NEXT IAS

SUMMARY OF

DOWN TO EARTH

[1–15 MAY, 2025]

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CONTENT

[1–15 May, 2025]

GLOBAL TRADE ORDER: A HISTORY OF EXPANSION, CRISIS, AND UNCERTAINTY

Context

- In recent years, the relevance of the **World Trade Organisation (WTO)** has been questioned due to **institutional paralysis, stalled negotiations, and rising protectionism.**

About

- Since the early 1990s, the world has undergone a major transformation in its trade policies, moving from the **General Agreement on Tariffs and Trade (GATT)** to the WTO.
    - The idea was to create a unified global trade system with rules that ensured compliance and fairness.
- However, underlying economic interests, especially those of the industrialized world, reshaped the system in ways that have led to unintended consequences—from environmental degradation to widening inequalities.

Shift to WTO and Its Consequences

- **Birth of WTO and China's Entry:** WTO was formed in 1995, replacing GATT to formalize global trade regulations.
    - In 2001, China joined the WTO, accelerating the relocation of global manufacturing from industrialized nations to low-wage economies like Vietnam, Bangladesh, and Cambodia.
- **Environmental and Labor Cost Considerations:** High manufacturing costs in Western nations, combined with expensive labor and strict environmental regulations, led industries to outsource production.
    - The **'Not-in-My-Backyard' (NIMBY) principle** was applied, shifting pollution and labor exploitation to emerging economies.

Dark Side of Globalization

- **Manufacturing Migration:** Global industries pursued cheaper locations as costs rose, creating a race to the bottom in terms of labor rights and environmental standards.
    - In India, industrial firms often relocate to unauthorized settlements to escape pollution regulations.
- **Protests Against Unfettered Global Trade:** In the 1990s, developing nations protested against WTO policies, fearing economic exploitation.
    - By 1999, anger against 'untamed globalization' spilled onto the streets during the Seattle WTO Summit, with both developing and developed nations voicing concerns.
- **Climate Change and Displacement of Emissions:** Western nations claimed carbon emission reductions, but in reality, emissions moved to new production sites, worsening global pollution.

Economic Winners and Losers

- **Corporate Profits vs. Wage Disparities:** Western companies thrived in low-wage economies, benefiting from cheaper manufacturing costs.
    - While consumers enjoyed cheaper goods, poor income distribution policies led to sharp economic inequalities.

- **Brexit and the Revenge of the Rich:** Brexit was a response to job losses caused by global trade shifts, demonstrating the frustration of industrialized nations.
    - Former U.S. President Donald Trump echoed similar protectionist sentiments, though they were temporarily overshadowed by COVID-19 disruptions.

Uncertain Future of Global Trade

- **Can Low-Wage Economies Survive Disengagement?**
    - Developing nations have benefitted economically from global trade but face risks if trade policies shift.
    - Disengaging from the interconnected trade, service, and finance network would come at a huge cost to global stability.
- **Next Trading System:**
    - The design of a new trade system will define whether the world sees another era of liberalization or a return to protectionism.
    - Policy decisions made today will shape economies and global relations for decades to come.

REDUCING AIR POLLUTION FROM BRICK MANUFACTURING

Context

- Brick manufacturing is a crucial industry in Mathura district, Uttar Pradesh, but its environmental impact has long been a concern.

About

- According to the **World Bank,** brick kilns contribute **8-14% of air pollution in the Indo-Gangetic plains,** releasing particulate matter and **black carbon (soot)** that deteriorate air quality and affect public health.
- In response, India's environmental authorities have introduced regulations and cleaner technologies to mitigate pollution from the brick sector.

Challenges Posed by Traditional Brick Kilns

- **High Pollution Levels:** Traditional brick kilns release harmful pollutants, including suspended particulate matter and carbon emissions, worsening air pollution.
    - These emissions contribute to respiratory diseases, reduced visibility, and climate change effects.
- **Fuel Inefficiency:** Older kilns rely on coal and biomass, leading to high fuel consumption and excess emissions.
    - Inefficient burning methods further intensify pollution.

Regulatory Measures and Cleaner Technologies

- **Emission Standards and Policy Interventions:** The Union Ministry of Environment, Forest and Climate Change, along with the Central Pollution Control Board, has introduced emission standards to regulate brick kiln pollution.
    - India's courts have reinforced these directives to ensure strict compliance.
- **Adoption of Zig-Zag Technology:** Zig-zag kilns enhance fuel efficiency, reducing pollution by 20-30% compared to conventional kilns.
    - They improve airflow, ensuring better combustion and lower emissions.

- Many brick kilns are transitioning to this cleaner and more efficient method, helping curb pollution levels in Mathura and surrounding regions.

Way Forward

- **Scaling Up Sustainable Practices:** Encouraging wider adoption of energy-efficient kilns and alternative construction materials can further reduce environmental harm.
- **Strengthening Enforcement Mechanisms:** Regular monitoring and strict enforcement of pollution control measures are essential to ensure compliance across the sector.
- **Community Awareness and Industry Participation:** Educating kiln operators and promoting eco-friendly policies can accelerate the transition to low-emission brick production.

POLLUTION MARKETS (*AKA* EMISSIONS TRADING SCHEMES OR CAP-AND-TRADE SYSTEMS)

Context

- Recent studies indicate that Pollution Markets mechanism has delivered both environmental and economic benefits, prompting discussions on its viability for broader implementation.

About the Pollution Markets

- These are designed to regulate industrial pollution by setting a fixed pollution cap for industries that receive tradable emission permits, allowing them to either buy or sell emission allowances based on their requirements.

Working of Pollution Markets

- **Cap-and-Trade System:** Governments set an overall pollution cap for industries.
  - Companies receive emission permits, which they can trade based on their pollution levels.
- **Financial Incentives for Pollution Reduction:** Industries that reduce emissions can sell excess permits, creating a financial incentive for cleaner production.
  - Companies exceeding their limits must purchase additional permits, ensuring accountability.

Case Study: Gujarat's Pollution Market

- **Implementation in Surat:** Gujarat's program established a collective pollution cap on 318 coal-using plants in Surat.
  - These plants were allocated emission permits or allowed to purchase additional permits to meet compliance standards.
- **Environmental and Economic Outcomes:** According to a study published in The Quarterly Journal of Economics, the scheme reduced particulate emissions by 20-30% over five years.
  - Pollution abatement costs declined by over 10%, making compliance cost-effective for industries.
  - Regulatory compliance increased to 99% among participating plants, demonstrating improved adherence to environmental laws.

Evaluating the Scheme's Effectiveness

- **Research Methodology:** Researchers conducted a randomized control test with 162 industrial plants over 10 compliance

periods (each lasting between four and six weeks).

- Findings confirmed that emission reductions resulted from:
  - A stricter initial pollution cap compared to previous regulations.
  - Further tightening of the cap over time by the state pollution regulator.

Challenges and Future Prospects

- **Lessons for Broader Implementation:** The success of Gujarat's model suggests that pollution trading can be an effective tool for managing emissions.
  - Similar schemes could be adapted for carbon emissions, industrial waste, and water pollution control.
- **Challenges to Consider:** The effectiveness of pollution markets depends on strict enforcement, accurate monitoring, and robust regulatory oversight.
  - There must be strong compliance mechanisms to prevent industries from exploiting loopholes or underreporting emissions.

