries such as **Austria, Slovakia and Moldova,** which are highly dependent on **Russia for energy**, fear the disruption of future supply.
- Before the invasion of Ukraine in 2022, Russia supplied about 35% of Europe's pipeline natural gas exports. This figure has now dwindled to less than 10%.
- **Moldova** imposed a **60-day emergency in the energy sector** over fears of natural gas supply cuts.
- **Slovakia** has rejected the EU's stance on moving away from Russian piped gas supply, saying it would result in high energy prices.
- The country has declared that it will block any sanctions on Russia related to nuclear energy.
    - Nuclear programmes in Slovakia are developed by Russia.

Geopolitical Ramifications

- Ukraine's move is seen as a strategic effort to weaken Russia financially by cutting off a major revenue stream.
- It aligns with broader European efforts to reduce dependency on Russian energy, a dependency that has been perceived as a tool for political leverage by Moscow.

Economic Consequences

- Russia stands to lose significant revenue from gas exports, which have been a cornerstone of its economy.
- On the other hand, European countries are likely to face higher energy prices and potential shortages, especially during the winter months.
- The transition to alternative energy sources will require substantial investment and time.

Postponement of Deforestation Law By European Parliament

Context

- In a significant move, the European Parliament has voted to postpone the implementation of the European Deforestation Regulation (EUDR) by one year.

Background and Purpose of European Deforestation Regulation (EUDR)

- The EUDR aims to ensure that products sold within the EU are not sourced from deforested land, addressing the urgent issues of climate change and biodiversity loss.
- It imposes supply chain due diligence requirements on operators and traders dealing with products linked to deforestation and forest degradation.

Reasons for Postponement

- The postponement comes in response to concerns from various stakeholders, including EU Member States, non-EU countries, traders, and operators, who indicated difficulties in fully complying with the rules by the original deadline.
- The European Council supported the above.

Proposed Amendments

- A new category of countries deemed to pose 'no risk' of deforestation was introduced.
- This category will have less stringent due diligence requirements, focusing mainly on compliance with the legislation of the country of production.
- The European Commission is tasked with finalizing the country benchmarking system by June 30, 2025.

Impact and Future Steps

- Despite the delay, the core substance of the deforestation law remains unchanged.
- The postponement is seen as a necessary step to ensure legal clarity and effective implementation of the regulation.
- Europe continues to lead in global forest protection efforts, with the next significant step being the publication of risk categories by country before June 2025.

Legalising Minimum Support Price (MSP)

Context

- Recently, a Parliamentary Standing Committee recommended implementing a legally-binding MSP in India, as farmers in northern states mounted multiple protests to demand for guaranteed MSP for crops.

About the Minimum Support Price (MSP)

- It has been a cornerstone of India's agricultural policy, aimed at ensuring farmers receive a fair price for their produce.
- However, the debate over legalising MSP has gained momentum, especially in light

of recent farmer protests and economic challenges.

Need for MSP

- Farmers in India face numerous challenges, including rising production costs, soil fertility loss, and insufficient irrigation.
- These factors, combined with market fluctuations and the necessity to sell crops to meet household expenses, often result in farmers receiving prices below their production costs.
- MSP aims to provide a safety net by guaranteeing a minimum price for certain crops, thus protecting farmers from market volatility.

Current MSP Framework

- The **Commission for Agricultural Costs and Prices (CACP)** recommends **MSPs for 23 commodities**, including cereals, pulses, oilseeds, and commercial crops.
- The Union Ministry of Tribal Affairs also provides **MSP for 87 minor forest produce**.
- However, the current MSP system is not legally binding, meaning there is no legal obligation for the government or private buyers to procure crops at MSP.

Arguments for Legalising MSP

- **Farmer Security:** Legalising MSP would provide farmers with a guaranteed income, reducing their vulnerability to market fluctuations and ensuring they can cover their production costs.
- **Market Stability:** A legally binding MSP could help stabilise market prices by setting a floor price, preventing prices from falling below a certain level.
- **Rural Economy Boost:** Ensuring fair prices for farmers can lead to increased rural incomes, boosting the overall rural economy and reducing poverty.

Challenges and Concerns

- **Fiscal Burden:** Implementing a legally binding MSP for all crops could impose a significant financial burden on the government.
    - Estimates suggest that procuring all MSP-covered crops could require up to ₹7.5 lakh crore annually.
- **Market Distortion:** A legally binding MSP could distort market dynamics, leading to overproduction of certain crops and underproduction of others, potentially affecting food security.
- **Implementation Complexity:** Ensuring compliance with a legally binding MSP would require robust monitoring and enforcement mechanisms, which could be challenging to implement.

Alternative Approaches

- **Private Sector Involvement:** One alternative is to legally obligate private buyers to purchase crops at or above MSP, similar to the current system for sugarcane procurement.
- **Direct Compensation:** Another approach is to provide direct compensation to

farmers if they sell their produce below MSP, reimbursing them for the difference.

- This method could be more cost-effective and easier to implement than direct procurement.

Conclusion

- Legalising MSP in India is a complex issue with significant implications for farmers, the economy, and the agricultural sector.
- While it offers potential benefits in terms of farmer security and market stability, it also poses challenges related to fiscal burden and market distortion.
- A balanced approach, involving stakeholder dialogue and exploring alternative mechanisms, is essential to address these challenges and ensure a sustainable and equitable agricultural system.

Electronic Waste in India

Context

- As per data shared by the Union Minister of State for Housing and Urban Affairs in the Rajya Sabha, India's electronic waste surged from 1.01 million tonnes in 2019- 20 to 1.75 million tonnes in 2023-24.

About the Electronic Waste (or e-Waste)

- India is witnessing a rapid surge in electronic waste (e-waste) generation, driven by the increasing use of electronic devices. This rise poses significant environmental and health challenges, necessitating effective management strategies.

Current Scenario

- India's e-waste generation has surged by 73% over the past five years, reaching 1.75 million metric tonnes in 2023-24.
- The sharpest increase occurred during the COVID-19 pandemic, as remote work and learning boosted electronic consumption.
- E-waste contains hazardous materials like heavy metals and persistent organic pollutants, which can harm the environment and human health if not properly managed.

Environmental and Health Impacts

- E-waste contains hazardous substances such as lead, mercury, cadmium, and brominated flame retardants.
- When e-waste is not managed properly, these toxic substances can leach into the soil and water, causing contamination.
- Additionally, informal recycling practices, which are prevalent in India, expose workers to harmful chemicals, leading to serious health issues such as respiratory problems, skin diseases, and even cancer.

Government Initiatives and Regulations

- **E-Waste (Management) Rules, 2022:** These rules emphasize **Extended Producer Responsibility (EPR),** requiring producers to meet annual recycling targets based on the quantity of e-waste generated or products sold.

- Producers must purchase EPR certificates from registered recyclers, ensuring proper disposal and recycling of e-waste.
- **Extended Producer Responsibility (EPR)** is a key component of these rules, requiring manufacturers to establish e-waste collection centers and ensure environmentally sound recycling practices.

Role of the Informal Sector

- Informal recyclers often use rudimentary methods to extract valuable materials from e-waste, which can be hazardous.
- Efforts are being made to integrate the informal sector into the formal e-waste management system.
- Training programs and awareness campaigns are being conducted to educate informal workers about safe recycling practices and the importance of environmental protection.

Public Awareness and Participation

- Initiatives such as ***e-waste collection drives, awareness campaigns, and educational program***s are being organized to inform citizens about the importance of proper e-waste disposal.
- Consumers are encouraged to dispose of their electronic devices at authorized collection centers and participate in recycling programs.

Challenges and Solutions

- Despite these efforts, **over 95% of India's e-waste is handled by the informal sector,** which lacks the necessary infrastructure and expertise for safe recycling. This informal handling exacerbates environmental and health risks. To address this, there is a need for:
- **Strengthening Formal Recycling Infrastructure:** Investing in advanced recycling facilities and technologies to handle e-waste safely and efficiently.
- **Public Awareness Campaigns:** Educating consumers about the hazards of improper e-waste disposal and encouraging responsible recycling practices.
- **Incentivizing Formal Sector Participation:** Providing incentives for businesses and individuals to engage with formal recycling channels.

Shared Resources and India's Marginalised Communities

Context

- A landmark 2011 Supreme Court ruling to protect shared resources deepens struggles for India's marginalised communities.

About

- Shared resources, or commons, such as water bodies, forests, and grazing lands, play a crucial role in the livelihoods of India's marginalized communities.

- These resources are often the backbone of rural economies, providing essential goods and services to those who lack access to private property.
- However, the management and protection of these commons have been fraught with challenges, leading to conflicts and further marginalization of vulnerable groups.

Historical Context

- The concept of commons in India has deep historical roots, with traditional community-based management systems ensuring equitable access and sustainable use.
- However, colonial and post-colonial land policies disrupted these systems, leading to the privatization and commercialization of shared resources.
- This shift has often resulted in the exclusion of marginalized communities, such as Scheduled Castes (SCs), Scheduled Tribes (STs), and landless laborers, from accessing these vital resources.

Legal Framework and Challenges

- A landmark 2011 Supreme Court ruling aimed to protect shared resources and prevent their encroachment.
- The court mandated the eviction of illegal occupants and the restoration of commons, with exceptions for marginalized groups.
- Despite this, implementation has been inconsistent, and many marginalized communities continue to face eviction without adequate rehabilitation.

Case Study: Rohar Jagir Village

- In Rohar Jagir village, Punjab, the 2011 Supreme Court verdict has had limited impact.
- The village pond, a crucial resource, remains encroached upon, and the affected families, primarily from marginalized backgrounds, have not benefited from the ruling.
- This case highlights the systemic inequities and the gap between legal provisions and ground realities.

Impact on Marginalized Communities

- The misinterpretation and selective enforcement of legal protections for commons have disproportionately affected marginalized communities.
- Studies have shown that evictions often occur without prior notice or fair hearings, violating the rights of the affected individuals.
- Furthermore, the lack of regularization policies for indigent persons and SC/ST communities exacerbates their vulnerability.

Way Forward

- To address these challenges, it is essential to strengthen the legal and institutional frameworks governing shared resources.
- This includes ensuring transparent and participatory decision-making processes,

providing legal aid to marginalized communities, and implementing comprehensive rehabilitation and compensation schemes.

- Additionally, reviving traditional community-based management systems can promote sustainable and equitable use of commons.

'Nexus Assessment' and 'Transformative Change Assessment'

Context

- Recently, reports **'Nexus Assessment'** and **'Transformative Change Assessment'** from the **Intergovernmental Science- Policy Platform on Biodiversity and Ecosystem Services (IPBES)** have highlighted the urgent need for a unified approach to tackle the interconnected global crises of biodiversity, water, food, health, and climate change.

About the Nexus Assessment

- It focuses on the interlinkages among biodiversity, water, food, and health. It emphasizes that addressing these issues in isolation can lead to counterproductive outcomes.
- For instance, prioritizing food production without considering its impact on biodiversity and water resources can exacerbate environmental degradation. It recommended:
    - **Integrated Decision-Making:** Moving beyond single-issue silos to manage and govern the interconnected elements effectively.
    - **Adaptive Governance:** Implementing flexible policies that can adapt to changing circumstances and new scientific insights.
    - **Sustainable Practices:** Promoting practices that balance the needs of biodiversity, water, food, and health to achieve long-term sustainability.

Transformative Change Assessment

- It provides actionable solutions to halt biodiversity loss and achieve a sustainable future.
- It underscores the importance of transformative changes in policies, practices, and societal values to meet global biodiversity targets by 2050.

Key Aspects

- **Holistic Approaches:** Encouraging holistic approaches that consider the broader impacts of actions on biodiversity and ecosystem services.
- **Stakeholder Engagement:** Involving diverse stakeholders, including indigenous communities, in decision-making processes to ensure inclusive and effective solutions.
- **Policy Integration:** Integrating biodiversity conservation into broader policy frameworks, such as climate change

mitigation and sustainable development goals.

