

SUMMARY OF DOWN TO EARTH

[01–15 November, 2024]

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SUBJECTIVE QUESTIONS

MCQS

INDIA FACED DISASTERS ON 93% OF DAYS THIS YEAR

Context

- Recently, the Centre for Science and Environment (CSE) highlighted in its report that, India experienced extreme weather events on 93% of the days in the first nine months of 2024, underscores the urgent need for robust climate action and disaster preparedness.

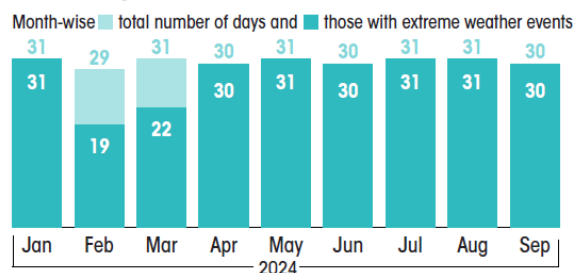
Scale of the Crisis

- From January to September 2024, India faced extreme weather on 255 out of 274 days. These events included heatwaves, cold spells, cyclones, lightning, heavy rains, floods, and landslides. The human and economic toll has been devastating:
 - **Lives Lost:** 3,238 people perished due to these disasters.
 - **Agricultural Impact:** 3.2 million hectares of crops were affected.
 - **Property Damage:** 235,862 houses and buildings were destroyed.
 - **Livestock Loss:** Approximately 9,457 livestock were killed.

Regional Impact

- Certain regions bore the brunt of these extreme weather events more than others:
 - **Assam:** Experienced heavy rains, floods, and landslides on 122 days, leaving large parts of the state submerged.

The country recorded extreme weather events every single day in seven months of 2024



- **Madhya Pradesh:** Faced extreme weather for 176 days, the highest in the country.
- **Kerala:** Recorded the highest number of fatalities with 550 deaths.

Climate Records Broken

- The year 2024 has also been marked by several climate records:
 - **January:** Ninth driest month since 1901.
 - **February:** Second-highest minimum temperature in 123 years.
 - **May:** Fourth-highest mean temperature on record.
 - **July, August, and September:** Highest minimum temperatures since 1901.

National Action Plan on Climate Change (NAPCC): Key Climate Policies in India

- Launched in 2008, the NAPCC outlines India's strategy to adapt to and mitigate climate change. It includes **eight national missions**:
 - **National Solar Mission:** Aims to increase the use of solar energy.
 - **National Mission for Enhanced Energy Efficiency:** Focuses on improving energy efficiency.

- **National Mission on Sustainable Habitat:** Promotes sustainable urban planning and waste management.
- **National Water Mission:** Ensures water conservation and management.
- **National Mission for Sustaining the Himalayan Ecosystem:** Protects the Himalayan environment and its resources.
- **National Mission for a Green India:** Enhances forest cover and ecosystem services.
- **National Mission for Sustainable Agriculture:** Promotes climate-resilient agricultural practices.
- **National Mission on Strategic Knowledge for Climate Change:** Develops knowledge systems for climate change.

Long-Term Low Emission Development Strategy (LT-LEDS)

- India's LT-LEDS focuses on seven key strategic transitions to achieve net-zero emissions by 2070. These include:
 - Low carbon development of electricity systems.
 - Integrated, efficient, and inclusive low-carbon transport systems.
 - Sustainable urbanisation and energy-efficient buildings.
 - Economy-wide decoupling of growth from emissions.
 - CO₂ removal and related engineering solutions.

- Enhancing forest and vegetation cover.
- Economic and financial aspects of low-carbon development.

Renewable Energy Targets

- India has set ambitious targets to increase its renewable energy capacity:
 - 500 GW of non-fossil fuel-based electricity generation capacity by 2030.
 - Meeting 50% of its energy requirements from renewable sources by 2030.

Other Notable Policies

- **National Electric Mobility Mission Plan:** Promotes electric vehicles to reduce emissions from the transport sector.
- **National Clean Air Programme:** Aims to reduce air pollution levels across the country.
- **Plastic Waste Management Rules:** Focuses on reducing single-use plastics and improving waste management.

Conclusion

- The data from 2024 paints a grim picture of the future if urgent climate action is not taken. The increasing frequency of extreme weather events highlights the need for comprehensive disaster management strategies and stronger climate policies.
- As the world prepares for the 2024 United Nations Climate Change Conference (COP29) in Azerbaijan, India's experience serves as a critical reminder of the urgent need for global

cooperation in addressing climate change.

DROUGHTS TRIGGER POWER OUTAGES ACROSS THE GLOBE

Context

- Droughts are triggering widespread electricity outages globally, affecting several countries reliant on hydropower.

About

- Droughts, a natural phenomenon characterised by prolonged periods of insufficient rainfall, have increasingly become a global concern.
- The impact of droughts extends beyond agriculture and water supply, significantly affecting power generation and distribution.

Link Between Droughts and Power Outages

- Droughts reduce water levels in rivers, lakes, and reservoirs, which are critical for hydroelectric power generation.
- Hydropower, a major source of renewable energy, relies on the availability of water to generate electricity.
- When water levels drop, the capacity to produce electricity diminishes, leading to power shortages and outages.