CLIMATE CRISIS DRIVING SURGE IN GENDER-BASED VIOLENCE: UN STUDY

Context

- Recently, the United Nations (UN) highlighted how extreme weather, displacement, food insecurity, and economic instability are exacerbating violence against women and girls, particularly in vulnerable communities.

How Climate Change Fuels Gender-Based Violence?

- **Rising Temperatures and Increased Violence:** The study found that every 1°C rise in global temperature is associated with a 4.7% increase in IPV cases.
  - If global warming reaches 2°C, an additional 40 million women and girls could experience IPV each year by 2090.
  - Under a 3.5°C warming scenario, this number more than doubles, highlighting the urgent need for climate action.

Impact of Climate Disasters

- In 2023 alone, 93.1 million people were affected by weather-related disasters and earthquakes, while an estimated 423 million women experienced IPV.
- Studies show that femicide rates increase by 28% during heatwaves, demonstrating the direct impact of climate stress on violence levels.

Displacement and Vulnerability

- Climate-induced displacement forces women into unstable living conditions, increasing their risk of human trafficking, child marriage, and sexual exploitation.
- Marginalized groups—including Indigenous women, LGBTQ+ individuals, and those living in poverty—face heightened risks due to limited access to protection and services.

Addressing the Crisis: Policy Recommendations

- **Integrating Gender Justice into Climate Policies:** Climate solutions must prioritize women's rights, safety, and justice to be effective and sustainable.
  - Governments must ensure gender-responsive disaster relief programs to protect vulnerable populations.
- **Strengthening Legal Protections:** Expanding legal frameworks to address

gender-based violence in climate-affected regions is crucial.

- Increased funding for women's shelters, counseling services, and law enforcement training can help mitigate risks.

- **Community-Led Solutions:** Empowering local women's organizations to lead climate adaptation efforts can enhance resilience and safety.
  - Education and awareness campaigns can help reduce stigma and encourage reporting of violence cases.

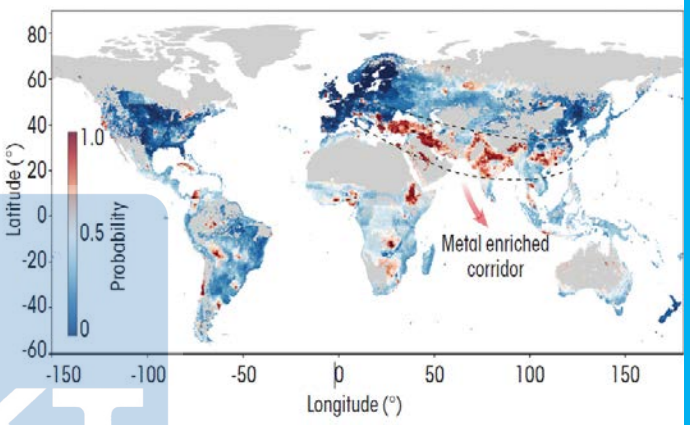
GLOBAL AGRICULTURAL LAND CRISIS

Context

- Recently, a study revealed that 242 million hectares of the world's agricultural land are contaminated by toxic heavy metals, posing serious threats to food security, public health, and ecosystems.

Key Findings of the Study

- **Extent of Contamination:** The study estimates that 900 million to 1.4 billion people live in high-risk regions affected by heavy metal pollution.
  - Unlike organic contaminants, metals do not degrade over time, making this pollution a persistent environmental hazard.
- **Geographical Hotspots:** A heavily contaminated belt stretches across low-latitude Eurasia, including southern Europe, the Middle East, South Asia, and southern China.
  - Cadmium, the most widespread pollutant, exceeds safe levels in 9% of soils globally, with hotspots in India, Pakistan, Bangladesh, southern China, and parts of Africa and Latin America.
  - Nickel and chromium contamination is most prevalent in the Middle East, subarctic Russia, and eastern Africa, while arsenic hotspots are concentrated in southern China, Southeast Asia, and West Africa.



Source: "Global soil pollution by toxic metals threatens agriculture and human health", *Science*, April 17, 2025

Causes of Heavy Metal Pollution

- Centuries of human activity, including mining, smelting, and agriculture, have contributed to the accumulation of these pollutants.
- Natural factors like metal-rich bedrock and low rainfall have further intensified contamination levels.

Implications for Food Security and Public Health

- **Impact on Crop Yields:** Heavy metal contamination reduces soil fertility, leading to lower agricultural productivity.
  - Polluted soils can transfer toxic metals into crops, endangering food safety.
- **Health Risks:** Long-term exposure to cadmium, arsenic, and lead can cause cancer, kidney damage, and neurological disorders.

- Contaminated food and water sources increase the risk of chronic illnesses in affected populations.

Urgent Need for Global Action

- **Expanding Soil Monitoring:** Researchers caution that the study likely underestimates the problem due to insufficient data from developing regions, particularly sub-Saharan Africa, northern Russia, and parts of central India.
  - International support is needed to expand soil monitoring programs in these areas.
- **Regulating Industrial Pollution:** Governments must enforce stricter regulations on mining, smelting, and agricultural practices to curb heavy metal contamination.
- **Sustainable Farming Solutions:** Promoting soil remediation techniques, such as phytoremediation (using plants to absorb toxins), can help restore polluted farmlands.

Conclusion

- The contamination of 242 million hectares of agricultural land by toxic heavy metals is a global crisis that demands urgent intervention. With millions of people at risk, policymakers must prioritize soil monitoring, pollution control, and sustainable farming practices to safeguard food security and public health.

ALARMING DECLINE IN SNOW PERSISTENCE IN INDIAN BASINS

Context

- A new report by the **International Centre for Integrated Mountain Development (ICIMOD)** has revealed a dramatic decline in snow persistence across the **Brahmaputra, Ganga, and Indus river basins,** marking a vicennial lowest in the Indus basin.
  - The **Hindu Kush Himalaya (HKH) region** has now experienced its third consecutive below-normal snow year, raising concerns about water security, hydropower generation, and agricultural sustainability.

About ICIMOD

- It is an intergovernmental knowledge and learning centre working on behalf of the people of the Hindu Kush Himalaya (HKH).
- It was established in 1983.
- It is based in Kathmandu, Nepal and works in and for eight regional member countries – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan.
- Activities range from hands-on research and piloting of solutions, to policy implementation with governments, to mountain advocacy on the global stage.

Key Findings of the ICIMOD Report

- **Declining Snow Persistence Across Major River Basins:** The Ganga basin, which recorded its highest snow persistence at +30.2% in 2015, dropped to a 23-year low of -24.1% in 2025.
  - The Indus basin saw a steep decline from +19.5% in 2020 to -27.9% in 2025, threatening early summer water supply for nearly 300 million people.
  - The Brahmaputra basin, which peaked at +27.7% in 2019, fell to -27.9% in

2025, posing risks to hydropower generation and agriculture.

