

## SUMMARY OF DOWN TO EARTH

[01 – 15 August, 2024]

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**SUBJECTIVE QUESTIONS**

**MCQS**

## COMBATING AIR POLLUTION IN INDIA

### Context

- India continues to grapple with drastically **poor air quality with PM2.5 concentrations** exceeding the WHO annual guideline by more than 10 times.

### About

- Air pollution is a critical issue in India, impacting both human health and the environment.

### Major Air Pollutants

- **Particulate Matter (PM2.5 and PM10):** These tiny particles suspended in the air can penetrate deep into our lungs and cause respiratory problems.
- **Carbon Monoxide (CO):** A colourless, odourless gas produced primarily from vehicle exhaust and incomplete combustion.
- **Ozone (O3):** A secondary pollutant formed when sunlight reacts with other pollutants. It can irritate the respiratory system.
- **Sulphur Dioxide (SO2) and Nitrogen Oxides (NOx):** Emitted from burning fossil fuels, industrial processes, and vehicular emissions.
- **Black Carbon (BC):** Fine particulate matter produced from incomplete combustion of fossil fuels and biomass.

### Sources of Air Pollution in India

- **Vehicular Emissions:** The rapid increase in vehicles contributes significantly to air pollution, especially in urban areas.
- **Coal-Based Power Plants:** These plants release pollutants like SO<sub>2</sub>, NO<sub>x</sub>, and particulate matter.
- **Industrial Activities:** Fossil fuel consumption in industries, including brick kilns, also adds to pollution.
- **Agricultural Activities:** Fertiliser application and farm fires release pollutants.
- **Biomass Burning:** Cooking using traditional stoves (chulhas) and waste burning contribute.
- **Construction Activities:** Dust from construction sites is a significant source.

- **Unregulated Sources:** Landfills, roadside burning, and unregulated small industries play a role.

### Health Impact

- Over 140 million people in India breathe air with PM2.5 levels exceeding WHO safe limits.
- WHO recommends a standard of 10 µg/m<sup>3</sup>, but more than 60% of India's districts exceed 40 µg/m<sup>3</sup> annually.
- Air pollution-related diseases impose a substantial health and economic burden, particularly in less developed states.

### Regulatory Framework

- India has established a robust regulatory framework to address air pollution. The **Central Pollution Control Board (CPCB)** plays a pivotal role in implementing and enforcing pollution control measures.
- The **Air (Prevention and Control of Pollution) Act, 1981:** It was enacted to prevent, control, and abate air pollution. It provides the legal basis for regulating emissions, setting standards, and monitoring air quality. It has been amended over the years to strengthen its provisions.
- **National Ambient Air Quality Standards (NAAQs):** The CPCB sets NAAQS to define acceptable levels of pollutants in the ambient air. These standards set permissible limits for pollutants like PM2.5, CO, NO<sub>x</sub>, SO<sub>2</sub>, and lead and guide pollution control efforts across the country.
- **State Pollution Control Boards:** Each state has its own pollution control board that works in coordination with the CPCB. These boards monitor air quality, issue permits, and enforce regulations.

### National Clean Air Programme (NCAP)

- It was launched in 2019 by MoEFCC to improve air quality in Indian cities, targeting 131 Indian cities with high pollution levels. It includes:
  - National Solar Mission

- National Mission for Enhanced Energy Efficiency
- National Mission on Sustainable Habitat
- National Water Mission
- National Mission for Sustaining the Himalayan Ecosystem
- National Mission for a Green India
- National Mission for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change
- Initially, these cities were required to reduce particulate concentration by **20-30% by 2024** (compared to the base year of 2017). Later, the target was **revised to 40% by 2025-26** (using the base year of 2019-20).

### Financial Support

- The **15th Finance Commission** provided **direct grants to 42 cities and seven urban agglomerates** (with populations over 1 million) for anti-pollution measures.
- **MoEFCC** allocated funds for the remaining cities, totaling ₹20,000 crore for the five-year period until 2025-26.

### Action Plans and Performance

- **Customised Action Plans:** Each state government and city had to create action plans based on pollution source studies.
- **Performance-Linked Funding:** Funding was tied to performance — cities needed to demonstrate improved air quality and an increase in 'good' air days (with an air quality index below 200).

### Focus on Paraphernalia vs. Action

- The focus on setting up infrastructure and administrative processes (paraphernalia) has sometimes overshadowed the actual actions needed to combat air pollution.

### Problem with NCAP

- The NCAP **primarily measures PM10** as the

key pollutant that is often dust-related, and becomes problematic when coated with toxins from sources like vehicle emissions and industrial activities.

- However, **PM2.5 (even smaller particles)** is more harmful and associated with serious health issues, including heart diseases.