Global Instances of Drought-Induced Power Outages

- **South America:** Countries like Colombia have experienced significant power outages due to low water reservoir levels. The hydroelectric systems, which supply a substantial portion of the

region's electricity, are unable to meet demand during peak hours.

- **Africa:** In Zambia, prolonged droughts have led to reduced water levels in dams, forcing the government to cut daily power supply by several hours. This has disrupted daily life and economic activities.
- **Asia:** India has also faced challenges with power generation due to droughts. The reduced water flow in rivers has impacted hydroelectric plants, leading to power cuts in various regions.

Broader Impact

- The consequences of drought-induced power outages are far-reaching. They affect not only households and businesses but also critical infrastructure such as hospitals and schools.
- In many developing countries, where alternative power sources are limited, the impact is even more severe.

Mitigation and Adaptation Strategies

- **Diversification of Energy Sources:** Investing in alternative renewable energy sources such as solar and wind can reduce dependence on hydropower.
- **Improved Water Management:** Efficient water management practices, including the construction of reservoirs and the implementation of water-saving technologies, can help mitigate the impact of droughts.
- **International Cooperation:** Countries sharing transboundary water resources need to collaborate on water

management to ensure sustainable use and prevent conflicts.

Tackling drought-induced power outages

- **Diversification of Energy Sources:** Investing in **solar and wind energy** can reduce reliance on hydropower. These sources are less affected by drought conditions and can provide a stable supply of electricity.

- Utilising **geothermal energy**, which harnesses heat from the Earth, can be a reliable alternative in regions with suitable geological conditions.

- **Advanced Water Management:** Converting seawater to freshwater through **desalination** can provide a steady water supply for both consumption and power generation.

- Implementing systems to **recycle and reuse water** in industrial and agricultural processes can conserve freshwater resources.

- **Energy Storage Solutions:** **Large-scale battery storage** systems can store excess energy generated from renewable sources, ensuring a continuous power supply during periods of low generation.

- Pumped Hydro Storage involves **pumping water to a higher elevation** during times of **surplus energy** and releasing it to generate electricity when needed.

- **Smart Grid Technologies:** Demand Response Programs incentivise consumers to reduce or shift their electricity usage during peak demand

periods, helping to balance supply and demand.

- **Grid Modernisation:** Upgrading the electrical grid with smart technologies can improve efficiency and reliability, reducing the impact of power outages.

- **Innovative Agricultural Practices:** Developing and planting Drought-Resistant Crops that require less water can reduce the strain on water resources.

- **Precision Agriculture:** Using technology to optimise water usage in agriculture can conserve water and ensure more is available for power generation.

- **Policy and International Cooperation:** Countries sharing water resources can establish agreements to manage and allocate water more effectively.

- **Climate Resilience Policies:** Governments can implement policies that promote the use of resilient infrastructure and sustainable practices to mitigate the impact of droughts.

Community-Based Solutions

- **Rainwater Harvesting:** Collecting and storing rainwater can provide an additional water source for communities and reduce dependence on traditional water supplies.

- **Local Energy Cooperatives:** Communities can form cooperatives to invest in and manage local renewable energy projects, enhancing energy security and resilience.

Conclusion

- Droughts are a growing threat to global power stability. As climate change continues to exacerbate the frequency and severity of droughts, it is crucial for governments and stakeholders to adopt comprehensive strategies to ensure a reliable power supply.
- By diversifying energy sources, improving water management, and fostering international cooperation, we can mitigate the impact of droughts on power generation and build a more resilient energy infrastructure.

CANCER CASES AND DEATHS IN INDIA

Context

- A study by the Indian Council of Medical Research predicts a sharp rise in cancer cases and deaths in India from 2022 to 2045. South Africa is expected to show a similar trend. Prostate, lung, and oral cancers dominate among men, while breast and cervical cancers lead among women.

About

- Cancer remains a significant public health challenge in India, with rising incidence and mortality rates.
- According to the latest data from the **National Cancer Registry Programme (NCRP)** and other sources, the burden of cancer in India is substantial and continues to grow.

Current Statistics

- As of 2022, India reported over 14.1 lakh new cancer cases and more than 9.1 lakh deaths due to cancer.

- The Indian Cancer Society's annual report highlights that approximately 1.3 million people are diagnosed with cancer each year, and nearly 850,000 succumbed to the disease in 2020. The ICMR-National Institute of Cancer Prevention and Research (NICPR) estimates that around 2.5 million people are living with cancer in India.

Common Types of Cancer

- Breast cancer is the most prevalent type of cancer among Indian women, while lung and oral cancers are more common among men.
 - The increasing incidence of these cancers is attributed to lifestyle changes, tobacco use, and other environmental factors.

Risk Factors

- **Tobacco Use:** Tobacco consumption, including smoking and chewing, is a leading cause of cancers such as lung, oral, and throat cancers.
- **Diet and Nutrition:** Poor dietary habits, including high consumption of processed foods, red meat, and low intake of fruits and vegetables, contribute to cancers like colorectal and stomach cancer.
- **Alcohol Consumption:** Excessive alcohol intake is associated with an increased risk of cancers of the liver, breast, and oesophagus.
- **Physical Inactivity:** Sedentary lifestyles and lack of physical activity are linked to higher risks of breast, colon, and endometrial cancers.