- **Impact on Water Availability:** The Tibetan Plateau, the source of many North Indian rivers, saw snow persistence plummet from +92.4% in 2022 to -29.1% in 2025, highlighting its climate sensitivity.
    - The **Mekong (-51.9%)** and **Salween (-48.3%)** basins recorded the most alarming declines, followed by the **Brahmaputra (-27.9%)**, **Yangtze (-26.3%), and Ganga (-24.1%)**.
- **Threats to Agriculture and Hydropower:** Reduced seasonal meltwater means lower river runoffs, leading to early-summer water stress for downstream communities already facing intensifying heat spells.
    - Hydropower projects dependent on glacial meltwater may experience reduced efficiency, affecting energy supply.

Urgent Call for Action

- **Improved Water Management Strategies:** Investing in seasonal water storage and efficient meltwater use.
- **Stronger Drought Preparedness:** Enhancing early warning systems for water shortages.
- **Regional Cooperation:** Strengthening transboundary water agreements to ensure equitable distribution of resources.

Conclusion

- The declining snow persistence in the Brahmaputra, Ganga, and Indus basins signals a critical water security challenge for millions.
- As climate change accelerates, science-led policies and proactive water management will be essential to mitigate risks and ensure long-term resilience.

GROUNDWATER CRISIS IN INDIAN STATES

Context

- Uttar Pradesh, India's largest extractor of groundwater, is facing a severe water crisis due to unsustainable farming practices.

States Facing Severe Groundwater Depletion

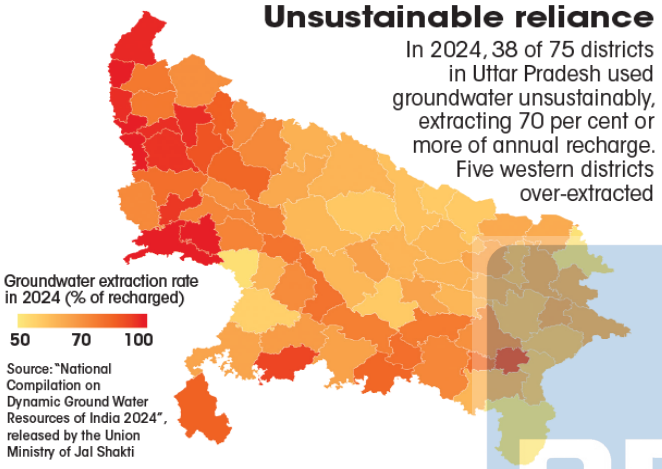
- **Punjab and Haryana:** Excessive use of borewells for irrigation, especially for water-intensive crops like paddy, has led to rapid groundwater depletion.
    - The **Central Ground Water Board (CGWB)** categorizes several districts as overexploited zones.
- **Rajasthan:** Desertification and erratic monsoons have led to severe groundwater stress, affecting agriculture and drinking water supply.
    - Artificial recharge projects are being explored to restore groundwater levels.

Groundwater Depletion in Uttar Pradesh

- **Overextraction for Agriculture:** In 2023, India extracted 241 billion cubic meters (bcm) of groundwater, with Uttar Pradesh alone withdrawing 46 bcm.
- **Water Intensive Crops:** Uttar Pradesh, spanning **over 34% of the Indo-Gangetic plains,** continues to rely heavily on water-intensive crops.
    - Sugarcane, paddy, and wheat dominate farming, replacing traditional low-water crops like millet and maize.
    - Producing just 1 kg of rice in the state consumes 649 litres of groundwater,

nearly 1.5 times the national average of 452 litres.

- **Unregulated Borewells and Tube Wells:** Farmers rely on deep borewells, leading to rapid depletion of underground reserves.
    - In Saharanpur, a district facing one of the worst water crises, borewells have become as common as households.



Policy Interventions and Sustainable Solutions

- **Groundwater Regulation and Monitoring:** The **UP Groundwater Management and Regulation Act, 2019**, aims to control illegal extraction and promote rainwater harvesting.
    - The **India-Groundwater Resource Estimation System (IN-GRES)** provides real-time groundwater data for better management.
- **Crop Diversification and Water Conservation:** Encouraging farmers to shift from water-intensive crops to drought-resistant varieties like millets and pulses.
    - Promoting drip irrigation and efficient water-use technologies to reduce dependence on groundwater.
- **Community-Led Conservation Efforts:** Strengthening local governance bodies to manage water resources sustainably.
    - Expanding artificial groundwater recharge projects to restore aquifers.

Way Forward

- **Diversifying Crops:** Encouraging farmers to shift to drought-resistant crops like millets and pulses.
- **Strengthening Regulations:** Enforcing groundwater extraction limits and promoting rainwater harvesting.
- **Community-Led Conservation:** Empowering local governance bodies to manage water resources sustainably.

INDIA'S COOLING PARADOX: HIDDEN CLIMATE CHALLENGE

Context

- India is experiencing a unique climate phenomenon—despite rising global temperatures, the country's warming rate is slower than the rest of the Northern Hemisphere.
- Scientists attribute this paradox to aerosols, tiny particles suspended in the air that reflect sunlight and reduce surface temperatures.

Role of Aerosols in India's Climate

- **Sunlight Reflection and Cooling Effect:** Aerosols, released from fossil fuel combustion, crop burning, and industrial activities, act like a sunshade, reducing solar radiation reaching the ground.
    - This effect has led to India warming only about 0.6°C since the 1950s, compared to higher warming rates in other regions.

- **Complex Interactions with Clouds:** Aerosols can increase cloud cover, further cooling the surface.
    - However, under certain conditions, they can also reduce cloud formation, leading to unpredictable temperature shifts.

Health and Environmental Consequences

- While aerosols slow warming, they also cause severe air pollution, leading to respiratory diseases and reduced visibility.
- Black carbon aerosols, emitted from industries and crop burning, absorb heat and worsen local warming effects.

Future of India's Climate Strategy

- **Reducing Aerosol Pollution:** Strengthening air quality regulations and promoting clean energy alternatives.
- **Balancing Climate Mitigation Efforts:** While aerosols slow warming, reducing emissions remains crucial for long-term climate stability.
- **Investing in Climate Research:** Understanding aerosol-cloud interactions can help predict future climate trends more accurately.

ORIGIN OF PROXIES: SCIENCE BEHIND DE-EXTINCTION

Context

- The concept of **proxies in wildlife conservation** has gained momentum with advancements in genetic editing and cloning technologies.
- The revival of extinct species showcases the potential of creating **genetic proxies**—organisms that resemble extinct species but are genetically modified versions of existing ones.

Science Behind Proxies

- **Genetic Editing and Cloning:** Scientists use CRISPR gene-editing technology to modify the DNA of closely related species.
    - The dire wolf proxy, for example, was created by altering gray wolf DNA to mimic the extinct species.
- **De-Extinction Projects:** Companies like Colossal Biosciences are leading efforts to bring back species like the dodo and woolly mammoth.
    - These projects aim to restore lost biodiversity but raise ethical concerns about ecosystem balance and genetic authenticity.

Technologies Used To De-Extinct Species

- **Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR):** A technology to edit genes in which specific parts of a living species' DNA are 'cut' and inserted with parts of the extinct species' DNA.
- **Cloning:** Cloning involves removing the DNA of a body cell from a donor and transferring it to a developing egg cell to generate a new, genetically identical, individual.
- **Selective breeding or back breeding:** Parents of species that share certain desirable genes of extinct species are bred so the characteristics are passed to offspring, called hybrid.