### Major Initiatives

- **Vehicle Emission Standards:** The adoption of Bharat Stage (BS) emission standards has significantly reduced vehicular emissions. Moving toward cleaner fuels and promoting electric vehicles are essential steps.
- **Industrial Pollution Control:** Stringent regulations govern industrial emissions. Industries must comply with emission norms and install pollution control equipment.
- **Urban Planning and Green Spaces:** Cities need better urban planning to reduce congestion and promote green spaces. Tree planting, parks, and green belts help absorb pollutants.
- **Promotion of Public Transport:** Encouraging public transport, cycling, and walking reduces the reliance on private vehicles and lowers emissions.
- **Clean Energy Transition:** Shifting from fossil fuels to renewable energy sources is crucial. Solar power, wind energy, and hydropower contribute to cleaner air.
- **Construction and Dust Control:** Construction activities generate dust. Implementing dust control measures at construction sites is essential.

### Way Forward

- **Governmentalisation of Air Pollution Agenda:** The focus on addressing air pollution should not be merely bureaucratic or administrative; it must lead to meaningful action. It implies that government agencies and policies play a central role in tackling air pollution.
- **Air Pollution as an Equaliser:** Air pollution affects everyone, regardless of socioeconomic status. Both the rich and the poor are impacted.

Unlike water pollution, where wealthier individuals can afford alternatives (such as bottled water), air pollution is unavoidable for all.

- **Public Awareness and Advocacy:** There is a need to recognise that even modest reductions in pollution levels can significantly improve life expectancy. Advocacy, education, and community participation are crucial.
- **Clean Energy Transition:** Promoting renewable energy sources and phasing out fossil fuels is essential. Investment in public transportation and electric vehicles can curb vehicular emissions.
- **Urban Planning and Green Spaces:** Cities need better planning to reduce congestion and promote green areas. Urban forests, parks, and green belts can act as natural air filters.
- **Stringent Enforcement:** Strict implementation of emission norms for industries and vehicles is non-negotiable. Monitoring and penalising violators are critical.

## MONOCULTURE IN INDIA

### Context

- A law graduate in Bihar promotes agroforestry to help the farmers of his village break free from paddy monoculture.

### About the Monoculture

- Monoculture refers to the practice of cultivating a single crop or species over a large area of land. While it has its advantages in terms of efficiency and economies of scale, it also comes with significant risks and challenges.
- In India, monoculture has both historical roots and contemporary implications.

### Historical Context

- **Green Revolution and High-Yielding Varieties (HYVs):** In the mid-20th century, India underwent the Green Revolution, which aimed to increase agricultural productivity through the adoption of HYVs of crops like wheat and rice. While this led to substantial yield gains, it also

promoted monoculture by emphasising specific crop varieties.

- **Cash Crops and Export-Oriented Agriculture:** India's focus on cash crops (such as cotton, sugarcane, and tobacco) for export markets has often led to monoculture. These crops are grown extensively in certain regions, sometimes at the expense of diverse food crops.

### Contemporary Challenges

- **Loss of Biodiversity:** Monoculture reduces biodiversity. When vast areas are dedicated to a single crop, native plant species, insects, and other organisms suffer. This loss of biodiversity affects ecosystem resilience and stability.
- **Pesticide Dependency:** Monocultures are susceptible to pests and diseases. Farmers often rely heavily on chemical pesticides and fertilisers, leading to environmental pollution and health risks.
- **Water Stress:** Monoculture demands consistent irrigation, which strains water resources. In water-scarce regions, this exacerbates the problem.
- **Soil Degradation:** Continuous cultivation of the same crop depletes soil nutrients, affecting soil health and fertility.

### Regional Perspectives

- **Punjab and Haryana:** Known as the 'Granaries of India', these states exemplify monoculture. Wheat and rice dominate, but this has led to groundwater depletion, soil degradation, and health issues due to pesticide use.
- **Tea Plantations in Assam:** Assam's tea estates represent another form of monoculture. While tea is a major industry, it has ecological consequences, including deforestation and soil erosion.

### Moving Forward

- **Crop Diversification:** Encouraging farmers to diversify crops can mitigate the risks of monoculture. Agroforestry, mixed cropping, and intercropping are promising approaches.

- **Sustainable Practices:** Promoting organic farming, conservation agriculture, and integrated pest management can reduce reliance on chemicals.
- **Awareness and Education:** Educating farmers and consumers about the benefits of biodiversity and sustainable practices is crucial.

## AGRICULTURE AND BIODIVERSITY CONSERVATION

### Context

- In Budget 2024-25, the Union Finance Minister announced numerous announcements for agriculture and biodiversity conservation.