Additional Information

- **Earth Summit (1992):** The world agreed on the links between climate change, desertification and biodiversity loss, and resolved to protect nature.
  - Still, the planet has continued to lose an estimated 2-6% of its biodiversity every decade.
- **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES):** It is a Bonn-based intergovernmental body that assesses the state of the planet's biodiversity and ecosystems, and has looked for solutions to arrest this loss of biodiversity for the past three years.
- **Kunming-Montreal Global Biodiversity Framework (KMGBF):** It aims to reverse and halt biodiversity loss by 2030

  recognises this and has identified IPLCs as crucial for meeting many of the targets.
  - At the recently held **COP16 of the Convention on Biological Diversity (CBD),** a new **Subsidiary Body on Article 8(j)** and Other Provisions of CBD related to indigenous peoples was established.
  - This would ensure that their views are included in the future policy decisions.
- **Biodiversity loss** — one of the crises that defines the polycrisis — has reached such a level that nature is no longer able to provide the services that ensure human survival.
  - Only 25% of the world's tropical rainforests, home to over 16,000 terrestrial mammals, bird, reptile and amphibian species, are of high quality.
  - IPBES also estimates that a million animal and plant species are threatened with extinction.
  - The first **'Global Tree Assessment'** published in an update of the **IUCN Red List** of Threatened Species, finds that one in three tree species faces extinction.

Burden of Poverty

Context

- According to the World Bank, poverty reduction has slowed amid poor economic growth and shocks like the covid-19 pandemic, high inflation, increased conflict and fragility.

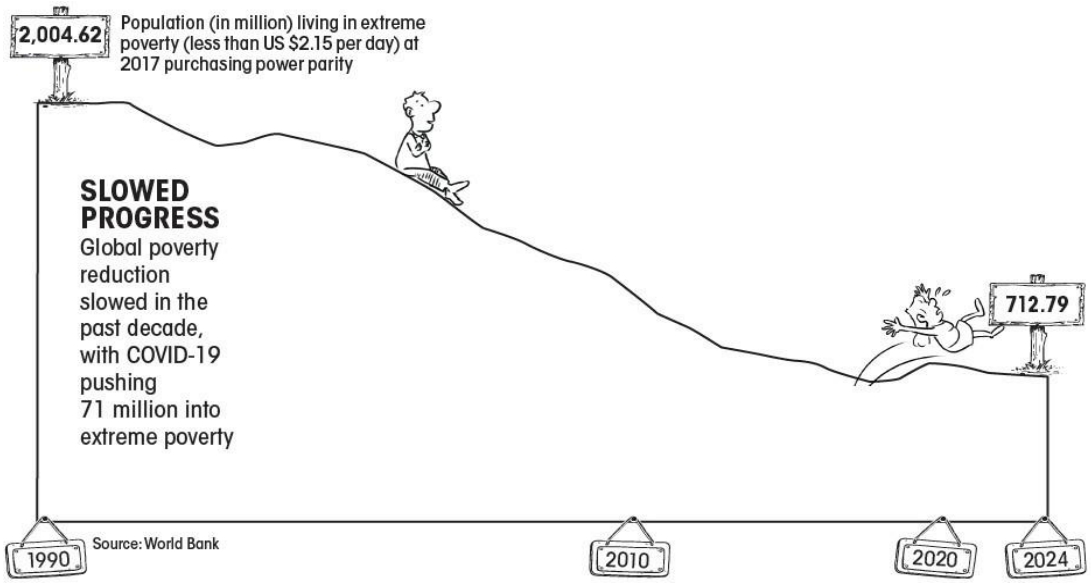
About

- Poverty remains one of the most pressing issues globally, affecting millions of lives and hindering sustainable development.
- Despite efforts to alleviate poverty, recent trends indicate a worrying rise in poverty

levels, exacerbated by economic shocks, conflicts, and climate change.

Current Trends

- According to the World Bank, as of 2024, approximately 700 million people, or 8.5% of the global population, live in extreme poverty, surviving on less than $2.15 per day.
- It has stagnated due to slow economic growth, the impacts of the COVID-19 pandemic, and increased fragility in many regions.



Regional Disparities

- Sub-Saharan Africa and South Asia are the most affected regions.
- In Sub-Saharan Africa, 67% of the population lives in extreme poverty, a figure that rises to 75% when including all fragile and conflict-affected countries.
- South Asia also saw a significant increase in poverty rates during the pandemic.

Income Inequality in India

- The richest 10% of the population now capture 52% of the national income, while the poorest half receive only 8.5%.
- This disparity has widened over the years, making it increasingly difficult for the poor to escape the cycle of poverty.
- The **World Inequality Lab** reports that the share of the top 10% in national income surged by 60% in recent years, compared to the 1990s.
    - Top 1% earning 23 times the average income in India.

Debt Distress

- More than half of low-income countries are facing debt distress, spending nearly 7.5% of their budgets on external debt servicing.

- This financial strain limits their ability to invest in welfare and development, pushing more people below the poverty line.

Impact of Climate Change

- Climate change is another factor contributing to the burden of poverty in India. Extreme weather events, such as floods and droughts, disproportionately affect the poor, who often lack the resources to recover from such shocks.
- The World Bank highlights that nearly one in five people globally are at risk of experiencing welfare losses due to extreme weather events.

Future Projections

- By 2030, the share of the global population living in extreme poverty is projected to decrease slightly to 7.3%, but in absolute numbers, the count of poor people will likely increase.
- It underscores the need for increased social spending and international cooperation to address the root causes of poverty.

Immigration and Depopulation

Context

- In recent years, the twin phenomena of immigration and depopulation have become central to discussions on global demographics and socio-economic policies.

About

- Immigration and depopulation are two interconnected phenomena that significantly impact global demographics.
- As fertility rates decline and populations age, many countries face the challenge of maintaining their population size and economic vitality.
- Immigration emerges as a crucial factor in addressing these demographic shifts.

Immigration Surge

- According to the **International Organization for Migration (IOM)**, there were approximately 281 million international migrants in 2020, a significant increase from previous decades.
- This surge is driven by various factors, including economic opportunities, political instability, and environmental changes.
- Countries like the United States, Germany, and Canada have seen substantial inflows of immigrants, which have contributed to their economic growth and cultural diversity.
- However, this influx has also sparked debates over national identity, resource allocation, and social integration.

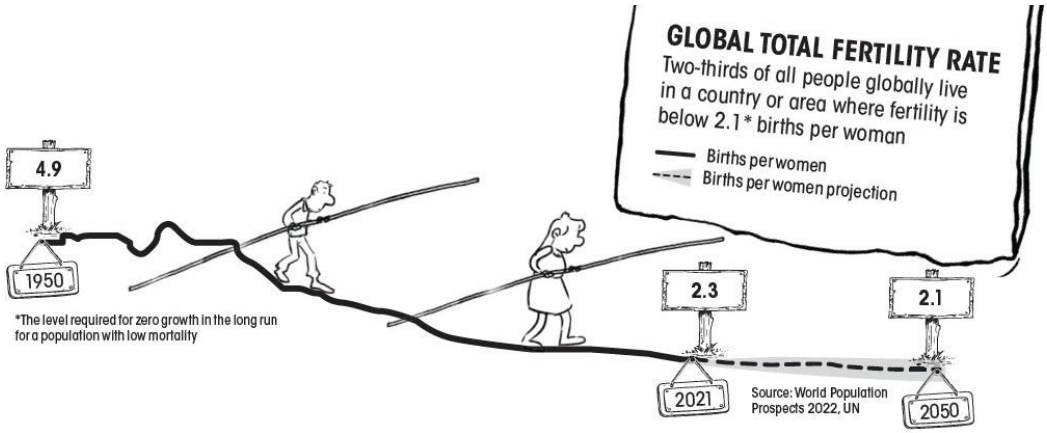
Depopulation Trends

- The **United Nations' World Population Prospects 2022** report highlights that 61 countries are projected to experience a population decline of 1% or more between 2022 and 2050.

- It is primarily due to low fertility rates and high emigration levels.

- Countries like Japan, Italy, and Russia are facing significant population declines, leading to challenges such as labor shortages, increased healthcare costs, and economic stagnation.

- These nations are implementing various policies to encourage higher birth rates and attract immigrants to mitigate the effects of depopulation.



Interplay Between Immigration and Depopulation

- **High-income countries** with declining populations often rely on immigrants to sustain their workforce and support their aging populations.
    - For instance, in the period from 2000 to 2020, international migration was a crucial factor in population growth in many developed nations.
- Conversely, **low and middle-income countries,** which continue to experience natural population growth, are often the source of emigrants seeking better opportunities abroad.
    - It creates a complex global landscape where migration patterns are influenced by economic disparities, demographic trends, and geopolitical factors.

Depopulation Trends

- Depopulation is a growing concern in many developed countries.
- The UN projects that by 2050, the population of developed regions will start to decline due to low fertility rates and an aging population.
- Without immigration, these regions would experience a significant reduction in population size, leading to potential economic and social challenges.

Immigration as a Solution

- Immigration can mitigate the effects of depopulation by replenishing the workforce and supporting economic growth.

- For instance, the **UN's medium-variant projection** suggests that continued immigration could help stabilize population sizes in developed regions.
- However, managing immigration effectively requires comprehensive policies that address integration, social cohesion, and economic opportunities for immigrants.

Challenges and Opportunities

- Countries must balance the benefits of immigration with the need to maintain social harmony and provide adequate resources for newcomers.
- Effective integration policies are essential to ensure that immigrants contribute positively to their new communities.

Policy Implications

- Countries must balance the need for economic growth and demographic stability with the challenges of social integration and resource management.
- Policies that promote inclusive growth, support family planning, and facilitate the integration of immigrants are essential.
- Moreover, international cooperation is crucial in addressing the root causes of migration, such as conflict, poverty, and climate change. By fostering global partnerships and sharing best practices, nations can create a more equitable and sustainable future.

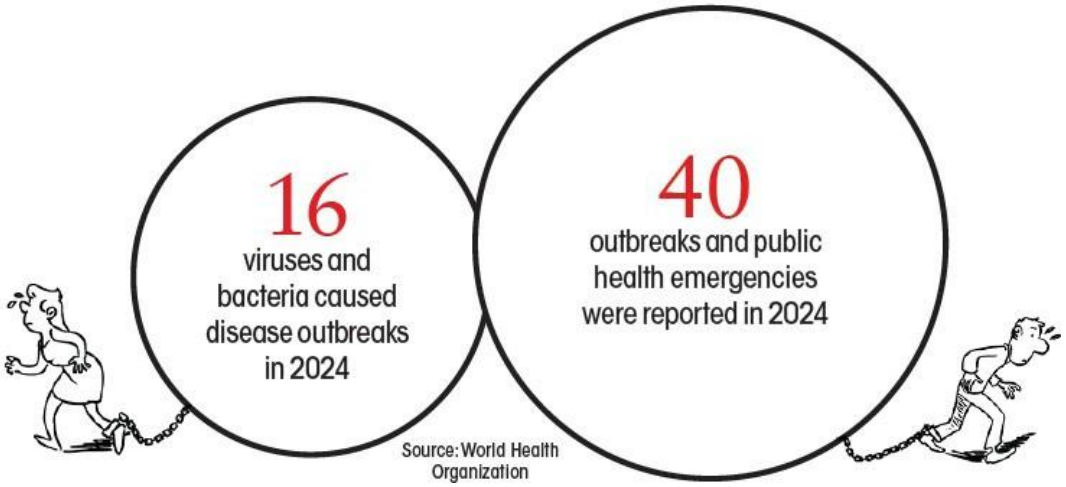
New Pathogens

Context

- The world faces an increasing threat from new and re-emerging pathogens. The **United Nations Environment Programme (UNEP)** has warned that the next pandemic could strike **by 2030** due to emerging zoonotic diseases.

Climate Change and Pathogen Spillover

- Climate change is a significant driver of pathogen spillover from animals to humans. Rising temperatures, deforestation, and habitat destruction are accelerating the spread of diseases.
    - For instance, the highly pathogenic **avian influenza (H5N1)** is just one mutation away from human-to-human transmission.
- Additionally, vector-borne diseases like dengue and chikungunya are spreading to new regions due to changing climate conditions.



Antimicrobial Resistance (AMR)

- The crisis of AMR is worsening, posing a grave threat to global health.
- The World Health Organization (WHO) has been negotiating the **International Treaty on Pandemic Prevention, Preparedness, and Response** since 2021, but significant gaps in collaboration and preparedness remain.
- In 2024, the UN approved a political declaration aimed at reducing the estimated 4.95 million human deaths linked to bacterial AMR.