- **Obesity:** Being overweight or obese increases the risk of several types of cancer, including breast, colorectal, and kidney cancers.
- **Environmental Pollution:** Exposure to both indoor and outdoor air pollution, including industrial emissions and vehicular exhaust, is a growing concern and is linked to lung and other respiratory cancers.
- **Infections:** Certain infections, such as human papillomavirus (HPV) and hepatitis B and C, are significant risk factors for cervical and liver cancers, respectively.
- **Genetic Factors:** Family history and genetic predisposition play a role in the risk of developing certain cancers, such as breast and ovarian cancers.
- **Ageing Population:** The risk of cancer increases with age, and as India's population ages, the incidence of cancer is expected to rise.
- **Occupational Hazards:** Exposure to carcinogens in the workplace, such as asbestos, chemicals, and radiation, can increase the risk of various cancers.

Challenges in Cancer Management

- **Early Detection and Awareness:** One of the major challenges in combating cancer in India is the lack of awareness and early detection.
 - Many cancers are diagnosed at advanced stages, reducing the chances of successful treatment.
- **Healthcare Infrastructure:** The healthcare infrastructure in India, particularly in rural areas, is inadequate

to handle the growing number of cancer cases.

- There is a need for more specialised cancer treatment centres and trained healthcare professionals.
- **Cost of Treatment:** The high cost of cancer treatment is a significant barrier for many patients. Despite government schemes and insurance coverage, the financial burden remains a critical issue for many families.

Government Initiatives

- The Indian government has launched several initiatives to address the cancer burden. The **National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS)** aims to strengthen infrastructure, promote early detection, and provide affordable treatment options.
- Additionally, the Ayushman Bharat scheme provides health coverage to economically disadvantaged sections of society, including cancer treatment.

Conclusion

- The rising incidence and mortality rates of cancer in India underscore the need for comprehensive strategies to improve early detection, enhance healthcare infrastructure, and make treatment more affordable.
 - Public awareness campaigns, lifestyle modifications, and robust healthcare policies are essential to combat this growing health crisis.
- By addressing these challenges, India can make significant strides in reducing

the cancer burden and improving the quality of life for millions of its citizens.

GM POLICY IN INDIA AND CONCERNS OF FARMERS

Context

- Recently, the Supreme Court of India directed the Union government to develop a **national policy on genetically modified (GM) crops** for research, cultivation, trade and commerce through public consultation.

About

- The debate over genetically modified (GM) crops in India has been ongoing for over two decades, reflecting the complexity of balancing technological advancements with environmental sustainability, health concerns, and the socio-economic well-being of farmers.
- The recent directive from the Supreme Court of India to formulate a national policy on GM crops has reignited discussions on the future of GM technology in Indian agriculture.

Current GM Policy Landscape

- India's approach to GM crops has been cautious and fragmented. The regulatory framework involves multiple agencies, including the **Genetic Engineering Appraisal Committee (GEAC)** under the Ministry of Environment, Forests and Climate Change (MoEFCC).
- Despite the approval of GM mustard (Dhara Mustard Hybrid—DMH-11) in 2022, the Supreme Court's intervention has highlighted the need for a

comprehensive and farmer-centric policy.

Farmers' Concerns

- **Economic Impact:** The high cost of GM seeds and the dependency on multinational corporations for these seeds can strain the financial resources of small and marginal farmers.
- **Environmental Risks:** GM crops have been associated with potential risks to biodiversity and soil health. The introduction of foreign genes can disrupt local ecosystems and harm beneficial organisms.
- **Health Concerns:** There are ongoing debates about the long-term health impacts of consuming GM foods. Critics argue that insufficient research has been conducted to ensure their safety.
- **Loss of Traditional Practices:** The adoption of GM crops may lead to the erosion of traditional farming practices and indigenous crop varieties, which are crucial for maintaining agricultural diversity.

Way Forward

- Experts emphasise the need for a democratic and consultative process in formulating the GM policy. This includes engaging with farmers, scientists, environmentalists, and other stakeholders to address their concerns and ensure that the policy is inclusive and sustainable.
- **Biosafety Measures:** Implementing stringent biosafety protocols to mitigate environmental and health risks.

- **Economic Support:** Providing financial assistance and subsidies to farmers adopting GM crops to reduce their economic burden.
- **Research and Development:** Investing in research to develop GM crops that are tailored to India's diverse agro-climatic conditions and are safe for the environment and human health.
- **Public Awareness:** Educating farmers and consumers about the benefits and risks of GM crops to make informed decisions.

Conclusion

- The formulation of a national GM policy in India is a critical step towards addressing the concerns of farmers and ensuring the sustainable development of agriculture. By adopting a balanced and inclusive approach, India can harness the potential of GM technology while safeguarding the interests of its farmers and the environment.

LIGHT POLLUTION

Context

- Increased illumination has damaging consequences for the health of humans, animals and plants. It's time governments introduced policies to protect the natural darkness and improve the quality of outdoor lighting.