Future of Proxies in Conservation

- **Restoring Ecosystems:** Scientists hope that proxies can help reintroduce lost ecological functions.
- **Ethical Debates:** The question remains—should we focus on preserving existing species rather than reviving extinct ones?

- **Technological Advancements:** As genetic research progresses, more species may be revived, but their impact on biodiversity remains uncertain.

Extinct Species

Ivory-Billed Woodpecker (Cuba)

- **Last seen:** 1987
- **Extinct due to:** Habitat destruction and hunting/collection
- **Ecosystem service:** Insect control, seed dispersal, nutrient cycling, habitat creation
- **Revival proponent:** Colossal Foundation, a US non-profit
- **De-extinction Technology:** CRISPR

Aurochs (Europe)

- **Last seen:** 1627
- **Extinct due to:** Hunting by humans
- **Ecosystem service:** Nutrient cycling by dispersing seeds through its range; shaped habitats through grazing and trampling
- **Revival proponent:** Rewilding Europe, a Netherlands-based non-profit, and Grazelands Rewilding
- **De-extinction technology:** Selective breeding

Passenger Pigeon (North America)

- **Last seen**: 1914
- **Extinct due to:** Hunting by humans
- **Ecosystem service:** Seed dispersal, provided nutrients to the forest floor through droppings
- **Revival proponent:** Revive and Restore, a US non-profit
- **De-extinction technology:** CRISPR

Dodo (Mauritius)

- **Last seen:** 1662
- **Extinct due to:** Hunting by humans and cats and dogs brought by them
- **Ecosystem service:** Seed dispersal; may have aided decomposition of fallen fruits, other organic matter
- **Revival proponent:** Colossal Biosciences Inc, US
- **De-extinction technology:** CRISPR

Wooly Mammoth (Across Globe)

- **Last seen**: 4,000 years ago
- **Extinct due to:** Hunting by humans, warming climate
- **Ecosystem service:** Helped maintain grasslands by preventing trees from encroaching; created water sources and wallows by digging the soil; distributed nutrients through its dung; prevented thawing of permafrost which could release greenhouse gases
- **Revival proponent:** Colossal Biosciences Inc, US
- **De-extinction technology:** CRISPR

Pyrenean Ibex (Iberian Peninsula & Southern France)

- **Last seen:** 2000
- **Extinct due to:** Hunting pressure; inability to compete with domestic and wild ungulates
- **Ecosystem service:** Seed dispersal, prevention and mitigation wildfire risk
- **Revival proponent:** Advanced Cell Technology Inc, US
- **De-extinction technology:** Cloning

Quagga (Southern Africa)

- **Last seen:** 1883

- **Extinct due to:** Hunting by humans
- **Ecosystem service:** Provided nutrient cycling, seed dispersal and food for predator species
- **Revival Proponent:** Project Quagga, a South African non-profit company
- **De-extinction technology:** Selective breeding

Thylacine (aka Tasmanian Tiger) Tasmania. Australia

- **Last seen:** 1936
- **Extinct due to:** Hunting by humans
- **Ecosystem service**: Regulated populations of wallabies, quolls; controlled overgrazing; helped maintain a healthy balance within the food web
- **Revival proponent:** Colossal Biosciences Inc, US
- **De-extinction technology:** CRISPR

Dire Wolf (North America)

- **Last seen:** 13,000 years ago
- **Extinct due to:** Reliance on mega herbivores led to their own end as these species died out
- **Ecosystem service:** Kept populations of large herbivores like horses, bison, and mammoths in check
- **Revival proponent:** Colossal Biosciences Inc, US
- **De-extinction technology:** CRISPR

Heath Hen (North America)

- **Last seen:** 1932
- **Extinction cause**: Hunting, habitat loss, and a devastating wildfire on Martha's Vineyard, US
- **Ecosystem service:** Seed dispersal, nutrient cycling, habitat creation
- **Revival proponent:** Revive and Restore, a US non-profit
- **De-extinction technology:** Gene editing

GLOBAL CONSERVATION TRENDS: SPECIES AT RISK AND THE ROLE OF PROTECTION EFFORTS

Context

- A recent assessment of 67,000 species on the **Red List of Threatened Species of** IUCN, has revealed alarming trends in biodiversity loss.
- Over the past four decades, 1,200 species have moved to more threatened categories, while only 201 species have shown improvement.

Key Findings from the Assessment

- **Escalating Threats to Biodiversity:** Nearly six times as many species—particularly amphibians, birds, and mammals—have deteriorated (1,220 species) compared to those showing improvement (201 species) between 1980 and 2024.
  - The decline in invertebrates and aquatic species has been more severe due to habitat destruction and climate change.
- **Impact of Conservation Efforts:** Despite global challenges, protected areas and targeted conservation actions have contributed to the recovery of certain species.
  - Just over 51.8% of assessed species had at least one documented conservation effort, including habitat restoration and wildlife protection laws.
- **Species Most Affected:** Amphibians, reptiles, birds, mammals, and corals have benefited more from conservation initiatives than aquatic species and invertebrates.
  - Species dependent on marine ecosystems continue to face extreme environmental pressures.

Urgency for Conservation Policies

- **Expanding Protected Areas:** Governments and environmental groups must accelerate efforts to establish more wildlife reserves and marine sanctuaries.
- **Stronger Climate Action:** Addressing climate change is crucial in preventing habitat loss and ensuring species survival.
- **Increased Funding for Conservation:** More global investment is needed to support scientific research, wildlife protection, and anti-poaching efforts.

MISSING HEART OF THE PANDEMIC TREATY: CHALLENGES IN GLOBAL HEALTH EQUITY

Context

- The **Pandemic Treaty** falls short in addressing critical equity concerns, particularly regarding the **Pathogen Access and Benefit-Sharing System (PABS)**, despite three years of negotiations.

About the Pandemic Treaty of WHO

- It is aimed at enhancing pandemic prevention, preparedness, and response.
- It is developed by the **Intergovernmental Negotiating Body (INB)**, and expected to be presented at the **78th World Health Assembly** in May 2025 for consideration.

Key Provisions of the Pandemic Treaty

- **Pathogen Access and Benefit-Sharing System (PABS):** Establishes a framework for rapid sharing of genetic sequences and pathogen samples to accelerate the development of diagnostics, vaccines, and treatments.
    - Requires manufacturers to provide 10% of real-time vaccine production as donations and another 10% at affordable rates.
- **Pandemic Prevention Measures**: Promotes a One Health approach, integrating human, animal, and environmental health to prevent future outbreaks.
    - Strengthens global research and development capacities to ensure geographically diverse production of pandemic-related health products.
- **Health System Resilience and Workforce Mobilization:** Calls for investment in national and global health emergency workforces, ensuring rapid response capabilities.
    - Establishes a coordinating financial mechanism to support pandemic preparedness efforts.
- **Global Supply Chain and Logistics Network:** Aims to create a secure and efficient global supply chain for medical equipment, vaccines, and essential health products.
    - Encourages technology transfer and knowledge-sharing to strengthen regional manufacturing capacities.