Emerging and Re-emerging Diseases

- The year 2024 saw outbreaks of re-emerging and zoonotic diseases such as **cholera, M-pox, Marburg, and Oropouche fever.**
- In Africa, a more virulent form of **M-pox, Clade 1b**, spread rapidly, causing up to 50,000 cases and over 1,000 deaths.
- In Latin America, large outbreaks of vector-borne diseases were reported in new areas, with Brazil experiencing over 6 million suspected dengue cases.

New Pathogens in New Territories

- Known pathogens are infecting new species in new places and evolving to acquire newer transmission routes.
- For example, the highly infectious avian influenza strain H5N1 clade 2.3.4.4b reached the sub-Antarctic region by the end of 2023, killing penguins for the first time in January 2024.
- Additionally, a new COVID-19 variant, XEC, emerged in 2024, spreading to 27 countries.

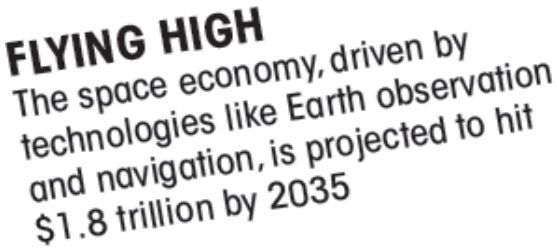
Space: New Marketplace

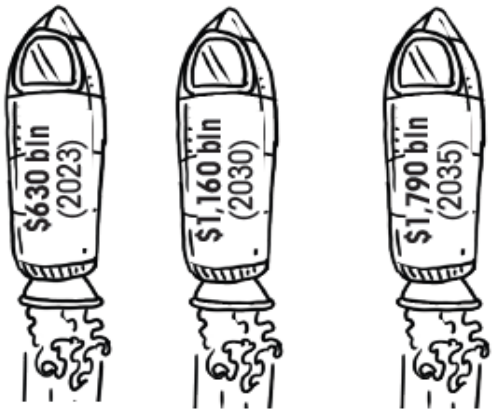
Context

- According to the World Economic Forum (WEF) and McKinsey & Company, Private players dominated the space economy, slated to be worth US $1.8 trillion by 2035 in 2024.

About

- The space industry is undergoing a remarkable transformation, evolving from a domain dominated by government agencies to a vibrant marketplace teeming with commercial opportunities.
- According to a recent report by the **World Economic Forum (WEF),** the global space economy is **projected to reach $1.8 trillion by 2035**, **up from $630 billion in 2023.**
- This shift, often **referred to as 'NewSpace'** is characterized by increased private sector participation, innovative technologies, and a growing array of applications that extend far beyond traditional space exploration.





Source: Space: "The $1.8 Trillion Opportunity for Global Economic Growth", World Economic Forum, April 2024

Rise of 'NewSpace'

- The term "NewSpace" encapsulates the burgeoning commercial space sector, which includes satellite communications, Earth observation, space tourism, and even asteroid mining. This new era is driven by several key factors:
- **Technological Advancements:** Innovations in satellite technology, miniaturization of electronics, and reusable launch vehicles have significantly reduced the cost of accessing space.
    - Companies like SpaceX and Blue Origin have pioneered reusable rockets, making space missions more affordable and frequent.
- **Private Sector Involvement:** The entry of private companies has revolutionized the space industry.
    - Firms such as SpaceX, OneWeb, and Planet Labs are leading the charge, offering services ranging from satellite internet to high-resolution Earth imaging.
    - This has opened up new revenue streams and business models.
- **Regulatory Reforms:** Governments worldwide are enacting policies to encourage private investment in space.

- In India, for instance, the government has introduced reforms to facilitate private sector participation, leading to a surge in space startups.

- **Venture Capital and Investment:** The space sector is attracting significant venture capital investment.
  - In India, the 2024-25 budget announced a ₹1,000 crore venture capital fund to boost the space economy.
  - This fund aims to support startups and small businesses, propelling the sector's growth fivefold over the next decade.

Applications and Opportunities

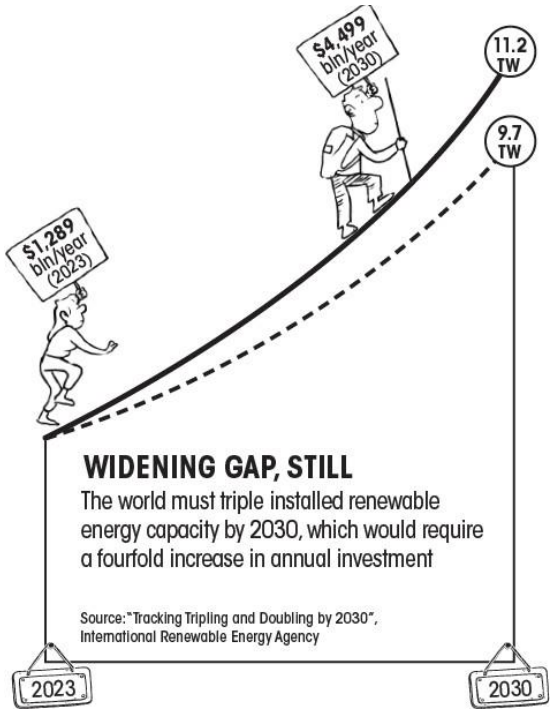
- **Satellite Communications:** Providing global internet coverage, enhancing telecommunications, and supporting remote sensing applications.
- **Earth Observation:** Offering critical data for agriculture, disaster management, environmental monitoring, and urban planning.
- **Space Tourism:** Companies like Virgin Galactic and Blue Origin are making space travel accessible to private individuals, heralding a new era of space tourism.
- **Asteroid Mining:** The potential to extract valuable minerals from asteroids presents a lucrative opportunity for future space missions.

Challenges and the Way Forward

- **Regulatory Hurdles:** Navigating the complex web of international and national regulations can be daunting for new entrants.
- **Sustainability:** Ensuring the long-term sustainability of space activities, including space debris management, is crucial.
- **Funding and Investment:** While venture capital is flowing into the sector, sustained investment is necessary to support long-term projects and innovations.

Our Last Chance

Context



- Recently, it is observed that the 16th of the last 17 months when global average surface air temperatures exceeded the warming limit of 1.5°C above pre-industrial levels, at 1.62°C above the pre-industrial level.

1.5°C Guardrail

- The **1.5°C target, set by the Paris Agreement**, is not just a number; it represents a threshold beyond which the impacts of climate change become increasingly catastrophic.
- Exceeding this limit could lead to more severe weather events, loss of biodiversity, and significant disruptions to human life. Despite this, current climate plans fall short.
- The latest nationally determined contributions (NDCs) are projected to result in greenhouse gas emissions of 51.5 gigatonnes of CO2 equivalent by 2030, only 2.6% lower than in 2019.

Path Forward: Renewable Energy and Energy Efficiency

- To stay within the 1.5°C limit, nations must triple their renewable power capacity and double energy efficiency by 2030. This ambitious goal requires a cumulative investment of $31.5 trillion.
    - While investments in solar photovoltaic are on track, other technologies remain underfunded.
- The **International Renewable Energy Agency (IRENA)** estimates that tripling renewable capacity will necessitate an average addition of 1,044 gigawatts annually from 2024 to 2030.

Challenges for Developing Countries

- Financial aid and technology transfer are crucial to enable these nations to transition to sustainable energy sources.
- The disparity in resources and capabilities between developed and developing countries must be addressed to ensure a global effort in combating climate change.

Role of International Cooperation

- The **COP28 in 2023** emphasized the need for enhanced international cooperation.
- Countries agreed to update their NDCs by February 2025, reflecting plans to significantly increase renewable energy capacity and improve energy efficiency.
- It is essential to meet the Paris Agreement's goals and secure a sustainable future.

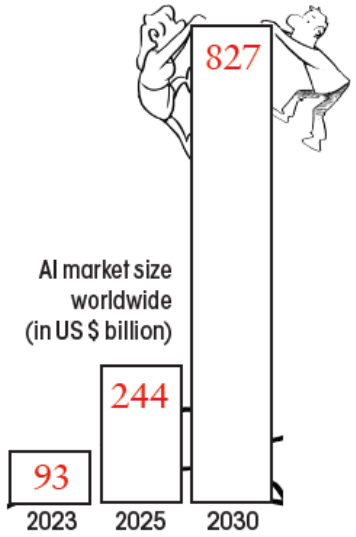
Evolution With Artificial Intelligence (AI)

Context

- AI's impact on various sectors continues to grow, bringing both opportunities and challenges.

Current Landscape of AI

- In 2024, AI advancements were recognized with Nobel Prizes in Physics and Chemistry, highlighting the technology's scientific significance.



MARKET BOOM
The global artificial intelligence market is projected to expand nearly eightfold from 2023 to 2030

- Investment in AI is projected to reach $200 billion globally by 2025, underscoring its economic importance.
- AI now features in nearly every technology we use, from automated teller machines to food delivery platforms to stock trading algorithms.
- However, AI also poses several concerns. The ability of AI systems to 'lie' and 'deceive' has raised alarms about fraud, election tampering, and loss of control over AI systems.
- In 2024 alone, over 30 AI-related lawsuits were filed, many concerning the use of copyrighted materials for training AI.
- The United Nations has also warned about the deployment of AI-based weapons in conflicts, prompting the adoption of a global resolution on AI to safeguard human rights.

AI and Human Evolution

- The integration of AI into our lives is not just a technological shift but also a potential driver of human evolution.
- An evolutionary biologist recently explored how AI might alter our physical, biological, and social environments, influencing natural selection.
    - For instance, AI's ability to capture user attention and influence behavior could have profound effects on social interactions and mental health.
- Predicting the exact impact of AI on human evolution is challenging. However, the relationship between humans and AI can be seen as a form of mutualism, where both species provide benefits to each other.
    - This dynamic could lead to significant changes in human traits and behaviors over time.

Future Trends and Ethical Considerations

- Looking ahead, several trends are expected to shape the AI landscape in 2025.
- Nations may begin discussions on the need for a treaty on AI, although achieving international consensus may prove difficult.
- The number of AI agents performing tasks autonomously is expected to double the workforce, with significant implications for employment and productivity.

- Ethical considerations will remain at the forefront of AI development.
- The 'Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence' in the US aims to establish new standards for AI safety and security, protect privacy, and promote innovation.
    - However, political changes could impact the implementation of such policies.

Treat of the Treaties

Context

- As 2025 begins, the world stands at a critical juncture, facing both significant challenges and opportunities.
- It is set to be transformative, with several landmark treaties and agreements poised to reshape global governance and address pressing issues such as climate change, health, and environmental sustainability.

Global Pandemic Treaty

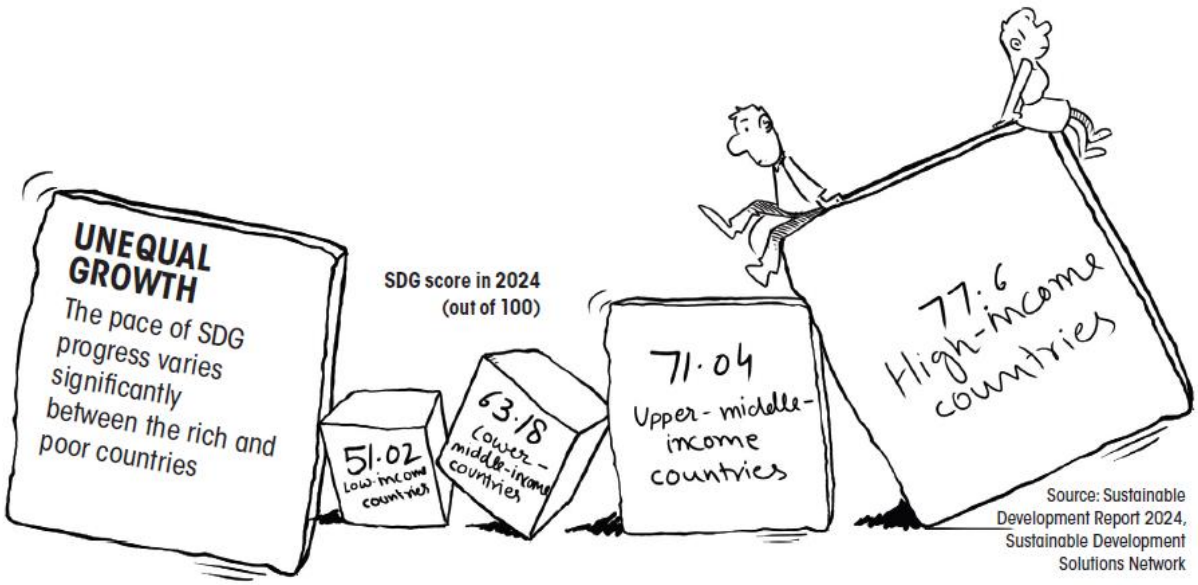
- It is expected to be finalized at the **78th WHO Health Assembly in Geneva.**
- It aims to address the weaknesses exposed by the COVID-19 pandemic by focusing on prevention, equity measures, health systems, financing, and governance.
- Its goal is to ensure equitable global health security and prevent future pandemics.