About the Light Pollution

- Light pollution, the excessive or misdirected artificial light at night, is an often overlooked but significant environmental issue.

- It affects not only our ability to view the night sky but also has profound impacts on human health, wildlife, and ecosystems.

Causes of Light Pollution

- Light pollution primarily results from human activities and poorly designed lighting systems. Key contributors include:
 - **Urban Sky Glow:** The brightening of the night sky over populated areas due to streetlights, buildings, and other sources of artificial light.
 - **Light Trespass:** Unwanted or intrusive light that spills over into areas where it is not needed, such as residential properties.
 - **Glare:** Excessive brightness that causes visual discomfort and reduces visibility.
 - **Clutter:** The excessive grouping of lights, often seen in urban areas, which can create confusing and overwhelming visual environments.

Impacts on Health and Environment

- **Human Health:** Exposure to artificial light at night can disrupt circadian rhythms, leading to sleep disorders and other health issues. It has been linked to increased risks of obesity, depression, and even certain types of cancer.
- **Wildlife:** Many species rely on natural light cycles for navigation, reproduction, and foraging. Artificial light can disorient animals, disrupt migration patterns, and interfere with predator-prey relationships.

- For example, sea turtles and migratory birds are particularly vulnerable to light pollution.
- **Ecosystems:** Light pollution can alter the natural behaviours of plants and animals, affecting entire ecosystems.
 - It can disrupt the timing of flowering in plants and the activities of nocturnal animals, leading to imbalances in local biodiversity.

Disruption of the Biological Clock

- Our biological clock, or circadian rhythm, is regulated by the natural light-dark cycle. However, exposure to artificial light, especially at night, can shift the timing of these rhythms and dampen their oscillation. It can lead to various health issues.

Health Impacts

- **Sleep Disorders:** Artificial light exposure can suppress the production of melatonin, a hormone that regulates sleep. This can lead to sleep disturbances and insomnia.
- **Metabolic Disorders:** Disrupted circadian rhythms are linked to an increased risk of metabolic disorders such as obesity, diabetes, and cardiovascular diseases.
- **Mental Health:** There is evidence suggesting that circadian disruption can contribute to mental health issues, including depression and anxiety.

Environmental Impacts

- **Wildlife:** Many species rely on natural light cues for navigation,

reproduction, and foraging. Artificial light can disorient animals, disrupt migration patterns, and interfere with predator-prey relationships.

- **Ecosystems:** The alteration of natural light cycles can affect entire ecosystems, leading to imbalances in local biodiversity.

Solutions to Light Pollution

- **Improved Lighting Design:** Using fixtures that direct light downward and minimise glare can significantly reduce light pollution.
 - Implementing motion sensors and timers can also help ensure lights are only used when necessary.
- **Regulations and Policies:** Governments can play a crucial role by enacting and enforcing regulations that limit excessive and misdirected lighting.
 - Policies that promote the use of energy-efficient lighting can also contribute to reducing light pollution.
- **Public Awareness:** Educating the public about the impacts of light pollution and encouraging responsible lighting practices can lead to community-driven solutions.
 - Initiatives like 'Dark Sky' reserves and events can help raise awareness and promote the preservation of natural nightscapes.

Conclusion

- Light pollution is a pervasive issue that requires immediate attention. By adopting better lighting practices,

implementing effective regulations, and raising public awareness, we can mitigate the adverse effects of light pollution and protect our health, wildlife, and environment.

- As we continue to urbanise, it is crucial to balance our need for artificial light with the preservation of the natural night sky.

MAKING STEEL SUSTAINABLE

Context

- As India works to double its GDP by 2030, its steel industry must balance growth with sustainability. By embracing policies like the Steel Scrap Recycling Policy 2019 and adopting green technologies, India is paving the way for a more sustainable future in steel production

About

- Steel is an essential material in our modern world, used in everything from infrastructure to household appliances. However, its production is a significant source of greenhouse gas emissions, accounting for about 7-8% of global emissions.
- The steel industry contributes **around 2% to India's GDP** and will act as a foundation for the country to meet its ambition to double its gdp and per capita income to US \$6.69 trillion and \$4,418, respectively, by 2030.
- The **National Steel Policy, 2017**, aims to provide this foundation by increasing India's steel production capacity from

122 million tonnes (MT) in 2015 to 300 MT by 2030.

- The urgency to address global excess capacity and cut carbon emissions is driving a shift in how industries operate. The steel industry, which accounts for approximately 8% of global emissions, is no exception.
- As the world moves towards a more sustainable future, making steel production greener is crucial.

Challenge of Steel Production

- Traditional steel production relies heavily on coal, which is used to reduce iron ore in blast furnaces. This process emits approximately two metric tons of CO₂ per ton of steel produced.
- Given the scale of steel production—1.8 gigatons annually—this results in substantial carbon emissions.

Pathways to Sustainable Steel

- **Green Hydrogen:** One of the most promising solutions is replacing coal with green hydrogen as a reducing agent. When burned, hydrogen emits only water, making it a clean alternative. If produced via electrolysis using renewable energy, it can significantly reduce the carbon footprint of steel production.
- **Electric Arc Furnaces (EAFs):** These furnaces use electricity to melt scrap steel, which can be sourced from renewable energy. EAFs are gradually replacing traditional blast furnaces, although their sustainability depends on the energy source used.