Challenges and Future Considerations

- **Equity Concerns:** Developing nations have raised concerns about fair access to vaccines and treatments, urging stronger commitments from wealthier countries.
    - Wealthier nations have resisted binding commitments, particularly regarding equitable vaccine distribution.
    - Lack of clear enforcement mechanisms raises concerns about whether these commitments will be honored.

- **Implementation Uncertainty:** While the treaty outlines ambitious goals, enforcement mechanisms remain unclear, particularly regarding binding commitments on vaccine distribution.
- **Final Negotiations:** The treaty's provisions, including PABS, will undergo further negotiations, with **final agreements expected by May 2026.**

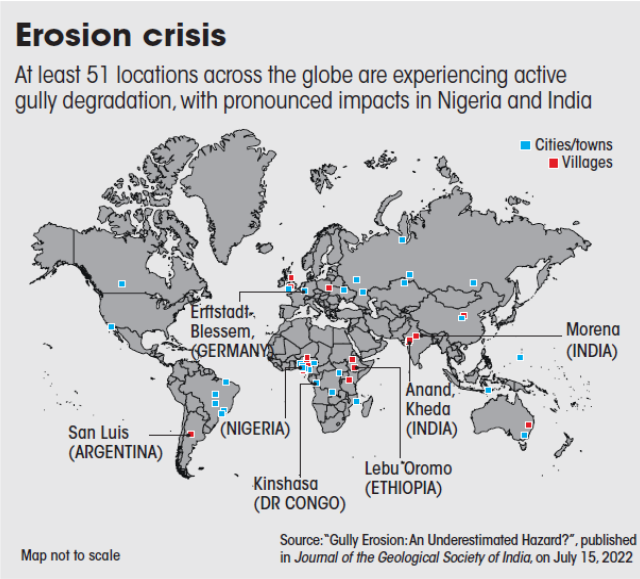
GROWING CRISIS OF GULLY EROSION

Context

- Climate change and land-use changes exacerbate gully erosion, which is a major driver of land degradation across the world.

About the Gully Erosion

- It is one of the most **overlooked yet destructive forms of land degradation**, carving **deep scars across landscapes** and threatening agriculture, infrastructure, and livelihoods.
- A recent study highlights that **77 districts in India** have unmanaged or active gullies that require urgent rehabilitative intervention.
- The crisis is exacerbated by climate change and land-use changes, making gully erosion a major driver of global land degradation.



Understanding Gully Erosion

- Gullies are erosional channels formed by surface and subsurface runoff, cutting deep into the soil.
- It is highly unpredictable and dynamic, leading to severe soil loss and land instability, unlike other types of erosion.
- In India, **Jharkhand, Chhattisgarh, Madhya Pradesh, and Rajasthan** are among the worst-affected states.

Impact of Gully Erosion

- **Loss of Topsoil:** Gully erosion removes the fertile topsoil layer, which is essential for agriculture. Once lost, it takes decades or centuries to regenerate.
  - The removal of fertile land leads to declining agricultural productivity, threatening food security **(SDG 2: Zero Hunger)** and farmer livelihoods.
- **Water Scarcity:** Gully erosion disrupts the natural water-holding capacity of the land, increasing surface runoff and reducing groundwater recharge, leading to water stress and droughts. **(SDG 6: Clean Water and Sanitation)**
- **Ecosystem Degradation:** Erosion leads to habitat fragmentation and biodiversity loss, impacting local flora and fauna.
- **Sediment Pollution:** The displaced soil often ends up in rivers and reservoirs, leading to siltation, water pollution, and reduced storage capacity.
- India has pledged **to restore 26 million hectares of degraded land by 2030,** but gully erosion remains a major obstacle to achieving this goal.

Urgent Need for Rehabilitation

- Soil conservation techniques, such as terracing and reforestation, can help stabilize gullies.

- Community-led land restoration programs are essential to prevent further degradation.
- Government intervention and policy reforms must prioritize gully erosion management to protect vulnerable regions.

SILENT REVOLUTION IN FOREST CONSERVATION

Context

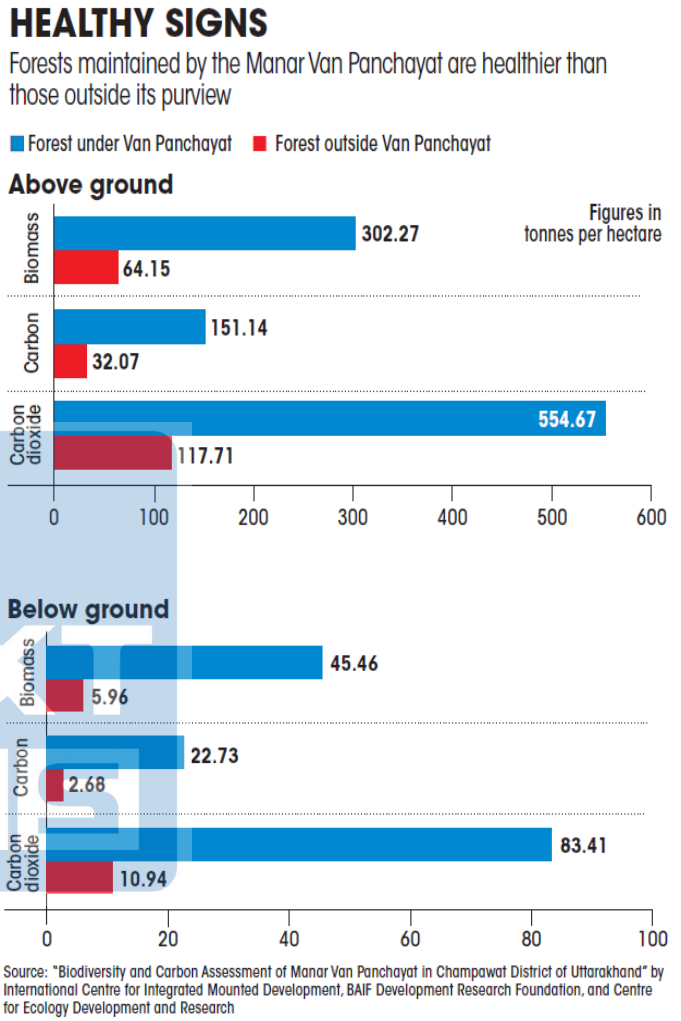
- In the remote village of **Champawat district, Uttarakhand**, a group of women have quietly transformed their landscape, leading a silent revolution in forest conservation.

Restoring the Forests: A Community Effort

- India's forests are vital for biodiversity, climate regulation, and local livelihoods, yet they face increasing threats from deforestation, land degradation, and climate change.
- Across the country, **community-led initiatives** have emerged as powerful forces in forest restoration, demonstrating how grassroots efforts can reverse environmental damage and promote sustainable conservation.

Community-Led Forest Restoration Initiatives

- **Champawat's Women-Led Forest Revival:** In Manar village, Uttarakhand, **women known as Van Sahelis** restored 11.6 hectares of degraded forest land.
  - Their efforts revived groundwater levels, reduced soil erosion, and improved access to firewood and water.
  - Sustainable Conservation Practices:
    - Planting native tree species to restore forest cover.
    - Preventing illegal logging and overgrazing to protect biodiversity.
    - Encouraging water conservation techniques to revive groundwater levels.