### Efforts Biodiversity Conservation

- The allocation for **biodiversity conservation** has **increased** from Rs 3.5 crore in 2023-24 to Rs 5 crore in 2024-25.
- The allocation for the **conservation of natural resources and ecosystems** has **increased** from Rs 25 crore in 2023-24 to Rs 43.50 crore in 2024-25.
- The funding for **wildlife habitat development** has **increased** from Rs 239.60 crore to Rs 290 crore.
- The allocation for **Green India Mission - National Afforestation Programme** has **increased** from Rs 119.43 crore to Rs 170 crore.
- The budget for the **National Biodiversity Authority (NBA)** has been **reduced** to Rs 16 crore from Rs 16.4 crore.

### Initiatives

- **National Mission for a Green India (GIM):** As part of the **National Action Plan on Climate Change (NAPCC)**, the GIM aims to protect, restore, and enhance India's forest cover.
  - It involves plantation activities in both forested and non-forest areas. By promoting sustainable afforestation, the GIM contributes to carbon sequestration and climate resilience.
  - It focuses on afforestation, biodiversity conservation, and sustainable forest management. It's heartening to see efforts

to enhance India's green cover and combat climate change

- **Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI):** This initiative, undertaken through the **National Coastal Mission**, focuses on mangrove restoration. Mangroves play a crucial role in carbon storage and shoreline protection.
  - MISHTI not only helps combat climate change but also provides livelihood opportunities for local communities.
- **Changes in Biodiversity Laws:** Recent amendments to **India's Biodiversity Act** aim to create a conducive environment for research and investments. While these changes have sparked discussions, they need to align with climate concerns and commitments.

### Agriculture and Climate Resilience

- The Ministry of Agriculture and Farmers Welfare has been allocated Rs 1,32,470 crore, which is **2.7% of the total budgeted expenditure**. It is an **increase of 5%** from the revised estimate of Rs 1,26,666 crore for 2023-24.
- Despite this, the budget for the **Department of Agricultural Research and Education** has **increased** by only 0.6% from the revised estimates of 2023-24. It is negligible compared to the 9% increase in 2023-24.

### Key Considerations

- **Post-Cop26 Strategies:** After the COP26 climate summit, discussions around Indian agriculture and food systems have intensified.
  - It's crucial for India to prepare and act strategically to address climate challenges in this sector.
- **Budget Allocations:** In the Union Budget for 2024-25, the MoEFCC received an allocation of Rs 3,330.37 crore.
  - Notably, the **National Tiger Conservation Authority's budget was more than doubled**, emphasising the importance of wildlife conservation.

- Other bodies, such as the Central Pollution Control Board and the National Coastal Mission, also received increased funding.

### 1.5% PEOPLE DISPLACED WORLDWIDE: UNEP

#### Context

- The UN Environment Programme (UNEP), in its recent report *'Navigating New Horizons: A Global Foresight Report on Planetary Health and Wellbeing'* has announced emerging challenges that may disrupt life on Earth.

#### Key Findings of the Report

- It says that already, **one in 69 people, or 1.5% of the global population**, is forcibly displaced.
  - Climate change, alongside conflicts and violence, is a dominant reason.
- Rising temperatures, sea levels, and extreme weather threaten the availability of habitable environments.
- Additionally, **emerging zoonotic diseases** could trigger **another pandemic by 2030** because of **factors like deforestation, wildlife trafficking and unsustainable agricultural practices**, which increase the risk of zoonosis.
- Emissions from increased satellite launches are **damaging the ozone layer**, and greater space activity threatens key communications and satellites, with impacts likely **within seven years**.
- The **EU, US, and China** are researching **Solar Radiation Management (SRM)** to cool the Earth by reflecting sunlight into space, but SRM poses **risks such as acid rain and altered precipitation patterns**, potentially occurring within seven years.

#### Other Important Findings

- **Triple Planetary Crisis (Three Interconnected Challenges):** These crises are accelerating, and their combined impact threatens planetary health and human wellbeing. These are:
  - **Climate Change:** The urgent need to address global warming and its impact on ecosystems, weather patterns, and human societies.

- **Biodiversity and Nature Loss:** The loss of species, habitats, and ecosystem services due to human activities.

- **Pollution and Waste:** The detrimental effects of pollution (air, water, soil) and unsustainable waste management.

#### Eight Critical Global Shifts

- **Technological Transformation:** Advances in technology (like AI, biotechnology, and automation) impact our environment and society.
- **Social and Demographic Changes:** Population growth, urbanisation, and changing demographics influence resource use and resilience.
- **Economic Shifts:** The transition to sustainable economies and circular models is crucial.
- **Governance and Institutions:** Adaptive governance and international cooperation are essential for addressing global challenges.
- **Environmental Stewardship:** Protecting natural resources and ecosystems is vital.
- **Health and Wellbeing:** Recognizing the link between human health and planetary health.
- **Cultural and Behavioural Shifts:** Changing attitudes and behaviours toward sustainability.
- **Equity and Justice:** Ensuring fair distribution of benefits and burdens.