- **Carbon Capture, Utilisation, and Storage (CCUS):** This technology captures CO₂ emissions from steel plants and either stores it underground or uses it in other industrial processes. CCUS can help mitigate emissions from existing steel production methods.
- **Direct Iron Electrolysis:** This emerging technology involves the direct reduction of iron ore using electricity, bypassing the need for carbon-based reducing agents. While still in development, it holds promise for zero-emissions steelmaking.

Economic and Policy Support

- Transitioning to sustainable steel production requires significant investment. Green steel products are currently more expensive, costing 20-50% more than conventional steel.
- To bridge this gap, policies such as carbon pricing, subsidies for green technologies, and international cooperation are essential.

Conclusion

- Making steel sustainable is not just an environmental imperative but also an economic opportunity. By adopting green technologies and supportive policies, the steel industry can significantly reduce its carbon footprint, contributing to global climate goals and paving the way for a greener future.

ALL-INDIA RURAL FINANCIAL INCLUSION SURVEY 2021-22

Context

- The recently released second edition of the 'All-India Rural Financial Inclusion

Survey 2021-22' by the National Bank for Agriculture and Rural Development (NABARD) reveals that 57% of rural households still depend on agriculture for sustenance.

All-India Rural Financial Inclusion Survey 2021-22: Key Insights and Implications

- The All-India Rural Financial Inclusion Survey (NAFIS) 2021-22, conducted by the NABARD, provides a comprehensive overview of the financial and economic conditions of rural households in India.

Income and Expenditure Trends

- One of the most significant findings of the survey is the substantial increase in the average monthly income of rural households. Between 2016-17 and 2021-22, the average monthly income rose by 57.6%, from ₹8,059 to ₹12,698.12.
- This growth reflects a nominal compound annual growth rate (CAGR) of 9.5%.
- However, this increase in income is accompanied by a rise in household expenditures, which grew from ₹6,646 to ₹11,262 per month.
- The share of food in total consumption declined from 51% to 47%, indicating a shift towards non-food expenditures.

Savings and Debt

- The survey highlights an improvement in financial savings among rural households. In 2021-22, 66% of households reported saving money, up from 50.6% in 2016-17.

- Agricultural households demonstrated higher savings rates compared to non-agricultural ones, with 71% of agricultural households reporting savings.
- Despite this positive trend, the proportion of households with outstanding debt increased from 47.4% to 52% over the same period.

Insurance and Financial Services

- Insurance coverage among rural households saw a remarkable increase, with the proportion of households having at least one member insured surging from 25.5% in 2016-17 to 80.3% in 2021-22.
- The survey also noted a significant rise in the reliance on institutional loans, with 75.5% of agricultural households borrowing from institutional sources in 2021-22, up from 60.5% in 2016-17.
- The Kisan Credit Card (KCC) scheme played a crucial role in expanding financial inclusion, with coverage increasing from 10.5% to 44.1%.

Agricultural vs. Non-Agricultural Households

- The survey reveals that 57% of rural households depend on agriculture for their livelihood.
- However, only about one-third of an agricultural household's income comes from cultivation, with the rest sourced from government or private services, wage labour, and other enterprises.
- This diversification highlights the resilience of small and marginal farmers, who often rely on multiple income sources to sustain their livelihoods.

Challenges and Opportunities

- Despite the positive trends in income and savings, the survey underscores several challenges. The average landholding size for farming decreased from 1.08 hectares in 2016-17 to 0.74 hectares in 2021-22.
- Additionally, many agricultural households reported crop failures due to irregular rainfall, pest attacks, and other factors.
- These challenges highlight the need for continued support and policy interventions to enhance the resilience and sustainability of rural livelihoods.

Conclusion

- The NAFIS 2021-22 survey provides a detailed snapshot of the financial inclusion landscape in rural India.
- While there have been significant improvements in income, savings, and access to financial services, ongoing challenges such as shrinking landholdings and rising debts need to be addressed to ensure sustainable development and economic stability for rural households.

PRELIMS

EUROPE SEES A SURGE OF MOSQUITO-BORNE DISEASES

Context

- Climate change is making Europe more susceptible to mosquito-borne diseases, with rising temperatures and shifting rainfall patterns creating favourable breeding conditions for mosquitoes.

Climate Change and Mosquito Proliferation

- Longer summers, hotter temperatures, and increased rainfall are creating ideal conditions for mosquitoes in regions where they previously could not thrive.
- The European Centre for Disease Prevention and Control (ECDC) reported 715 locally acquired cases of WNV across 15 countries in Europe this year, surpassing last year's figures and the continent's 10-year average.
- This shift is largely attributed to climate change, which has extended the transmission periods and expanded the habitats of mosquitoes like the *Culex pipiens* and *Aedes albopictus*.

West Nile Virus (WNV)

- It is a mosquito-borne arbovirus of the family **Flaviviridae**, belonging to the Japanese encephalitis antigenic complex.
- It has become a significant public health concern globally, including in India. This article explores the virus's transmission, symptoms, and the recent outbreak in Kerala, India.