Plastics Treaty

- After missing its initial deadline in 2024, the world is now expected to finalize a plastics treaty later this year.
- While there is a consensus on the fundamental framework, disagreements persist between oil producers and other nations over whether the treaty should impose limits on plastics production or focus solely on waste management.

UN Environment Assembly

- The **7th session of the UN Environment Assembly (UNEA-7)** will take place in December 2025 under the **theme 'Advancing sustainable solutions for a resilient planet'.**
- This session will see the finalization of proposals by the Open-ended Working Group, established in 2022, to create a science-policy panel for the environmentally sound management of chemicals and waste.



Minamata Convention

- On April 25, amendments adopted at the **5th Conference of the Parties to the Minamata Convention (COP-5)** in 2023 will come into force.
- These amendments include the elimination of the mercury threshold in cosmetics and the **phasing out of mercury-added batteries, switches, and relays** by 2025.
    - COP-6 is scheduled for November 2025.

UN Ocean Conference

- Building on the success of previous conferences, the 3rd UN Ocean Conference in June will bring together UN member states and other stakeholders to advance **Sustainable Development Goal 14** on ocean protection.
- The conference will conclude with the adoption of voluntary commitments under the **Nice Ocean Action Plan.**

CITES Conference

- The **20th Conference of the Parties to the Convention on International Trade in Endangered Species (CITES)** will take place in Uzbekistan from November 24 to December 5, commemorating 50 years since the Convention's inception.
- This conference will address critical issues related to the trade in endangered species and biodiversity conservation.

Conclusion

- The treaties and agreements set to be finalized in 2025 represent a significant step towards addressing global challenges and achieving sustainable development.
- If successfully implemented, these treaties will play a crucial role in bringing balance to the planet and ensuring a resilient future for all.

On the Horizon

Context

- As we step into 2025, the global community is at a critical juncture in addressing environmental challenges, and highlights several key trends and initiatives that will shape our efforts towards a sustainable future.

Global Biodiversity Framework

- The **Kunming-Montreal Global Biodiversity Framework (December 2022)** sets an ambitious pathway to achieve a world living in harmony with nature by 2050.
- It includes four goals for 2050 and 23 targets for 2030, focusing on reducing threats to biodiversity, sustainable use, and benefit-sharing.
    - It has 23 targets for 2030 and 4 Goals for 2050.

Sustainable Development Goals (SDGs)

- The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, remains a cornerstone for global efforts.
- The 17 SDGs aim to end poverty, improve health and education, reduce inequality, and spur economic growth, all while tackling climate change and preserving oceans and forests.
    - It has 169 Targets under 17 Goals

International Trade in Endangered Species

- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in wild fauna and flora is legal and sustainable by 2030.
- It contributes to halting biodiversity loss and achieving the 2030 Agenda for Sustainable Development.
    - It has 1 target.

Montreal Protocol (1987)

- The Montreal Protocol targets the phase-out of ozone-depleting substances.
- By 2030, it aims to eliminate hydrochlorofluorocarbons (HCFCs), significantly contributing to the protection of the ozone layer.
    - It has 1 target.

Global Methane Pledge (2021)

- It commits 159 countries to collectively reduce methane emissions by at least 30% below 2020 levels by 2030.
- This initiative is crucial for mitigating climate change and improving air quality.
    - It has 1 target.

Combatting Desertification

- The **UN Convention to Combat Desertification (UNCCD)** aims to restore 1.5 billion hectares of degraded land by 2030.

- This target is part of a broader strategy to achieve land degradation neutrality and support sustainable land management.
    - It has 1 target.

Nutrition Targets

- The World Health Organization (WHO) has extended its nutrition targets to 2030, aiming to eliminate all forms of malnutrition and achieve universal coverage for essential nutrition services.
- This effort is vital for improving global health and well-being.
    - It has 6 targets.

India's Groundwater Recovery

Context

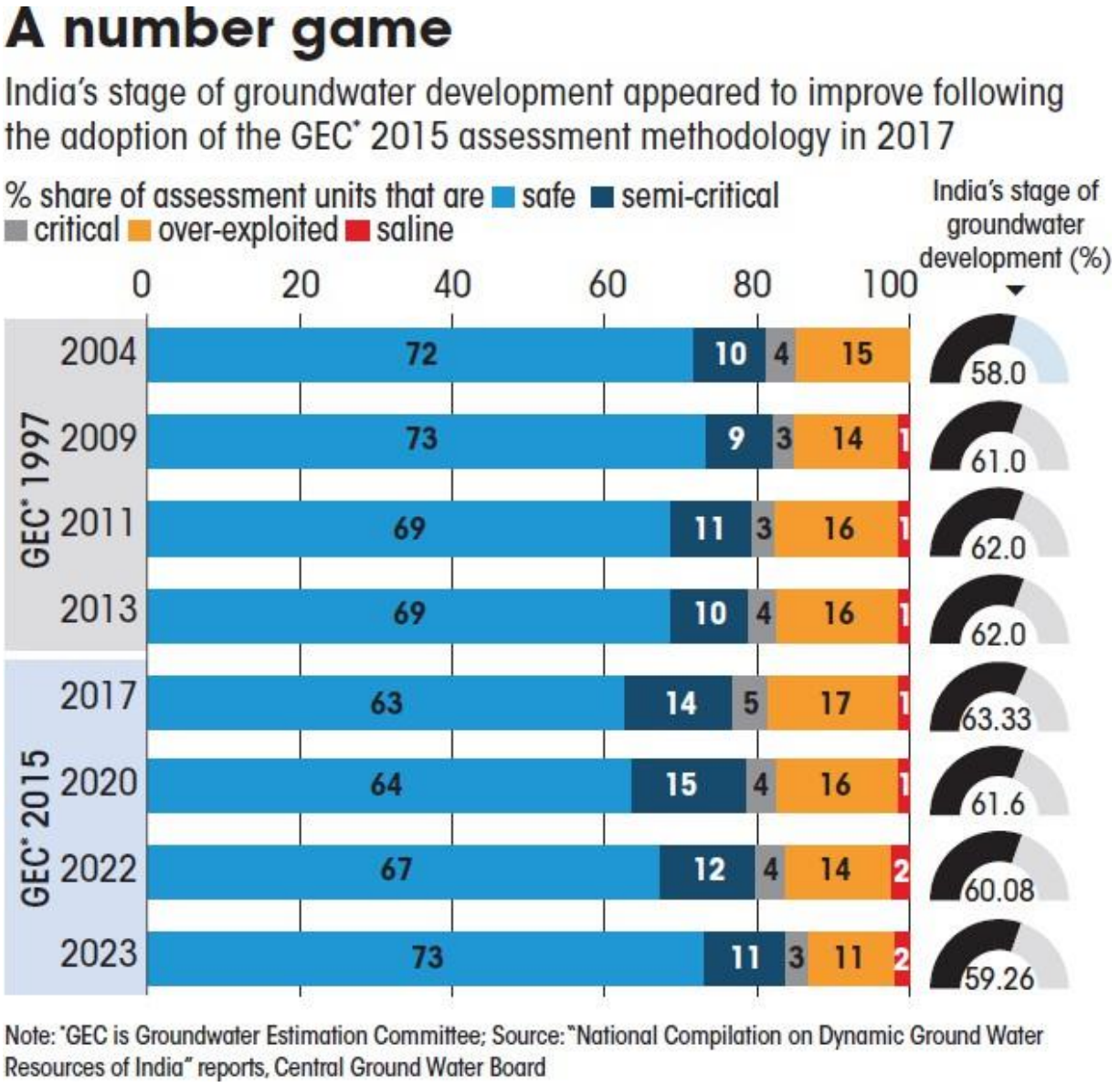
- Recent studies and reports highlight the urgent need for effective groundwater management and recovery strategies.

About

- India's groundwater resources are under severe stress due to over-extraction, urbanization, and climate change.
- Groundwater is a critical resource for agriculture, drinking water, and industrial use, but its unsustainable exploitation has led to alarming depletion rates.

Current State of Groundwater in India

- Groundwater depletion in India is a significant concern. A study published in Down to Earth indicates that the rate of groundwater depletion **could triple by 2041-2080 due to climate change.**
- This accelerated depletion is driven by increased irrigation demands as temperatures rise, despite potential increases in precipitation.
- The study emphasizes that **more than 60% of India's irrigated agriculture relies on groundwater,** making its sustainable management crucial for food and water security.



Factors Contributing to Groundwater Depletion

- **Agricultural Practices:** The Green Revolution led to increased agricultural productivity but also resulted in excessive groundwater extraction for irrigation.
    - Policies providing free or subsidized electricity for pumping groundwater have exacerbated the problem.
- **Urbanization and Industrialization:** Rapid urbanization and industrial growth have significantly impacted groundwater reserves.
    - Urbanization and industrial activities in states like Punjab, Haryana, Uttar Pradesh, West Bengal, and Kerala have led to substantial groundwater depletion.

- **Climate Change:** Rising temperatures increase crop water demand, leading to higher groundwater extraction.
    - Climate change projections suggest that this trend will continue, further stressing groundwater resources.

Efforts and Strategies for Groundwater Recovery

- **Regulating Groundwater Extraction:** Implementing stricter regulations on groundwater extraction, especially in over-exploited regions, is essential. This includes metering groundwater use and revising policies that encourage over- extraction.
- **Promoting Sustainable Agricultural Practices:** Encouraging farmers to adopt water-efficient irrigation techniques, such as drip and sprinkler systems, can significantly reduce groundwater use. Crop diversification and the cultivation of less water-intensive crops are also crucial.
- **Rainwater Harvesting and Recharge:** Enhancing rainwater harvesting and artificial recharge of aquifers can help replenish groundwater levels. Community-based initiatives and government programs should focus on constructing recharge structures and promoting water conservation practices.
- **Urban Water Management:** Urban planning should integrate sustainable water management practices, including the use of treated wastewater for non-potable purposes and the implementation of green infrastructure to enhance groundwater recharge.
- **Awareness and Education:** Raising awareness about the importance of groundwater conservation and educating communities on sustainable water use practices are vital for long-term groundwater management.

PRELIMS

Korku Language

Context

- Korku language makes education accessible for the tribal community in Madhya Pradesh and Maharashtra.

About the Korku Language

- It is an **Austroasiatic language**, spoken by the Korku tribal community primarily in the **central Indian states** of **Madhya Pradesh and Maharashtra.**
- It belongs to the Munda group, is the westernmost Austroasiatic language, making it unique in its geographical and cultural context.

Historical and Cultural Significance

- The Korku people have a rich cultural heritage, closely associated with the **Nihali people,** who traditionally lived in special quarters of Korku villages.
- The language is an integral part of their identity, reflecting their traditions, beliefs, and way of life.

Current Status and Challenges

- Despite its cultural significance, the Korku language is classified as "vulnerable" by UNESCO.
- The 2011 Indian census reported approximately 730,000 Korku speakers.
- However, the influence of dominant languages like Hindi has led to a decline in the use of Korku, especially among the younger generation.
- Literacy in Korku is low, and most adult men are bilingual or multilingual, often speaking Hindi and local Dravidian languages.

Rising cases of severe illness among humans

Context

- In recent years, the world has witnessed a troubling increase in severe illnesses among humans. This trend is driven by a combination of factors, including climate change, urbanization, deforestation, and the emergence of new pathogens.