- **Eco Clubs for Mission LiFE:** It encourages students to participate in tree planting, waste reduction, and water conservation.
  - Over 5.18 crore saplings have been planted nationwide, fostering environmental awareness among youth.
- **Addressing Deforestation in India:** Satellite assessments reveal a steady decline in dense, natural forests, despite reported gains in forest cover.
  - Community-driven afforestation projects aim to restore degraded lands,

particularly in tribal and ecologically sensitive regions.

Impact of the Silent Revolution

- Groundwater levels have improved, ensuring better access to drinking water.
- Forest regeneration has reduced soil erosion, protecting agricultural lands.
- Women now spend less time collecting firewood, allowing them to focus on education, income generation, and community development.

Challenges and Future Directions

- **Balancing Development and Conservation:** Infrastructure projects often lead to forest fragmentation, requiring sustainable land-use policies.
- **Strengthening Community Participation:** Expanding grassroots conservation programs can enhance long-term forest protection.
- **Government Support and Policy Reforms:** Increased funding and policy backing for community-led afforestation will be crucial in achieving India's land restoration goals.

ICAR POLICY PAPER CALLS FOR RESOURCE REALLOCATION IN INDIAN AGRICULTURE

Context

- A recent policy paper by the **ICAR-National Institute of Agricultural Economics and Policy Research (ICAR-NIAP)** highlights the urgent need to reallocate agricultural resources from traditional staples like rice and wheat to diverse, nutrient-rich crops.

Key Findings of the Policy Paper

- **Shrinking Agricultural Land**: By 2047, farmland availability is expected to decline to 176 million hectares (mha) from the current 180 mha.
    - **India's net sown area** is projected to decrease to 138 mha, requiring intensification of cropping.
- **Surging Demand for Diverse Crops:**
    - **Fruits:** Expected to reach 233 million tonnes, growing at 3% annually.
    - **Vegetables**: Forecast to increase to 365 million tonnes, with a 2.3% annual growth rate.
    - **Pulses**: Demand projected to double to 49 million tonnes.
    - **Edible oils and sugar:** Expected to rise by 50% and 29%, respectively.
- **Declining Landholdings:** The average landholding size is expected to shrink from 1 hectare to 0.6 hectare by 2047, making large-scale farming more difficult.
    - Smaller landholdings may affect economies of scale, making farming less economically viable.
- **Surge in Cropping intensity:** It will likely rise to 170%, up from the current 156%, reflecting the need for better yield optimization.

Policy Recommendations for Sustainable Agriculture

- **Diversification of Crops:** Gradually reduce reliance on rice and wheat and promote alternative crops to enhance nutritional security.
- **Technological Advancements:** Invest in precision farming, efficient irrigation, and crop rotation techniques to optimize yields despite land constraints.
- **Strengthening Market Linkages:** Improve storage facilities, transportation networks, and agricultural policies to support farmers transitioning to diverse crops.
- **Environmental Considerations:** Increased cropping intensity may strain water and

energy resources, requiring sustainable farming practices to mitigate environmental impact.

CHINA UNVEILS WORLD'S FIRST 'MELTDOWN-PROOF' THORIUM REACTOR

Context

- Recently, **Chinese** scientists have successfully added fresh fuel to an operational **2-megawatt experimental thorium-based molten salt reactor.**

Why Thorium? A Safer and Cleaner Nuclear Fuel

- **Lower Waste and Higher Efficiency:** Thorium reactors produce less radioactive waste than uranium-based reactors.
  - They burn fuel more efficiently, reducing plutonium waste—a major long-term environmental and security concern—by over 80%.
- **Meltdown-Proof Design:** Unlike conventional nuclear reactors, molten salt reactors using thorium are intrinsically safe, eliminating the risk of core meltdowns.
- **No Weapons-Grade By-Products:** Thorium does not produce weapons-grade plutonium, making it a secure energy option with non-proliferation advantages.

China's Leadership in Thorium Energy Development

- **Building on Past Research:** While U.S. scientists developed and tested molten salt reactors in the 1960s, the program was shelved in favor of uranium.
  - China's renewed investment in thorium technology marks a shift toward next-generation nuclear solutions.
- **Scaling Up to Commercial Viability:** China is already constructing a 10-MW thorium reactor, signaling the transition toward large-scale energy production.

Future Implications and Global Competition

- **A Game-Changer for Clean Energy:** If commercial thorium reactors prove viable, they could revolutionize global nuclear energy with safer and more sustainable technology.
- Countries like **India and Norway** have explored thorium-based reactors, but China's recent advances may accelerate international interest in thorium energy deployment.

BIRD FLU (H5N1)

Context

- Recently, Vietnam has reported its second case of bird flu (H5N1), in which the virus has impacted the central nervous system as against the known respiratory tract.

About the Bird flu (aka Avian Influenza, H5N1)

- It is a highly **contagious viral infection** that primarily affects birds but has also been **known to infect humans and other mammals.**

How H5N1 Spreads

- **Transmission Among Birds:** H5N1 spreads through direct contact with infected birds, contaminated surfaces, or bird droppings.
  - Wild birds, especially migratory species, play a key role in spreading the virus across regions.
- **Human Infections:** While human cases are rare, infections occur through close contact with infected birds or contaminated environments.

- The virus does not easily spread from human to human, but mutations could increase its transmissibility.

Scientific Analysis

- The globally circulating **Clade 2.3.4.4b** has been infecting mammals, wild birds, poultry, and humans since 2022, but scientists in 2024 warned of a **new H5N1 reassortant strain** affecting both birds and people in the Greater Mekong region.

Symptoms and Health Risks

- **Symptoms in Humans:**
  - Fever, cough, sore throat, and difficulty breathing.
  - Severe cases may lead to pneumonia, respiratory failure, and multi-organ damage.
- **Mortality Rate:**
  - H5N1 has a high fatality rate, with over 50% of reported human cases resulting in death.
  - Early detection and antiviral treatment improve survival chances.
- **Vaccination and Treatment:**
  - While vaccines for poultry exist, human vaccines are still in development.
  - Antiviral drugs like oseltamivir (Tamiflu) help reduce severity in infected individuals.

INDIA'S URBAN AIR QUALITY CRISIS

Context

- India's urban centers continue to struggle with chronic PM10 pollution, with all major metropolitan cities exceeding the **National Ambient Air Quality Standards (NAAQS).**

Key Findings on PM10 Pollution

- **Consistently High Pollution Levels:** The study found that all monitored cities failed to meet NAAQS limits, reflecting the stubborn nature of particulate pollution.
  - Even with air quality policies in place, pollution levels remained dangerously high, affecting millions of residents.
- **Persistent Air Quality Violations:** Studies indicate that all 11 monitored metropolitan cities have failed to meet NAAQS standards for PM10 between 2021 and 2024.
  - Northern cities, including Delhi and Patna, recorded dangerously high PM10 concentrations, exacerbating health risks.
- **Limited Impact of Policy Measures:** Despite initiatives like the **National Clean Air Programme (NCAP)**, pollution levels remain stubbornly high.
  - Factors such as vehicular emissions, industrial pollution, construction dust, and crop residue burning continue to drive poor air quality.