Transmission

- West Nile virus is primarily transmitted to humans through the bites of infected *Culex* mosquitoes, which acquire the virus from infected birds, particularly migratory species.
- The virus can also infect horses and other mammals. Human-to-human transmission is rare but can occur through blood transfusions, organ transplants, and from mother to baby during pregnancy, delivery, or

breastfeeding.

Symptoms and Impact

- The incubation period for WNV ranges from 3 to 14 days. Approximately 80% of infected individuals are asymptomatic.
- However, about 20% may develop symptoms such as fever, headache, body aches, joint pains, vomiting, diarrhoea, or rash.
- Severe cases, which occur in less than 1% of infections, can lead to neuroinvasive diseases such as encephalitis or meningitis, which can be fatal, especially in individuals with weakened immune systems or comorbidities.

Preventive Measures

- Preventing WNV involves reducing mosquito exposure. Public health authorities recommend using insect repellents, wearing long-sleeved clothing, and ensuring that windows and doors are properly screened.
- Eliminating standing water where mosquitoes breed is also crucial.
- In Kerala, local bodies and district administrations have been instructed to take mosquito control measures to destroy breeding grounds.

Impact on Public Health

- The rise in mosquito-borne diseases poses significant public health challenges. WNV, for instance, can cause severe neurological complications in less than 1% of cases, leading to life-

threatening conditions such as encephalitis.

- The majority of reported cases in Europe are among individuals over 65 years old, who are more vulnerable to severe outcomes.
- Similarly, dengue fever, which causes high fever, severe headache, and joint pain, is also on the rise, further straining healthcare systems.

EUROPE'S STATE OF WATER 2024

Context

- Recently, the European Environment Agency (EEA) has released the 'Europe's State of Water 2024' highlighting the urgent need for enhanced water resilience across the continent.

About

- Pollution, habitat degradation, climate change, and overuse of freshwater are placing unprecedented pressure on Europe's lakes, rivers, coastal waters, and groundwaters,
- It reveals that only 37% of Europe's surface waterbodies achieved "good" or "high" ecological status, and just 29% attained "good" chemical status between 2015 and 2021, under the EU's Water Framework Directive.

Key Challenges

- **Protecting and Restoring Aquatic Ecosystems:** Europe's rivers, lakes, and wetlands are under significant stress from pollution, habitat destruction, and climate change.

- The report calls for robust measures to protect and restore these vital ecosystems, ensuring they can continue to provide essential services such as clean water, biodiversity, and flood protection.

- **Achieving the Zero Pollution Ambition:** Pollution remains a pervasive issue, affecting both surface and groundwater quality.

- The EEA emphasises the need for stringent regulations and innovative solutions to reduce pollutants from agricultural runoff, industrial discharges, and urban wastewater.
- Achieving the zero pollution ambition is crucial for safeguarding public health and preserving aquatic life.

- **Adapting to Water Scarcity, Drought, and Flood Risks:** Climate change is exacerbating water scarcity and increasing the frequency and intensity of droughts and floods.

- The report highlights the importance of adaptive water management strategies, including sustainable water use, improved infrastructure, and nature-based solutions to enhance resilience against these extreme events.

Solutions and Recommendations

- **Integrated Water Management:** Promoting an integrated approach to water management that considers the entire water cycle, from source to sea. This includes coordinated efforts across

sectors and regions to ensure sustainable water use and protection.

- **Investment in Green Infrastructure:** Encouraging the development and implementation of green infrastructure, such as wetlands, green roofs, and permeable surfaces, to enhance natural water retention, reduce runoff, and improve water quality.
- **Public Awareness and Engagement:** Raising public awareness about the importance of water conservation and the impacts of pollution.
 - Engaging communities in water management initiatives can foster a sense of stewardship and drive collective action.
- **Research and Innovation:** Supporting research and innovation to develop new technologies and practices for efficient water use, pollution control, and climate adaptation.
 - It includes investing in data collection and monitoring to inform evidence-based decision-making.

KLANG VALLEY

Context

- Severe flash floods hit the **Klang Valley area**, including Malaysia's capital, Kuala Lumpur temporarily suspending a Parliament session.

About

- **Klang Valley**, Malaysia's bustling urban conglomerate, is a region of significant economic, cultural, and environmental importance.

- Encompassing the capital city of Kuala Lumpur and its surrounding areas, Klang Valley is a dynamic hub that faces unique challenges and opportunities in sustainable development and environmental management.

Geographical and Economic Significance

- Klang Valley is geographically framed by the **Titivangsa Mountains** to the east and the **Strait of Malacca** to the west.
- It includes key cities such as Kuala Lumpur, Petaling Jaya, Shah Alam, and Klang. This region is the economic powerhouse of Malaysia, contributing a substantial portion of the nation's GDP through industries like finance, manufacturing, and services.

Environmental Concerns

- **Water Management:** The region has faced significant water supply challenges, particularly highlighted by the 1998 water crisis.
 - Projects like the Sungai Selangor dam have been pivotal in addressing these issues, but they also raise concerns about environmental impacts.
- **Air Pollution:** Rapid urbanisation and industrial activities have led to deteriorating air quality.
 - Efforts to mitigate pollution include stricter regulations on emissions and promoting public transportation to reduce vehicular pollution.
- **Green Spaces and Biodiversity:** Urban sprawl threatens the region's green spaces and biodiversity.