Emerging Pathogens and Zoonotic Diseases

- According to a 2024 report by the **UN Environment Programme**, the **next pandemic could strike by 2030** due to emerging zoonotic diseases like the highly pathogenic avian influenza, H5N1.
- The report emphasizes that climate change accelerates the spillover of these diseases, with fatalities projected to be **12 times higher by 2050 than in 2020.**
- In 2024, the world saw outbreaks of re-emerging and zoonotic diseases such as **Cholera, M-pox, Marburg, and Oropouche fever.**
- These diseases are spreading rapidly due to factors like deforestation, urbanization, and habitat destruction, which bring humans into closer contact with wildlife.

Impact of Climate Change

- Increasing temperatures and changing precipitation patterns create favorable conditions for the spread of vector-borne diseases.
- For instance, Brazil reported over 6 million suspected dengue cases in 2024, the highest ever recorded.
- Similarly, dengue, a tropical disease, is now spreading across Europe, with the invasive mosquito species Aedes Albopictus establishing itself in 13 EU countries.

Antimicrobial Resistance

- The World Health Organization (WHO) has been negotiating the International Treaty on Pandemic Prevention, Preparedness, and Response since 2021, but significant gaps in collaboration and preparedness remain.
- In September 2024, the UN approved a political declaration aimed at reducing the 4.95 million estimated human deaths linked to bacterial AMR.

Regional Outbreaks and Public Health Responses

- In Africa, a more virulent form of M-pox, Clade 1b, has caused up to 50,000 cases and over 1,000 deaths since its detection in the Democratic Republic of Congo in September 2023. In Latin America, large outbreaks of vector-borne diseases like dengue, chikungunya, zika, and Oropouche fever are being reported in new areas.
- In North America, the highly pathogenic H5N1 influenza spread from poultry to dairy cows, affecting 16 US states and infecting at least 65 people by the end of 2024.
- It raises concerns about mutations and rapid adaptation of the virus.

Oil Spilled Into Black Sea

Context

- Vast amounts of oil spilled into the Black Sea after two tankers (Volgoneft-212 and Volgoneft-239) carrying fuel collided recently.

Catastrophic Oil Spill in the Black Sea

- The Black Sea is facing a severe environmental crisis after two Russian tankers sank in the Kerch Strait, releasing thousands of tonnes of fuel oil into the water.
    - **The Kerch Strait,** a crucial marine ecosystem connecting the Black Sea and the Azov Sea, is now at the center of this environmental disaster.
- It has exacerbated the ecological challenges in a region already struggling with the impacts of war and pollution.
- The **Black Sea** is bordered by **Bulgaria, Romania, Georgia, Moldova, Russia, Turkey and Ukraine.**

Environmental Impact

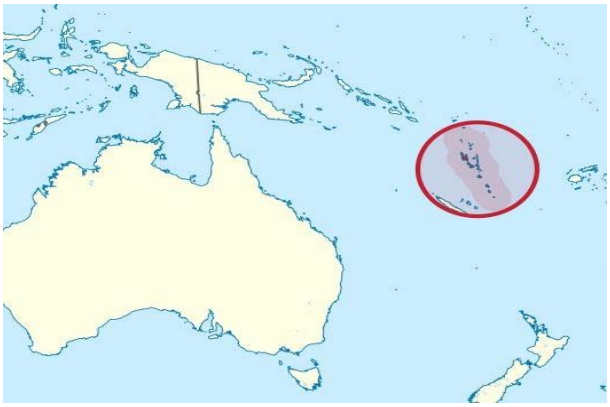
- The heavy fuel oil, or mazut, poses a significant threat as it does not float to the surface but sinks, affecting marine life at various depths.
- The region has a history of similar incidents, with a major spill in 2007 causing long-lasting damage.

Vanuatu Earthquake

Context

- Recently, **Efate, the main island of Vanuatu,** was hit by a 7.3-magnitude earthquake, killing at least 14 people and injuring 200 others.

Vanuatu Earthquake and Ring of Fire Connection



- Vanuatu is located within the **Pacific Ring of Fire,** ***a belt of tectonic activity that surrounds the Pacific Ocean***.

- This region is characterized by frequent earthquakes and volcanic eruptions due to the movement of tectonic plates.
- The **Pacific plate and the Australian plate** meet to the immediate **west of Vanuatu,** with the Australian Plate being subducted beneath the Pacific plate at a rate of about 80 to 90 millimeters per year.

Causes of Earthquakes in the Pacific Region

- The primary cause of earthquakes in the Pacific region is the interaction of tectonic plates.
- The Pacific Plate, one of the largest tectonic plates, is constantly moving and interacting with surrounding plates such as the North American Plate, the Eurasian Plate, and the Indo-Australian Plate.

Interactions

- **Subduction Zones:** In these areas, one tectonic plate is forced under another. This process generates significant seismic activity. Notable subduction zones in the Pacific include the Japan Trench and the Peru-Chile Trench.
- **Transform Boundaries:** Here, plates slide past each other horizontally. The San Andreas Fault in California is a well-known example of a transform boundary.
- **Divergent Boundaries:** At these boundaries, tectonic plates move away from each other, creating new crust. The East Pacific Rise is an example of a divergent boundary.

Siang Upper Multipurpose Project

Context

- Recently, villages in **Siang, Upper Siang and East Siang districts of Arunachal Pradesh** began protests against a 12- gigawatt hydropower project proposed on the Siang river.

About Siang Upper Multipurpose Project (SUMP)

- It is a proposed hydropower project on the Siang River in Arunachal Pradesh, India.
- It is designed **to generate 12.5 GW** of electricity, making it one of the largest hydropower projects in the world.
- The **Siang River, known as the Yarlung Tsangpo in Tibet**, flows into Arunachal Pradesh and later **becomes the Brahmaputra in Assam.**
- It aims to harness the river's potential to meet India's growing energy demands.

Strategic Importance

- One of the key motivations behind the SUMP is **to counter China's ambitious hydropower projects on the Yarlung Tsangpo,** including a proposed 60,000 MW 'super dam' in Tibet's Medog County.
- This project by China poses significant threats, such as flash floods and water scarcity, to downstream regions in India.
- The SUMP is seen as a strategic move to mitigate these risks and ensure water security for India.

African Swine Fever (ASF)

Context

- Recently, **Kerala** confirmed an outbreak of African Swine Fever (ASF) in pig farms in **Kottayam district**, placing several areas under surveillance.

About African Swine Fever (ASF)

- It is a highly contagious **viral disease** that affects domestic and wild pigs.
- With a near **100% mortality rate,** ASF has become a significant concern for pig farmers and the global pork industry.
- The disease, first reported in Kenya in 1921, has spread to 49 countries since January 2021, causing substantial economic losses and threatening food security.

Global Spread and Impact

- ASF has resulted in the loss of around 1.5 million animals since 2021, affecting more than 0.95 million pigs and over 28,000 wild boars.
- The highest losses have been reported in Europe, followed by Asia and Africa.
- The disease spreads through direct contact with infected animals, contaminated feed, and certain tick species.
- There is **no cure or vaccine for ASF,** making containment efforts crucial.

ASF in India

- India managed to avoid ASF for nearly a century, with the first case reported in 2020. The disease quickly spread across several states, including Assam, Manipur, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh, and Sikkim.
- The outbreak in **Assam's bio-secure pig-breeding farm** and the **ICAR-National Research Centre on Pig** highlighted lapses in biosecurity measures.

SUBJECTIVE QUESTIONS

1. Critically analyze the arguments for and against legalizing the Minimum Support Price (MSP) in India. Discuss the potential economic, social, and political implications of such a policy change.
2. Critically analyze the current state of e-waste management in India, highlighting the challenges, environmental impacts, and potential solutions for a sustainable future. Discuss the role of government, industry, and citizens in mitigating the e- waste crisis.
3. Examine the concept of shared resources in India, focusing on its impact on the rights and livelihoods of marginalized communities. Provide specific examples to illustrate your points.
4. Discuss the multifaceted impact of poverty on individuals and society, extending beyond basic needs to encompass psychological, social, and developmental consequences.
5. Discuss the complex interplay between immigration and depopulation, analyzing how these phenomena can both exacerbate and mitigate each other's

effects on a nation's social, economic, and cultural fabric.

MCQs

1. The *'Extended Producer Responsibility (EPR)'* is the key component of which of the following rules:
   (a) Ozone Depleting Substances Rules, 2000
   (b) E-Waste (Management) Rules, 2022
   (c) Wetlands (Conservation and Management) Rules, 2010
   (d) The Environment (Protection) Rules, 1986

2. Recently, reports *'Nexus Assessment'* and *'Transformative Change Assessment'* are in news, released by:
   (a) United Nations Framework Convention on Climate Change (UNFCCC)
   (b) Intergovernmental Panel on Climate Change (IPCC)
   (c) Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
   (d) International Union for Conservation of Nature (IUCN)

3. *Korku language*, sometimes appeared in the news, is primarily spoken in:
   (a) Jharkhand
   (b) Odisha
   (c) Tamilnadu
   (d) Madhya Pradesh

4. Consider the following:
   1. Bulgaria
   2. Romania
   3. Georgia
   4. Moldova

   How many of the above countries are surrounded by the *Black sea*?
   (a) Only one
   (b) Only two
   (c) Only three
   (d) All fours

5. Recently, *Vanuatu* was hit by a 7.3-magnitude earthquake, killing at least 14 people and injuring 200 others. It is located in:
   (a) Pacific Ocean
   (b) Indian Ocean
   (c) Atlantic Ocean
   (d) Antarctic Ocean

Answer Key:

1. (b) 2. (c) 3. (d) 4. (d) 5. (a)

Table of Content

PRELIM

SUBJECTIVE QUESTIONS

MCQs

RUPEE SLIDE IMPACTS AGRICULTURAL TRADE

Context

- Recently, the Union Cabinet approved the **extension of a subsidy package** of Rs 3,500 per tonne on **di-ammonium phosphate (DAP)** for companies amid a fall in the value of the Indian currency against the US dollar and a global rise in DAP prices.

Di-Ammonium Phosphate (DAP)

- It is a fertilizer that provides essential nutrients—**Nitrogen** (18%); **and Phosphorus** (46% through Phosphorus Pentoxide).
  - It is highly soluble in water, making it readily available for plant uptake **(Agricultural Use).**
- **Chemical Formula:** $(NH_4)_2HPO$

Non-Agricultural Uses

- Fire Retardant; Industrial Processes such as metal finishing and soldering; and Food Industry

Rupee Slide Impacts Agricultural Trade

- The depreciation of the Indian rupee against major global currencies has raised significant concerns, particularly in the agricultural sector.
- As a critical driver of the Indian economy, agriculture is intricately linked to both domestic and international markets.
- The weakening rupee's ripple effects are now being felt across the supply chain, impacting exports, imports, and the overall trade balance.

Export Gains or Challenges?

- **Higher Input Costs:** Many Indian farmers rely on imported fertilizers, pesticides, and agricultural machinery.
  - It has led to a significant rise in the cost of these inputs, eroding the profit margins of exporters.
- **Global Competition:** Competing nations with stable or depreciating currencies are also vying for market share, limiting the extent to which Indian agricultural exports can capitalize on the rupee's slide.

Import Woes

- India is a major importer of agricultural commodities like edible oils, pulses, and certain cereals to meet domestic demand.
- A weaker rupee has made these imports costlier, directly impacting food prices and inflation.
- Edible oils, for instance, constitute a large portion of India's agricultural imports, and their rising costs are straining household budgets and increasing dependency on subsidies.

Strategies for Mitigation

- **Diversifying Import Sources:** Exploring alternative sources for agricultural inputs to reduce dependency on imports from countries with stronger currencies.
- **Promoting Local Production:** Encouraging the domestic production of essential agricultural inputs to reduce reliance on imports.
- **Enhancing Financial Support:** Providing additional financial support to farmers and fertiliser companies to help them cope with the increased costs.
- **Currency Hedging:** Encouraging exporters and importers to hedge against currency risks to manage volatility.
- **Incentivizing Local Production:** Promoting domestic production of high-demand imported commodities to reduce dependency on global markets.

EXTREME HEAT REACHED NEW HEIGHTS IN 2024

Context

- According to analysis by research consortium **World Weather Attribution (WWA)** and non-profit Climate Central, globally, climate change **added on average 41 additional days of dangerous heat in 2024**, threatening people's health.

About

- According to data from the **Copernicus Climate Change Service (C3S)**, 2024 saw a global average temperature of 15.10°C, surpassing the previous record set in 2023.
  - This increase of 0.12°C above the previous highest annual value highlights the accelerating impacts of climate change.