Health and Economic Implications

- **Respiratory Diseases:** Long-term exposure to PM10 pollution increases cases of asthma, lung infections, and cardiovascular diseases.
- **Economic Costs:** Air pollution leads to reduced productivity, higher healthcare expenses, and losses in tourism and local businesses.

- **Policy Reforms Needed:** Strengthening air pollution regulations, expanding clean energy adoption, and improving urban green spaces could mitigate the ongoing crisis.

National Ambient Air Quality Standards (NAAQS) in India

- NAAQS are **regulatory limits** set by the **Central Pollution Control Board (CPCB)** under the **Air (Prevention and Control of Pollution) Act, 1981.**
- These standards define permissible levels of air pollutants to protect public health and the environment.

Key Pollutants Monitored Under NAAQS

- India's NAAQS covers 12 major air pollutants, including:
  - *Particulate Matter (PM10 & PM2.5);*
  - *Sulphur Dioxide (SO_2);*
  - *Nitrogen Dioxide (NO_2);*
  - *Carbon Monoxide (CO);*
  - *Ozone (O_3);*
  - *Lead (Pb);*
  - *Ammonia (NH_3);*
  - *Benzene (C_6H_6);*
  - *Arsenic (As);*
  - *Nickel (Ni);*
  - *Benzo(a)pyrene (BaP)*

Recent Developments in Air Quality Standards

- **Periodic Review of NAAQS:** MoEFCC periodically revises NAAQS based on scientific advancements and health impact studies.
  - The latest review was conducted by IIT Kanpur, focusing on risk assessment and exposure levels.
- **Stricter Regulations for Polluted Areas:** The 2022 revision emphasized uniform air quality standards across industrial and residential zones.
  - Ecologically sensitive areas have stricter limits for NO_2 and SO_2 to protect biodiversity.
- **Alignment with Global Standards:** India's NAAQS incorporates elements from WHO guidelines and EU air quality standards, ensuring international best practices.

About National Clean Air Programme (NCAP)

- It was launched by the MoEFCC in 2019 as a **long-term, time-bound strategy to tackle air pollution across India.**
- It aims to reduce **particulate matter (PM10 and PM2.5)** concentrations by 40% by 2025-26, improving air quality in 131 cities identified as non-attainment cities—those that have consistently failed to meet the NAAQS.

Key Objectives of NCAP

- **Reducing Air Pollution Levels:**
  - Targeting a 40% reduction in PM10 and PM2.5 concentrations by 2025-26.
  - Implementing city-specific air action plans to improve air quality.
- **Strengthening Air Quality Monitoring:** Expanding the network of air quality monitoring stations across India.
  - Enhancing real-time data collection and public accessibility through the PRANA portal.

- **Multi-Stakeholder Engagement:** Encouraging collaboration between government agencies, industries, and research institutions.
  - Promoting public awareness campaigns on air pollution mitigation.

Implementation and Achievements

- **Annual Targets for Cities:** 82 cities under NCAP have been assigned annual PM10 reduction targets ranging from 3% to 15%.
  - 49 cities under the **XVth Finance Commission** air quality grant have been given a 15% annual reduction target.
- **Financial Support:** The government has allocated ₹12,368.63 crores for air pollution control measures.
  - Funds are used for pollution control technologies, urban greening, and clean transportation initiatives.

PUNJAB'S DRAFT GREEN HYDROGEN POLICY

Context

- Recently, the Punjab Energy Development Agency (PEDA) has released the draft Green Hydrogen Policy.

Key Objectives of the Policy

- **Promoting Green Hydrogen Production:** Encouraging biomass gasification, electrolysis of wastewater, and hydrogen fuel blending.
  - Targeting a production capacity of 100 kilotonnes per annum by 2030.
- **Infrastructure Development:** Establishing hydrogen hubs and manufacturing facilities for electrolyzers.
  - Strengthening storage and transportation networks for hydrogen distribution.
- **Financial Incentives and Investments:** Offering tax exemptions, subsidies, and viability gap funding to attract investors.
  - Facilitating public-private partnerships for large-scale hydrogen projects.

Strategic Importance for Punjab

- **Economic Growth:** Green hydrogen can boost industrial competitiveness and create new employment opportunities.
- **Energy Security:** Reducing dependence on fossil fuels and integrating renewable energy sources.
- **Environmental Benefits:** Supporting India's net-zero targets by cutting carbon emissions in key sectors.

Challenges and Future Prospects

- **High Initial Costs:** Green hydrogen production requires significant capital investment in technology and infrastructure.
- **Policy Implementation:** Effective execution depends on clear regulatory frameworks and stakeholder collaboration.
- **Global Competitiveness:** Punjab must align its strategy with international hydrogen markets to attract investments.

DISASTER MANAGEMENT (AMENDMENT) BILL, 2024

Context

- Recently, the **Rajya Sabha** has passed the **Disaster Management (Amendment) Bill, 2024,** seeking to clearly define the roles

and responsibilities of various agencies involved in disaster management, fostering greater coordination, synergy and consistency in disaster response efforts.

About the Disaster Management (Amendment) Bill, 2024

- It was introduced in the Lok Sabha on August 1, 2024, aiming to enhance India's disaster preparedness and response framework.
- The Bill **amends the Disaster Management Act, 2005**, strengthening the roles of national, state, and district disaster management authorities while introducing new provisions for urban disaster management and risk assessment.

Key Amendments in the Bill

- **Enhanced Functions of NDMA and SDMA:** These are aimed to be responsible for preparing disaster management plans, rather than just reviewing them.
    - NDMA aims to conduct post-disaster audits to assess preparedness and response effectiveness.
- **Creation of Disaster Databases:** The Bill mandates the development of national and state disaster databases, containing information on disaster risks, fund allocation, expenditure, and mitigation plans.
- **Urban Disaster Management Authorities:** States will be empowered to establish Urban Disaster Management Authorities for state capitals and municipal corporation cities.
    - These authorities will be led by the Municipal Commissioner and District Collector, ensuring localized disaster response.
- **Formation of SDRF:** The Bill allows states to constitute their own disaster response forces, similar to the NDRF.
    - SDRFs will specialize in rapid disaster response and mitigation efforts.
- **Regulatory Powers for NDMA:** NDMA will now have the authority to make regulations under the Act, subject to central government approval.

Impact of the Amendments

- **Improved Disaster Preparedness:** Strengthening NDMA and SDMA functions will ensure better coordination and risk assessment.
- **Localized Disaster Response:** Urban Disaster Management Authorities will enhance city-level disaster mitigation efforts.
- **Data-Driven Decision Making:** The creation of disaster databases will help policymakers allocate resources effectively.

THE GUJARAT BOVINE BREEDING (REGULATION) ACT, 2025

Context

- Recently, the Gujarat assembly passed the **Gujarat Bovine Breeding (Regulation) Bill 2025** providing for the constitution of **Gujarat Bovine Breeding Regulatory Authority.**

Key Provisions of the Act

- **Regulation of Bovine Breeding Activities:** The Act mandates quality control in bovine semen production, processing, storage, and distribution.
    - It establishes guidelines for artificial insemination to prevent genetic disorders and improve breed quality.

- **Licensing and Certification:** Individuals and organizations engaged in bovine breeding must obtain licenses from the state government.
    - Certification ensures that breeding bulls and semen banks meet scientific and health standards.