- Initiatives to preserve areas like the Bukit Nanas Forest Reserve and the Klang Gates Quartz Ridge are crucial for maintaining ecological balance.

LARGEST 3D MAP OF THE UNIVERSE

Context

- In a groundbreaking achievement, the **European Space Agency (ESA)** has unveiled the first segment of the largest 3D map of the universe, created by the **Euclid space mission**, aiming to chart the cosmos in unprecedented detail, offering new insights into the structure and evolution of the universe.

About the Euclid Mission

- Launched in 2023, the Euclid mission is a collaborative effort between ESA and NASA, designed to explore the mysterious phenomena of dark matter and dark energy.
- These elements are believed to constitute a significant portion of the universe, yet remain largely undetected and poorly understood.
- By mapping the distribution of galaxies and their movements, Euclid seeks to shed light on these cosmic enigmas.

First Cosmic Atlas

- On October 15, 2024, ESA revealed the first piece of this vast cosmic map at the International Astronautical Congress in Milan, Italy.
- This initial mosaic, a staggering 208 gigapixels in size, covers 132 square degrees of the southern sky—an area more than 500 times the size of the full Moon.

- It represents just 1% of the total survey Euclid will complete over its six-year mission.

Unveiling the Universe

- The mosaic includes 260 observations made in both visible and infrared light, capturing the shapes, distances, and motions of billions of galaxies up to 10 billion light-years away.
- This detailed mapping allows scientists to study the influence of dark matter and dark energy on the universe's expansion.
- The first segment alone contains around 100 million sources, including stars within our Milky Way and distant galaxies.

Scientific Impact

- The data from Euclid will enable astronomers to construct the most comprehensive 3D map of the universe ever made.
- This map will cover more than one-third of the sky and provide critical data to understand the universe's large-scale structure and its underlying physical processes.
- By observing how galaxies cluster and move, scientists can infer the presence and behaviour of dark matter and dark energy, offering potential breakthroughs in cosmology.

Future Prospects

- As Euclid continues its mission, the resulting 3D map will serve as a fundamental resource for astronomers and physicists worldwide.

- It will help answer fundamental questions about the universe's origin, composition, and fate.
- The mission exemplifies the power of international collaboration in advancing our understanding of the cosmos.

FRESHWATER DOLPHINS

Context

- Recently, the Union Minister of Environment, Forest and Climate Change has surveyed over 8,000 kilometres to ascertain the status of its freshwater dolphins, the Ganges and Indus species.

About the Freshwater Dolphins

- Freshwater dolphins, also known as **river dolphins**, are a unique group of cetaceans that inhabit the rivers and freshwater ecosystems of South America and Asia.
- Unlike their oceanic counterparts, these dolphins have adapted to life in murky, shallow waters, making them fascinating subjects of study and conservation.

Species and Distribution

- **Amazon River Dolphin (Inia Geoffrensis):** Also known as the boto or pink river dolphin, this species is found in the Amazon and Orinoco river basins. It is notable for its pink coloration and long snout.
- **South Asian River Dolphin (Platanista Gangetica):** This species includes the Ganges river dolphin and the Indus river dolphin, found in the river systems of India, Bangladesh, Nepal, and Pakistan.

- **Yangtze River Dolphin (Lipotes Vexillifer):** Also known as the baiji, this species was native to the Yangtze River in China but is now considered functionally extinct.

Adaptations and Behavior

- **Echolocation:** Due to the often murky waters they inhabit, these dolphins rely heavily on echolocation to navigate and hunt for prey.
- **Flexible Bodies:** Their streamlined bodies and flexible necks allow them to manoeuvre easily through complex river systems.
- **Diet:** They primarily feed on fish, but their diet can also include crustaceans and small aquatic animals.

Conservation Status

- **Habitat Destruction:** Dams, pollution, and river traffic disrupt their habitats and breeding grounds.
- **Bycatch:** Dolphins often get caught in fishing nets, leading to injuries or death.
- **Pollution:** Industrial and agricultural runoff contaminates the rivers, affecting the health of dolphin populations.

Conservation Efforts

- Organisations like the World Wildlife Fund (WWF) are actively working to protect freshwater dolphins through various initiatives:
- **Habitat Protection:** Efforts are being made to safeguard and restore river habitats.
- **Research and Monitoring:** Satellite tagging and river expeditions help track dolphin populations and behaviors.

- **Community Engagement:** Collaborating with local communities to promote sustainable practices and reduce human-dolphin conflicts.

NILAMBUR FOREST

Context

- The Nilambur forest in Malappuram district, Kerala, is seeing a drastic shift in seasonal patterns over the past decade. It has shown a number of impacts, including delayed food production and disappearance of certain bird species.

About the Nilambur Forest

- Nestled in the **Malappuram district of Kerala**, Nilambur Forest is renowned for its rich biodiversity, lush greenery, and historical significance.
- This forest is a **part of the Western Ghats, a UNESCO World Heritage site**, and plays a crucial role in the ecological balance of the region.