Record-Breaking Temperatures

- 2024 was not only the warmest year on record but also the first year with an average temperature exceeding **1.5°C above the pre-industrial level, a threshold set by the Paris Agreement** to significantly reduce the risks and impacts of climate change.
- It underscores the urgent need for global action to mitigate climate change.

Impact on Extreme Weather Events

- The extreme heat of 2024 fueled a series of devastating weather events, including heatwaves, droughts, wildfires, storms, and floods.
- These events resulted in significant human and economic losses, with thousands of lives lost and millions of people displaced.
- Climate change contributed to the deaths of at least 3,700 people and the displacement of millions in 26 weather events studied in 2024.

Regional Variations

- The impact of extreme heat was felt globally, with regions experiencing varying degrees of temperature increases.
- For instance, Europe saw record-high temperatures, while South Asia faced severe heatwaves that affected agriculture and water availability.
- The Amazon region experienced a historic drought, exacerbated by climate change.

Urgency for Action

- The exceptional year of extreme weather in 2024 highlights the urgent need to move away from fossil fuels and adopt sustainable practices.
- The analysis by Climate Central revealed that climate change added an average of 41 additional days of dangerous heat in 2024, threatening people's health and livelihoods.
    - From Kathmandu to Dubai to Rio Grande do Sul to the Southern Appalachians, the last 12 months have been marked by a large number of devastating floods.
    - In the first week of January, Brazil, Indonesia, Serbia and China all reported 2024 as their hottest year on record.
    - **India,** Germany, the Czech Republic and Australia also report 2024 to be one of the warmest years since their respective temperature records began.
- **Small islands and developing states**, which are highly vulnerable to climate change, experienced the highest number of dangerous heat days.

E-KYC VERIFICATION: BURDEN OF PROOF

Context

- The government's drive for e-KYC verification to ensure rightful targeting of beneficiaries has proved exclusionary for many.

About e-KYC Verification

- **e-KYC, or electronic Know Your Customer**, is a digital process used by businesses to verify the identity of their clients.
- It involves the use of biometrics, digital document uploads, and verification through government databases, such as the Aadhaar database in India.
- The **primary goal of e-KYC** is to ensure that clients are who they claim to be, thereby mitigating risks such as fraud and money laundering.

Burden of Proof in e-KYC

- One of the critical issues with e-KYC verification is the burden of proof.
- Traditionally, the burden of proof in identity verification rested with the individual, who had to provide documents such as passports, utility bills, and bank statements.
- With e-KYC, the burden of proof shifts to the service provider, who must ensure that the digital verification process is accurate and secure.

Challenges and Concerns

- **Data Security:** The digital nature of e-KYC raises concerns about data security and privacy.
    - Ensuring that biometric and personal data are protected from breaches and misuse is a significant challenge.
- **Accuracy of Verification:** The accuracy of e-KYC verification can be compromised by technical glitches, errors in government databases, and issues with biometric recognition.
    - It can lead to false positives or negatives, affecting the credibility of the verification process.
    - Digital data mismatch cases are emblematic of a growing number of errors linked to the use of Aadhaar and biometrics for beneficiary identification in rural India.
- **Accessibility:** Not all individuals have access to the necessary technology or internet connectivity to complete e-KYC verification.
    - It can create barriers for certain segments of the population, particularly those in rural or underserved areas.
- **Legal and Regulatory Compliance:** Ensuring that e-KYC processes comply with local and international regulations is a complex task.
    - Businesses must navigate a maze of legal requirements to avoid penalties and maintain compliance.

Addressing the Burden of Proof

- To address the burden of proof in e-KYC verification, businesses and regulators must work together to develop robust frameworks that ensure data security, accuracy, and accessibility.
- It includes implementing multi-factor authentication, regular audits of verification processes, and providing support for individuals who face barriers to accessing e-KYC services.

SACRED GROVES IN INDIA

Context

- The Supreme Court has recommended that the Union government create a comprehensive policy for the governance and management of sacred groves across the country.

About the Sacred Groves

- These are patches of land dedicated by local communities to deities, nature or ancestral spirits. The communities preserve these areas with near natural-state of vegetation.
- These preserve biodiversity, regulate climate, conserve water, support livelihoods, protect cultural heritage, and promote environmental awareness.
- These include: *Dev Vans of Himachal, the Bugyals of Uttarakhand, the Sarpa Kavu of Kerala, Kovil Kavu of Tamil Nadu, Devarakadu in Karnataka, Sarna in Madhya Pradesh, Oran in Rajasthan, Devrai in Maharashtra, Umanglai in Manipur, Law Kyntang/Law Lyngdoh in Meghalaya* are a few examples of sacred groves in India.

Threats to Sacred Groves

- **Urbanization and Encroachment:** Increasing human settlements and infrastructure development have led to the loss of sacred grove areas.
- **Deforestation and Resource Exploitation:** Unsustainable extraction of wood, medicinal plants, and other resources threatens the ecological balance.
- **Cultural Erosion:** Changing socio-cultural values and diminishing community practices weaken traditional protections.

Supreme Court Ruling

- The court recommended protection of sacred groves under the **Wildlife Protection Act, 1972,** particularly through **Section 36-C,** which enables the declaration of **'community reserves'.**
- The preservation of these groves was seen as critical for maintaining biodiversity and safeguarding the cultural heritage of entire communities.

India's Current Policy on Forest Protection

- Under the **Wildlife Protection Act, 1972,** state governments can declare any private or community land as a community reserve to protect biodiversity and cultural values.
- The **National Forest Policy of 1988** encourages local communities to protect and improve forest patches through customary rights.
- The Supreme Court, through the **T.N. Godavarman Thirumulpad** case and other judgments, has reinforced the role of communities in protecting forest ecosystems.

Constitutional Safeguards

- **Directive Principles of State Policy (DPSP): Article 48A** of the Constitution directs the State to protect and improve the environment and to safeguard the forests and wildlife of the country.
- **Fundamental Duties: Article 51A(g)** enjoins citizens to 'protect and improve the natural environment including forests, lakes, rivers, and wildlife, and to have compassion for living creatures'.

Examples of Successful Community Efforts

- **Piplantri Village, Rajasthan:** Local efforts transformed barren land into lush green groves, demonstrating the power of community-driven conservation.
- **Mawphlang Sacred Grove:** Located in the East Khasi Hills district of Meghalaya, this grove is a popular tourist destination and an important educational center

RENEWABLE AND NON-FOSSIL FUEL-BASED ENERGY IN INDIA

Context

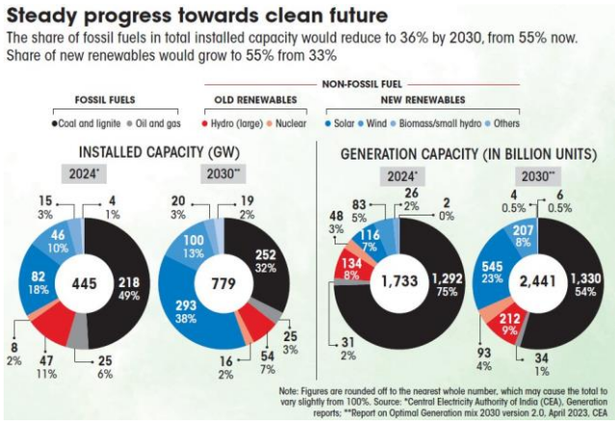
- India submitted to the UNFCCC its target to reduce the emissions intensity by 45% by 2030 (compared to 2005 levels), and to achieve 50% of cumulative electric power capacity from non- fossil fuel sources by 2030.

About

- India has made significant strides in transitioning to renewable and non-fossil fuel-based energy sources. It is crucial for reducing greenhouse gas emissions, enhancing energy security, and promoting sustainable development.
- The Indian government has set an ambitious target of achieving 500 GW from non-fossil fuel sources by 2030.

Current Status

- As of October 2024, India's total renewable energy capacity has crossed the 200 GW (gigawatt) mark, accounting for 46.3% of the country's total installed electricity generation capacity.
- It reflects the country's commitment to clean energy and its progress in building a greener future.



Why Invest in Renewable Energy?

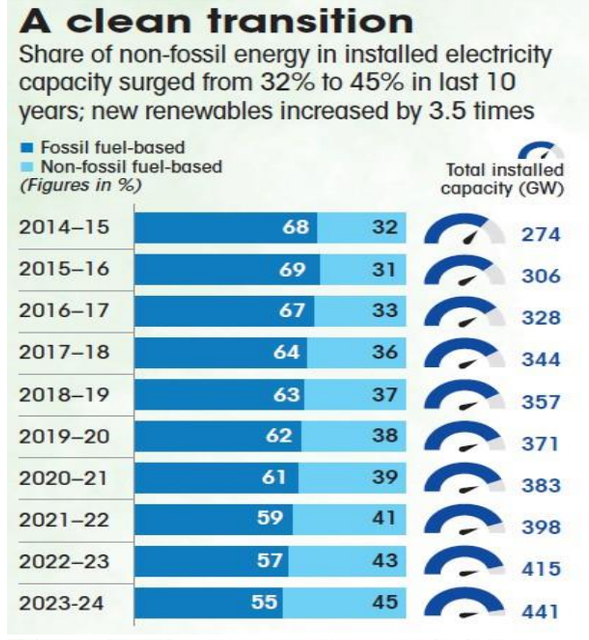
- **Liberal FDI Policy:** 100% FDI permitted under the automatic route;
- **Assured Demand Driven By Government:** Bids for 50 GW per annum Renewable Energy capacity, with at least 10 GW per annum Wind power capacity, to be issued each year from 2023-24 to 2027-28.
- **Indigenous Supplier Ecosystem:** Existence of an Indigenous supplier ecosystem across solar, wind, and green hydrogen.
- **Forward-looking Policies:** Forward-looking policies including waiver of Inter-state transmission charges, Renewable Purchase Obligations and Production Linked Incentives.

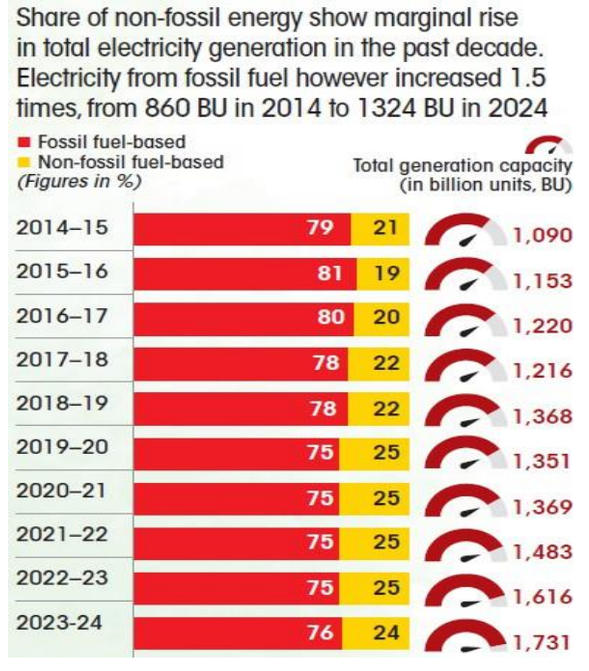
Key Renewable Energy Sources

- **Solar Power:** India has achieved a solar power installed capacity of 94.17 GW, with a total capacity (including pipeline projects) reaching 261.15 GW.
- **Wind Power:** The installed wind power capacity stands at 47.96 GW, with a total capacity (including pipeline projects) of 74.44 GW.
- **Bioenergy:** Bioenergy capacity has grown to 11.34 GW, contributing to the diversification of India's energy mix.
- **Hydroelectric Power:** Large hydro projects have an installed capacity of 46.97 GW, with a total capacity (including pipeline projects) of 67.02 GW.
- **Nuclear Energy:** The nuclear energy installed capacity has increased to 8.18 GW, with a total capacity (including pipeline projects) of 22.48 GW.

Government Initiatives

- **Transmission Schemes:** Plans for integrating 66.5 GW of renewable generation in states like Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Karnataka, Andhra Pradesh, and Tamil Nadu.
- **Renewable Energy Zones:** Identification of 181.5 GW potential Renewable Energy Zones in states like Andhra Pradesh, Karnataka, Telangana, Rajasthan, Maharashtra, Madhya Pradesh, and offshore wind at Gujarat & Tamil Nadu.