Monitoring and Compliance

- The Act empowers state veterinary authorities to conduct inspections and audits of breeding centers.
- Violations of breeding regulations may result in penalties or suspension of licenses.

Impact on Livestock Development

- **Enhancing Dairy Productivity:** Scientific breeding methods will improve milk yield and genetic traits of cattle.
- **Preventing Genetic Disorders:** Regulated breeding practices will reduce hereditary diseases in bovines.
- **Boosting Rural Economy:** Strengthening livestock breeding will benefit farmers, dairy cooperatives, and animal husbandry enterprises.

NEW ORAL ANTIBIOTIC SHOWS PROMISE AGAINST DRUG-RESISTANT GONORRHOEA

Context

- Recently, The Lancet published research showing **a new oral antibiotic, Gepotidacin** promising results in treating **drug-resistant Gonorrhoea**.

About the Drug-Resistant Gonorrhoea

- **Drug-resistant gonorrhoea** is emerging as a major public health threat, with **strains of Neisseria gonorrhoeae** showing **resistance to multiple antibiotics.**

Why Is Gonorrhoea Becoming Drug-Resistant?

- **Overuse of Antibiotics:** Excessive use of antibiotics has led to bacterial mutations, making gonorrhoea harder to treat.
- **Genetic Adaptation:** The bacterium rapidly evolves, developing resistance to multiple drug classes.
- **Global Spread:** Drug-resistant strains have been detected in Kenya, Europe, and the U.S., raising concerns about untreatable infections.

Recent Breakthroughs in Treatment

- **Gepotidacin (New Oral Antibiotic)**: A study published in The Lancet found that gepotidacin, an oral antibiotic, successfully treated 93% of gonorrhoea cases.
    - It offers a potential alternative for patients who cannot tolerate injections or standard antibiotics.
- **Challenges in Treatment:** While gepotidacin is effective for rectal infections, it is less effective for throat infections (78% cure rate vs. 94% with standard treatment).
    - More research is needed to assess its long-term efficacy.

Public Health Implications

- **Need for Global Surveillance:** Health agencies must monitor drug-resistant strains to prevent widespread outbreaks.
- **Promoting Safe Practices:** Encouraging safe sex practices and early diagnosis can help reduce transmission.
- **Developing New Antibiotics:** Investment in novel drug research is crucial to combat antibiotic-resistant infections.

How Gepotidacin Works?

- Gepotidacin blocks bacterial DNA replication, using a novel mechanism different from traditional antibiotics.

- It is already used to treat urinary tract infections (UTIs) and has now demonstrated effectiveness against gonorrhoea.

Clinical Trial Results

- The study involved 628 participants with uncomplicated gonorrhoea.
- 93% of patients treated with gepotidacin were cured, compared to 91% who received the **standard treatment (ceftriaxone injection + azithromycin pill).**
- The drug was particularly effective in rectal infections, showing 100% success, though it was less effective for **throat infections (78% cure rate vs. 94% with standard treatment).**

GOLDMAN ENVIRONMENTAL PRIZE (2025)

Context

- Recently, **Mariluz Canaquiri** from the **Peruvian Amazon**, has won the **Goldman Prize (2025)** for her work to secure legal recognition of the **Maranon river's rights.**

About the Goldman Environmental Prize

- It is often referred to as the 'Green Nobel' recognizes outstanding grassroots environmental activists from around the world.
- It was **founded in 1989**, and it has honored 233 winners from 98 countries, celebrating individuals who fight for environmental justice, conservation, and sustainability.
- The prize has awarded $32 million in funding to grassroots environmental leaders.

Winners of 2025

- **Laurene Allen (United States):** Led a campaign against PFAS-contaminated drinking water, forcing an industrial giant to shut down after 20 years of pollution.
- **Mari Luz Canaquiri Murayari (Peru):** Secured a landmark court ruling granting legal personhood to the Marañón River, ensuring its protection from contamination.
- **Semia Gharbi (Tunisia):** Exposed a corrupt waste trafficking scheme, leading to the return of 6,000 tons of illegally exported waste from Italy to Tunisia.
- **Besjana Guri & Olsi Nika (Albania):** Successfully campaigned for the Vjosa River's designation as a Wild River National Park, protecting 250 miles of free-flowing waterways.
- **Batmunkh Luvsandash (Mongolia):** Advocated for the creation of a 66,000-acre protected area in the Eastern Gobi Desert, safeguarding endangered species.
- **Carlos Mallo Molina (Canary Islands):** Led efforts to halt the construction of Fonsalía Port, preventing damage to a 170,000-acre marine protected area.

Impact and Legacy of the Goldman Prize

- Since its founding in 1989, the Goldman Environmental Prize has honored 233 winners from 98 nations.
- Many recipients have gone on to become government officials, NGO leaders, and Nobel Prize laureates.
- The 2025 winners exemplify the power of grassroots activism, proving that ordinary individuals can drive extraordinary change.

SUBJECTIVE QUESTIONS

1. How can technological advancements, policy interventions, and sustainable practices be integrated to reduce air pollution from brick manufacturing?
2. How effective have pollution markets, such as emissions trading schemes or cap-and-trade systems, been in reducing greenhouse gas emissions?
3. How does the climate crisis contribute to the rise in gender-based violence, and what policy interventions, societal changes, and global collaborations are needed to protect vulnerable communities?
4. How have unsustainable extraction practices, climate variability, and policy challenges contributed to the groundwater crisis in Indian states?
5. How has the growing crisis of gully erosion affected agriculture, water security, and local livelihoods?

MCQs

1. The *'Pathogen Access and Benefit-Sharing System (PABS)',* sometimes appeared in news, is key features originated from:

   (a) Nagoya Protocol

   (b) Pandemic Treaty (WHO)

   (c) Convention on Biological Diversity (CBD)

   (d) (UN Trade and Development (UNCTAD)

2. With reference to the *National Ambient Air Quality Standards (NAAQS) in India*, consider the following statements:

   1. NAAQS are regulatory limits set by the Central Pollution Control Board (CPCB) under the Air (Prevention and Control of Pollution) Act, 1981.
   2. These standards define permissible levels of air pollutants to protect public health and the environment.

   Which of the statements given above is/are *not* correct?

   (a) 1 only

   (b) 2 only

   (c) Both 1 and 2

   (d) Neither 1 nor 2

3. Consider the following:

   1. Carbon Monoxide (CO)
   2. Carbon Dioxide (CO_2)
   3. Ozone (O_3)
   4. Ammonia (NH_3)
   5. Sulphur Dioxide (SO_2);
   6. Nitrogen Dioxide (NO_2)

   How many of the above are Pollutants Monitored Under National Ambient Air Quality Standards (NAAQS) in India?

   (a) Only three

   (b) Only four

   (c) Only five

   (d) All six

4. Term *'Clade 2.3.4.4b'* sometimes appeared in the news, is in the context of:

   (a) Bird flu

   (b) Tuberculosis

(c) Alzheimer
(d) Encephalitis

5. Consider the following:

1. CRISPR
2. Cloning
3. Back Breeding

How many of the above is / are potential technologies used to de-extinct species?

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

Answer Key: _____

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