Ecological Significance

- Nilambur Forest is home to a variety of flora and fauna, including several endemic and endangered species.
- The forest is particularly famous for its teak plantations, which are among the oldest in the world.
- The teak from Nilambur is known for its high quality and durability, making it a valuable resource for the timber industry.

Biodiversity

- The forest supports a diverse range of wildlife, including elephants, tigers,

leopards, and various species of deer and birds.

- The rich biodiversity of Nilambur is a testament to the forest's well-preserved ecosystem.
- Efforts by the Kerala Forest Department have been instrumental in maintaining the ecological integrity of this region.

Cultural and Historical Importance

- The region is known for its ancient teak plantations, some of which date back to the British colonial period.
- The Conolly's Plot, named after H.V. Conolly, the then Collector of Malabar, is one of the oldest teak plantations in the world.

ANUSANDHAN NATIONAL RESEARCH FOUNDATION (ANRF)

Context

- Anusandhan National Research Foundation (ANRF) is expected to reorient India's innovation goals but funding issues, old mindsets remain a drag.

About the ANRF

- It represents a significant shift in India's approach to scientific research and innovation.
- Established through the **ANRF Act of 2023**, this foundation aims to provide high-level strategic direction for research, innovation, and entrepreneurship across various scientific disciplines.

Objectives and Structure

- The ANRF is designed to seed, grow, and promote research and development (R&D) throughout India's universities, colleges, research institutions, and R&D laboratories.
- It acts as an apex body, fostering a culture of research and innovation in line with the recommendations of the **National Education Policy (NEP)**.
- The foundation subsumes the **Science and Engineering Research Board (SERB)**, which was established in 2008, to streamline and enhance the research landscape in India.

Strategic Goals

- **Promoting Collaboration:** ANRF aims to forge strong collaborations among industry, academia, and government departments.
 - It includes creating an interface mechanism for the participation and contribution of industries and state governments.
- **Funding and Support:** With a proposed budget of ₹50,000 crore for 2023-28, the ANRF plans to raise ₹36,000 crore from private sources, primarily industry and philanthropists.
 - This model is inspired by the National Science Foundation (NSF) of the United States, although it faces challenges due to the traditionally low industry funding for research in India.
- **Inclusive Growth:** The foundation emphasises inclusive growth by supporting research in state universities

and colleges, which cater to over 95% of Indian students.

Challenges and Criticisms

- **Funding Issues:** Securing the required funding from private sources remains a significant hurdle. Indian industry has historically been reluctant to invest heavily in research.
- **Governance and Representation:** The governing body of the ANRF has been criticised for lacking representation from Indian industry and state universities, which are crucial for the foundation's success.
- **Operational Hurdles:** The transition from SERB to ANRF has temporarily halted calls for research proposals, affecting ongoing and new research initiatives.

Future Prospects

- The ANRF's success will depend on its ability to overcome these challenges and effectively implement its strategic goals.
- By fostering a collaborative environment and securing adequate funding, the foundation has the potential to revolutionise India's scientific research landscape and position the country as a global leader in innovation and development.

SUBJECTIVE QUESTIONS

1. How does the increasing frequency and severity of droughts worldwide impact the global energy landscape? How can governments and energy providers collaborate to develop resilient power

- grids that are less susceptible to drought-related disruptions?
2. What are the most pressing challenges India faces in addressing the rising burden of cancer, and how can these challenges be overcome to improve cancer outcomes in the country?
 3. Evaluate the potential benefits and risks associated with the introduction of genetically modified (GM) crops in India, considering the perspectives of both farmers and consumers. Should the government prioritise the development of GM crops to address food security concerns, or should it focus on sustainable agricultural practices and support for small-scale farmers?
 4. Discuss the environmental and social implications of traditional steel production. Evaluate the potential of emerging technologies and sustainable practices to mitigate these impacts.
 - (d) Ministry of Health and Family Welfare
 3. Which one of the following institutes recently released the second edition of the 'All-India Rural Financial Inclusion Survey 2021-22'?
 - (a) National Bank for Agriculture and Rural Development (NABARD)
 - (b) Agriculture and Sustainable Rural Development (ASRD)
 - (c) Indian Council of Agricultural Research (ICAR)
 - (d) Department of Rural Development
 4. *Klang Valley*, sometimes appeared in news, located in which of the following:
 - (a) Taiwan
 - (b) Japan
 - (c) Indonesia
 - (d) Malaysia
 5. Which one of the following recently has unveiled the first segment of the largest 3D map of the universe?
 - (a) National Aeronautics and Space Administration (NASA)
 - (b) Indian Space Research Organisation (ISRO)
 - (c) European Space Agency (ESA)
 - (d) China National Space Administration (CNSA)

MCQS

1. The term 'LT-LEDS' sometimes appeared in the news, is primarily in context of:
 - (a) Wireless Technology
 - (b) Net Zero Emission
 - (c) Installing LED Light
 - (d) Mitigating Light Pollution
2. The 'Genetic Engineering Appraisal Committee (GEAC)' in India functions under which of the following:
 - (a) Ministry of Science and Technology
 - (b) Ministry of Chemicals and Fertilisers
 - (c) Ministry of Environment, Forests and Climate Change

Answer Key: _____

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