Still import reliant

India is breaking into the global photovoltaic cell and module market, but it heavily depends on imports for meeting domestic requirements

Import (in millions)	2019-20	2020-21	2021-22	2022-23
Photovoltaic cells not assembled in modules or made up into panels	795.82	739.05	773.48	1233.81
Photovoltaic cells assembled in modules or made up into panels	NA*	NA	99.83	7.95
Export (in millions)	**2019-20**	**2020-21**	**2021-22**	**2022-23**
Photovoltaic cells not assembled in modules or made up into panels	6.91	1.05	0.84	1.86
Photovoltaic cells assembled in modules or made up into panels	NA	NA	0.97	5.75

*Not available
Source: Ministry of Commerce and Industry, Export Import Data Bank

Future Prospects

- India's green investments are projected to reach Rs 31 lakh crore by 2030, driven by renewable energy, transport, and oil & gas sectors.
- This substantial investment will support the country's transition to non-fossil fuel-based energy sources and help achieve its net-zero goals.

ENVIRONMENTAL EMERGENCY AFTER OIL SPILL

Context

- **Peru** on December 26, 2024, declared a 90-day environmental emergency for its northern **province of Talara**, six days after an oil spill from a state oil company refinery.

About Oil Spill

- Oil spills occur when liquid petroleum is accidentally released into the environment, particularly marine areas.
  - Theseincidentsarisefromshipwrecks, pipeline leaks, offshore drilling rig malfunctions, or accidents during the transportation of crude oil and refined products.
- These are among the most catastrophic environmental disasters, causing widespread harm to marine ecosystems, coastal habitats, and human communities.

Environmental Impacts of Oil Spills

- **Marine Ecosystems:** Thick oil slicks coat the fur and feathers of marine animals, such as otters and seabirds, destroying their insulating and buoyancy abilities.
  - Toxic compounds in oil poison fish, plankton, and other organisms critical to the aquatic food chain.
  - Coral reefs—often referred to as the "rainforests of the sea"—suffer lasting damage when exposed to hydrocarbons.
- **Coastal Habitats:** When oil reaches the shoreline, it devastates wetlands, mangroves, and beaches.
  - These habitats, home to diverse flora and fauna, face long-term degradation.
  - Mangroves, which act as carbon sinks, lose their capacity to combat climate change when contaminated by oil.
- **Human Health and Livelihoods:** Oil spills harm communities dependent on fishing and tourism.
  - Tainted seafood affects local economies, while the exposure to volatile organic compounds (VOCs) during cleanup operations can cause respiratory, neurological, and skin-related health issues among workers and nearby populations.

Major Oil Spill Incidents

- **Exxon Valdez (1989):** It released 11 million gallons of crude oil into Prince William Sound, Alaska, remains one of the most infamous ecological disasters.
  - It killed thousands of seabirds, marine mammals, and fish and left a toxic legacy in the region.
- **Deepwater Horizon in Gulf of Mexico (2010):** It stands as the largest accidental marine oil spill in history.
  - Approximately 4.9 million barrels of oil leaked over 87 days, causing catastrophic damage to marine biodiversity and local economies.

Response and Mitigation Strategies

- **Emergency Cleanup Efforts:** Immediate responses to oil spills involve mechanical containment methods such as booms and skimmers, chemical dispersants to break down oil, and bioremediation techniques using microorganisms to degrade oil naturally.
- **Preventative Measures:** Enhanced safety protocols, stricter regulations, and robust oversight of oil transportation and drilling activities are vital.

    - Technological advancements like real-time monitoring systems for pipelines and double-hulled tankers reduce the risk of spills.
- **International Cooperation:** Conventions such as the **International Convention for the Prevention of Pollution from Ships (MARPOL)** and regional response agreements ensure collective preparedness and resource-sharing during emergencies.

Preparedness: A Long-Term Vision

- **Policy Advocacy:** Governments must adopt stringent environmental policies that emphasize spill prevention and rapid response mechanisms.
- **Community Engagement:** Local communities need training in oil spill response to build resilience and ensure timely action.
- **Research Investment:** Scientists must develop innovative cleanup technologies, such as magnetic nanoparticles and oil-eating bacteria, to revolutionize spill response.
- **Transition to Clean Energy:** Reducing global dependence on oil is the most effective way to prevent spills. Expanding the use of wind, solar, and other renewable sources will mitigate the environmental risks associated with oil production and transportation.

POVERTY LINES IN INDIA

Context

- The concept of poverty lines in India has been a subject of intense debate and scrutiny over the years.
- The poverty line is a monetary threshold below which an individual is considered poor, and it is used to measure the extent of poverty in the country.

About Historical Context

- The poverty line in India has evolved over time, with various committees and methodologies being employed to determine it.
- The **Tendulkar Committee (2009)** was one of the earliest to propose a methodology for estimating poverty, which was later updated by the **Rangarajan Committee (2014).**
- These committees have faced criticism for their methodologies and the thresholds they set.

Current Estimates

- Recent estimates of poverty in India vary widely due to differences in methodologies and data sources.
- The **State Bank of India (SBI) Research** estimated India's poverty rate at 4-4.5% based on the **Household Consumption Expenditure Survey (2023-24)**.
    - It translates to a monthly **per capita consumption expenditure (MPCE)** of Rs 4,122 for rural areas and Rs 6,996 for urban areas.
- However, other estimates, such as those by the **Foundation for Agrarian Studies (FAS)**, suggest that 26.4% of Indians live in poverty using the **Rangarajan method.**

Methodological Differences

- The differences in poverty estimates arise from the methodologies used to calculate the poverty line.
- The Tendulkar Committee's methodology, which was based on calorie intake, has been criticized for not accounting for other essential needs like health and education.
- The **Rangarajan Committee's methodology,** on the other hand, included a broader basket of goods and services but was still contested for its thresholds.

Implications

- The varying estimates of poverty have significant implications for policy-making and resource allocation.
- Accurate poverty data is crucial for directing development programs and social welfare schemes to the right population groups.
- The lack of consensus on poverty lines also affects the credibility of poverty statistics and the effectiveness of poverty alleviation measures.

NATURAL CALAMITY IN INDIA

Context

- Recently, the Chief Minister of Odisha announced that the unseasonal rain in the state was a **'natural calamity'** enabling compensation distribution to affected farmers from the **State Disaster Response Fund (SDRF).**

About the Natural Calamity in India

- India faces a range of disasters that cause significant loss of life, property, and economic disruption.
- Odisha frequently experiences cyclones, floods, and unseasonal rains, which have devastating effects on agriculture, infrastructure, and the livelihoods of its residents.

- In December 2023, Odisha faced unprecedented unseasonal rainfall, leading to widespread crop damage across the state.
- Odisha's Chief Minister declared this weather event a natural calamity during the **'Krushi Odisha Conclave'** in Bhubaneswar.
- Approximately 6,66,720 farmers reported crop losses of 33% or more, affecting around 2,26,791 hectares of farmland.
- The government has committed approximately Rs 291 crore from the SDRF to assist affected farmers.

Types of Natural Calamities

- **Cyclones:** Coastal regions, particularly the eastern coast, are prone to cyclones. The Bay of Bengal is a hotspot for tropical cyclones, which can cause widespread destruction.
- **Floods:** Heavy monsoon rains often lead to severe flooding, especially in the northern and northeastern states. The Brahmaputra and Ganga rivers are particularly prone to flooding.
- **Earthquakes:** The Himalayan region is vulnerable to earthquakes due to its tectonic activity. The 2001 Gujarat earthquake and the 2011 Sikkim earthquake are notable examples.
- **Droughts:** Parts of central and western India frequently experience droughts, affecting agriculture and water supply.
- **Landslides:** The hilly regions of the Himalayas and Western Ghats are susceptible to landslides, often triggered by heavy rains.
- **Tsunamis:** The Indian Ocean tsunami of 2004 caused massive devastation along the southern coast, particularly in Tamil Nadu and the Andaman and Nicobar Islands.

Government Response and Disaster Management

- The **National Disaster Management Authority (NDMA)** and **State Disaster Management Authorities (SDMAs)** play a crucial role in coordinating relief efforts and implementing disaster preparedness measures.
- **State Disaster Response Fund (SDRF):** It was established under the **Disaster Management Act, 2005**
- SDRF is divided into three **sub-allocations:**
  - Response and Relief (40%);
  - Restoration and Reconstruction (30%); and
  - Preparedness and Capacity-building (10%).
- The remaining 20% is allocated to the State Disaster Mitigation Fund (SDMF).

Long-Term Strategies and Preparedness

- The recent natural calamity underscores the need for improved agricultural policies and disaster preparedness.
- Enhanced forecasting, better crop insurance schemes, and support for sustainable farming practices can help protect farmers from future calamities.
- The Odisha State Disaster Management Authority (OSDMA) is working with different stakeholders to reduce disaster risk and increase the wellbeing and safety of the people.

PRELIMS

HUMAN METAPNEUMOVIRUS (HMPV)

Context

- China in mid-December 2024 announced a surge in human metapneumovirus (HMPV) infections in its northern regions.

About the Human Metapneumovirus (HMPV)

- It is a **common respiratory virus** that primarily affects young children, older adults, and individuals with **weakened immune systems**.
- First identified in 2001, it belongs to the **Pneumoviridae family**, which also includes the **respiratory syncytial virus (RSV).**

Symptoms and Transmission

- HMPV typically causes **upper respiratory infections,** such as cough, runny nose, sore throat, and fever.
- In some cases, it can lead to more severe **lower respiratory infections like bronchitis or pneumonia**.
- The virus spreads through infectious respiratory particles, such as those from coughing or sneezing, and can also be transmitted by touching contaminated surfaces.

Seasonality and Prevalence

- HMPV circulates primarily during the winter and early spring months, similar to other respiratory viruses like influenza and RSV.
- While most cases are mild, about **5% to 16% of children** infected with HMPV develop lower respiratory tract infections.
- **Adults over 65 and individuals with underlying health conditions** are also at higher risk for severe illness.

HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI)

Context

- Recently, three tigers and a leopard died at the **Balasaheb Thackeray Gorewada International Zoological Park in Nagpur**, after contracting the **Highly Pathogenic Avian Influenza (HPAI) H5N1** or bird flu virus.

About the Highly Pathogenic Avian Influenza (HPAI) H5N1

- It is commonly known as **bird flu**, is a severe and highly **contagious viral disease** that poses significant threats to **both poultry and public health**.
- It is caused by **influenza A viruses** that primarily affect birds, including domestic poultry such as chickens, turkeys, and ducks, as well as wild birds.
- The virus spreads through direct contact with infected birds, their droppings, or contaminated surfaces, equipment, and clothing.
- Infected birds shed the virus in their saliva, mucus, and feces, which can contaminate the environment and facilitate further transmission.

About Influenza Virus

- There are four types of influenza viruses: types A, B, C and D.
  - **Influenza A** viruses infect humans and many different animals.
  - **Influenza B** viruses circulate among humans and cause seasonal epidemics. Recent data showed seals also can be infected.
  - **Influenza C** viruses can infect both humans and pigs but infections are generally mild and are rarely reported.
  - **Influenza D** viruses primarily affect cattle and are not known to infect or cause illness in people.

Human Health Risks

- While human infections with HPAI H5N1 are rare, they can occur, particularly in individuals who have close contact with infected birds.
- Symptoms in humans can include severe respiratory illness, and in some cases, the infection can be fatal.
- However, there is currently no evidence of sustained human-to-human transmission of HPAI H5N1.

Prevention and Control Measures

- Preventing the spread of HPAI H5N1 requires a combination of **biosecurity practices and public health measures**.
- Poultry farmers are advised to enhance biosecurity protocols, such as washing hands and boots before and after entering poultry areas, buying birds from reputable sources, and having a written biosecurity plan in place.
- Additionally, public health authorities recommend avoiding unnecessary contact with wild birds and reporting any sick or dead birds to local authorities.

SULPHUR DIOXIDE (SO_2) EMISSION

Context

- Recently, the Union Ministry of Environment, Forest and Climate Change (MoEF&CC) issued an extension for thermal power plants (TPPs) to comply with sulphur dioxide emission norms.

Background and Implementation

- MoEF&CC introduced the **first set of emission norms for SO_2, NO_x (nitrogen oxides), and mercury** control for coal-based TPPs in 2015.
- These norms mandated the installation of **Flue Gas Desulphurisation (FGD) systems** to reduce SO_2 emissions.
- The initial deadline for compliance was set for December 2017, but due to various challenges, including delays and limited vendor capacity, the deadline has been extended multiple times.

Compliance Deadlines and Extensions

- The compliance deadlines for SO_2 emission norms vary based on the location of the TPPs.
- Plants within a 10-kilometer radius of the National Capital Region (NCR) or cities with populations over a million were initially required to comply by December 2019.
  - However, the deadline has been **extended to December 2024** for these plants.
- For TPPs in critically polluted areas, the deadline has been extended to December 2025, and for other areas, it has been **extended to December 2026.**

Environmental and Health Impacts

- SO_2 is a precursor to fine **particulate matter (PM2.5)**, which has been linked to **respiratory and cardiovascular diseases**.
- Reducing SO_2 emissions is crucial for improving air quality and protecting public health.

- The implementation of FGD systems in TPPs is expected to significantly reduce SO_2 emissions and mitigate their harmful effects.

Challenges and Progress

- Despite the extensions, progress in installing FGD systems has been slow.
- As of November 2024, only a small percentage of coal-fired power plants have installed the necessary pollution control equipment.
- The repeated extensions reflect systemic issues in managing air pollution from TPPs and highlight the need for more effective implementation strategies.

INDIAN FLAPSHELL TURTLES

Context

- Recently, Uttar Pradesh police arrested three individuals for trafficking 297 **rare Indian flapshell turtles** from a pond in **Karhal, Mainpuri**, and were illegally exporting them to China via Uttarakhand at a price of Rs 10,000 a turtle.

About the Indian Flapshell Turtles (Lissemys Punctata)

- It is a **freshwater species** found **across South Asia**, including India, Pakistan, Bangladesh, Nepal, and Myanmar.

- These are known for their distinctive **'flap-shelled' appearance,** with flaps of skin covering their limbs when they retract into their shells.
- They are particularly common in the Indus and Ganges drainages and have been introduced to the Andaman and Nicobar Islands.

Protection Status

- IUCN Red List: Least Concern
- CITES: Appendix II;
- Indian Wildlife (Protection) Act, Schedule I

SIANG UPPER MULTIPURPOSE PROJECT (SUMP)

Context

- As India pushes for a **mega-dam on the Siang river** to counter China's upstream projects, the **Adi tribal community of Arunachal Pradesh** fears losing ancestral land.

Adi Tribe

- They are indigenous peoples in the state of **Arunachal Pradesh** in East Siang and Lower Dibang Valley districts**,** believed to have **come from southern China** in the 16th century.

Language: Tibeto-Burman

Festivals:

- Solung: Harvesting festival where animal sacrifices and rituals are performed;
- Aran: A hunting festival where all the male members of the family go for hunting;

Siang Upper Multipurpose Project (SUMP)

- It is located in the **Upper Siang district of Arunachal Pradesh,** which is in the northeastern part of India.
  - **Siang is a tributary of the Brahmaputra River.**
- It originates near **Mount Kailash in Tibet**, where it is known as the **Yarlung Tsangpo.**
  - It traverses over 1,000 km eastward before entering Arunachal Pradesh as the Siang.
  - Further downstream, in Assam, it joins tributaries like the Dibang and Lohit to become the Brahmaputra.
- **Capacity of SUMP:** Exceeding 10,000 MW;
- **Multipurpose Nature:** Flood Control; Irrigation; Water Supply

Environmental and Social Concerns

- **Displacement of Local Communities:** The construction of dams and reservoirs result in the displacement of people who live along the river.
- **Ecological Impact:** Alterations to the river ecosystem affect biodiversity, fisheries, and downstream water availability.
- **Seismic Risks**: The region is earthquake-prone, raising concerns about the safety of large dams in such an area.

Context

- Despite reporting net gains in green cover, the latest forest survey shows degradation of natural forests, particularly in ecologically sensitive hotspots.

Forest Survey of India

- FSI was established in 1981 and is under the MoEF&CC.
- It succeeded the **Pre-investment Survey of Forest Resources (PISFR)**, initiated in 1965 with **Food and Agriculture Organization (FAO) and United Nations Development Programme (UNDP)** support.

- It is published every two years by the **Forest Survey of India.**
- **Headquartered: Dehradun**
- The **first survey** was published in 1987, and **ISFR 2023 is the 18th** such report in the series.
  - It contains information on forest cover, tree cover, mangrove cover, growing stock, carbon stock in India's forests, instances of forest fire, Agroforestry, etc.
- It conducts surveys and research to monitor India's forest and land resources, providing data for national planning, conservation, and sustainable management.

Major Findings of India State of Forest Report (ISFR) 2023

- **Forest and Tree Cover:**
  - **Total Forest and Tree Cover:** The combined forest and tree cover of the country is 8,27,357 sq km, which constitutes 25.17% of the geographical area.
  - **Forest Cover:** The forest cover is 7,15,343 sq km, accounting for 21.76% of the geographical area.
  - **Tree Cover:** The tree cover is 1,12,014 sq km, making up 3.41% of the geographical area.
  - **Increase in Cover:** Compared to the 2021 assessment, there has been an increase of 1,445 sq km in the total forest and tree cover, with 156 sq km increase in forest cover and 1,289 sq km increase in tree cover.
- **State-wise Analysis:**
  - **Top States:** The states with the largest forest and tree cover are Madhya Pradesh (85,724 sq km), Arunachal Pradesh (67,083 sq km), and Maharashtra (65,383 sq km).
  - **Top States for Increase:** The states showing the maximum increase in forest and tree cover are Chhattisgarh (684 sq km), Uttar Pradesh (559 sq km), Odisha (559 sq km), and Rajasthan (394 sq km).
  - **Highest Forest Cover Percentage:** Lakshadweep (91.33%), Mizoram (85.34%), and Andaman & Nicobar Islands (81.62%) have the highest forest cover percentages.

Too good to be true

The latest forest assessment report claims that 481.13 sq km of open forest and 44.43 sq km of non-forest areas transitioned to very dense forests within recorded forest areas between 2021 and 2023. Experts argue that such rapid change is ecologically impossible

Forest cover change matrix inside recorded forest area (RFA) and green wash (GW) between 2021 and 2023 assessments (in sq km)

FOREST CLASSES	2023 ASSESSMENT INSIDE RECORDED FOREST AREA/GREEN WASH*					TOTAL FOR 2021
	VDF	MDF	OF	SCRUB	NF	
Very dense (VDF)	85,568.45	2,570.74	201.20	21.86	231.18	88,593.43
Moderately dense (MDF)	4,930.17	2,33,135.56	4,232.44	233.80	2,246.83	2,44,778.80
Open forests (OF)	481.13	7,269.84	1,72,692.54	1,090.99	5,451.31	1,86,985.81
Scrub	0.75	72.08	2,910.18	19,155.54	1,578.35	23,716.90
Non-forest	44.43	495.63	5,760.18	2,009.95	1,88,877.68	1,97,187.87
Total for 2023	91,024.93	2,43,543.85	1,85,796.54	22,512.14	1,98,385.35	7,41,262.81
Net change	2,431.50	-1,234.95	-1,189.27	-1,204.76	1,197.48	

* Currently, digitised boundaries of recorded forest areas are available for 25 states. For the others, Forest Survey of India has adopted an alternative approach, using the "green wash" boundaries, which are areas represented in green on the Survey of India topographic sheets, as a proxy for recorded forest areas.
Source: "India State of Forest Report 2023", Forest Survey of India

- **Carbon Stock:**
  - **Forest Carbon Stock:** The forest carbon stock is estimated at 7,285.5 million tonnes, with an increase of 81.5 million tonnes compared to 2021.
  - **Total Carbon Stock:** India's carbon stock has reached 30.43 billion tonnes of CO_2 equivalent, exceeding the 2005 base year by 2.29 billion tonnes, nearing the 2030 target of 2.5–3.0 billion tonnes.
- **Mangrove Cover:** The total mangrove cover is 4,921 sq km, with 3,554 sq km in the mainland and 1,367 sq km in the islands.
- **Forest Fires Alerts:** The report highlights the use of advanced technology for near real-time fire alerts and forest fire services.
- **Agroforestry Area:** The area under agroforestry is 1,94,575 sq km, which includes 1,49,777 sq km of land under agroforestry and 44,798 sq km under homestead agroforestry.

INDIAN VULTURES & USE OF NIMESULIDE

Context

- Recently, the Union government banned the manufacture, sale and distribution of all formulations of **Nimesulide, a painkiller administered to animals,** after studies conducted by an institute of ICAR that confirmed its **toxicity to vultures.**

About Nimesulide

- It is a **non-steroidal anti-inflammatory drug (NSAID)** commonly used to treat pain and inflammation in livestock.
  - It is the fourth such non-steroidal anti-inflammatory drug banned in the country since 2006.
- It is highly toxic to vultures. It **remains in their carcasses**, when livestock treated with nimesulide die.
  - It causes renal failure and death in vultures, contributing significantly to their population decline.
- Vultures, which primarily feed on animal carcasses, inadvertently ingest the drug, leading to severe health issues.

Vultures

- Vultures play a crucial ecological role by scavenging on animal carcasses, thereby preventing the spread of diseases.
- Their decline has had negative repercussions on biodiversity and ecosystems, highlighting the importance of their conservation.

Types

- Vultures are one of the 22 species of large carrion-eating birds that live mostly in the tropics and subtropics.
- India is home to **nine species of Vulture** namely the Oriental white-backed, Long-billed, Slender-billed, Himalayan, Red-headed, Egyptian, Bearded, Cinereous and the Eurasian Griffon.

Conservation Status

- Bearded, Long-billed, Slender-billed, Oriental white-backed are protected in the **Schedule-1 of the Wildlife Protection Act 1972**.
  - Rest are protected under 'Schedule IV'.
- According to **IUCN,** Oriental White-backed Vulture, Long-billed Vulture, Slender-billed Vulture and Red-headed Vulture are **Critically endangered.**
  - **Egyptian Vulture** is '**Endangered'** and Eurasian Griffon is least concerned while remaining are '**Near Threatened'**.

■■■■

SUBJECTIVE QUESTIONS

1. **Analyze the impact of natural calamities in India, focusing on their socio-economic consequences and the effectiveness of disaster management strategies employed by the government.**
2. **Analyze the impact of a depreciating Indian Rupee on India's agricultural trade, considering both potential benefits and drawbacks. Discuss the implications for farmers, exporters, and the overall economy.**
3. **Discuss the legal and ethical considerations surrounding the burden of proof in e-KYC verification processes. Analyze the potential risks and benefits of different approaches, such as shifting the burden of proof to the customer versus the service provider.**
4. **Discuss the significance of sacred groves in India, highlighting their ecological, cultural, and socio-economic importance. Analyze the threats they face and suggest measures for their conservation and sustainable management.**
5. **Critically analyze the current state of renewable and non-fossil fuel-based energy sources in India. Discuss the challenges faced in their widespread adoption and suggest potential solutions to overcome these hurdles.**

MCQs

1. Consider the following pairs:

	Sacred Grooves	Indian States
1.	Sarpa Kavu	Kerala
2.	Kovil Kavu	Tamil Nadu
3.	Bugyals	Uttarakhand
4.	Devrai	Maharashtra

How many of the above pairs are correctly matched?

(a) Only one pair
(b) Only two pairs
(c) Only three pairs
(d) All fours

Ans (d)

2. With reference to the Human Metapneumovirus (HMPV), consider the following statements:

1. It is a common respiratory virus that primarily affects individuals with weakened immune systems.
2. It belongs to the Pneumoviridae family, which also includes the respiratory syncytial virus (RSV).

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

Ans (c)

3. Adi tribes, sometimes appeared in the news, primarily live in:

(a) Meghalaya
(b) Arunachal Pradesh
(c) Assam
(d) Manipur

Ans (b)

4. Consider the following statements:

1. Siang river is a tributary of the Brahmaputra River.
2. It originates near Mount Kailash in Tibet.

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

Ans (c)

5. Consider the following pairs:

	Vultures	-	IUCN Status
1.	Long-billed Vulture	-	Critically endangered
2.	Egyptian Vulture	-	Endangered
3.	Eurasian Griffon	-	Near Threatened

How many of the above pair(s) is/are correctly matched?

(a) Only one
(b) Only two
(c) All three
(d) None

Ans (c)