#### Signals of Change

- These signals help us anticipate and respond to emerging challenges. The report gathers insights from global experts and consultations with stakeholders, including youth.
- It highlights **18 'signals of change'**—early indicators of potential disruptions or positive transformations.

#### Call to Action

- The report urges us to prioritise long-term prosperity over short-term gains.
- It emphasises the interconnectedness of our systems and the need for anticipatory action.

- Solutions lie in cooperation, innovation, and a new social contract.

### GROUNDWATER DEPLETION IN INDIA

#### Context

- Recently, Indian Institute of Technology (IIT), Gandhinagar found that North India accounted for **95% of groundwater depletion** in the country in 2002-21.
  - It also found that the **monsoon rainfall decreased by 8.5% from 1951 to 2021** and winters got drier, hampering groundwater recharge across northern India.

#### About the Groundwater Depletion in India

- Groundwater, often referred to as the **'invisible water'** plays a vital role in India's water supply. It supports **agriculture, industry, and domestic needs** across the country.
- However, unsustainable extraction practices, population growth, and climate change have led to significant groundwater depletion.
- The **'INDIA-Groundwater Resource Estimation System (IN-GRES)'** is a collaborative effort by the Central Ground Water Board (CGWB) and State/UT Ground Water Departments to assess dynamic groundwater resources in India.

#### Methodology for Assessment

- It involves evaluating annual replenishable groundwater resources (recharge), annual groundwater draft (utilisation), and the percentage of utilisation concerning recharge (stage of development).
- Thematic maps, geo-hydrological data, and GIS technology are used to understand surface hydrology and aquifer behaviour.

#### Status of Groundwater

- India heavily relies on groundwater, which constitutes nearly 62% of irrigation and 85% of rural water supply.
- As per the CGWB's Assessment (2023), total annual groundwater recharge for the entire country increased to 449.08 BCM, marking an

11.48 BCM rise compared to the previous year (2022).

- Annual groundwater extraction stood at 241.34 BCM.

#### Scale of the Problem

- India is the largest user of groundwater globally, accounting for about 25% of the world's total groundwater extraction. Over the years, excessive pumping has caused aquifers to decline rapidly, especially in regions with intensive agriculture.

#### Uranium Contamination

- A recent report by the CGWB highlighted that groundwater in **12 Indian states contains elevated levels of uranium** beyond permissible limits. Uranium concentrations in shallow groundwater range from 0 to 532 parts per billion (ppb).
- **Punjab is the worst-affected state**, with nearly 29% of wells contaminated with uranium. The concentration of uranium in some wells **exceeds safe levels** prescribed by the Bureau of Indian Standards (BIS) and the World Health Organization (WHO).
- Other states like **Haryana, Uttar Pradesh, Rajasthan, and Delhi** also face toxic uranium levels in their groundwater.

#### Causes of Groundwater Depletion

- **Agricultural Overuse:** Agriculture consumes around 80% of India's groundwater. Unregulated tube wells and inefficient irrigation methods lead to over-extraction.
- **Urbanisation:** Rapid urban growth increases demand for water. Cities rely heavily on groundwater, often without proper recharge mechanisms.
- **Industrial Demand:** Industries also draw heavily from aquifers, impacting local water tables.
- **Lack of Regulation:** Weak enforcement of groundwater regulations exacerbates the problem.

## Consequences

- **Drying Wells:** Many wells have gone dry, affecting farmers' livelihoods.
- **Land Subsidence:** Over-pumping causes land subsidence, damaging infrastructure.
- **Salinization:** In coastal areas, excessive extraction leads to saltwater intrusion.
- **Ecological Impact:** Reduced groundwater affects ecosystems and biodiversity.

## Solutions

- **Recharge Structures:** Building check dams, percolation tanks, and rainwater harvesting systems can recharge aquifers.
- **Crop Pattern Changes:** Promoting less water-intensive crops and efficient irrigation practices.
- **Regulation:** Strengthening groundwater management through policies and monitoring.
- **Community Participation:** Involving local communities in sustainable water use.

### MEASURING THE COST OF FARMING

## Context

- The ongoing debate on legalising Minimum Support Price (MSP) has drawn focus on calculating the right price for farmers' produce.

## About the MSP

- It is like a safety net for our farmers—a floor price at which the government commits to buying their produce.
- It's based on a calculation that ensures farmers receive at least one-and-a-half times the cost of production incurred by them.
- Essentially, it's a way to shield farmers from market volatility and provide them with a minimum assured income.

## Understanding the Cost of Cultivation

- **Input Costs:** The cost of cultivation includes expenses related to seeds, fertilisers, pesticides, and other material inputs. A recent survey found a sharp increase in cultivation costs during the kharif season due to rising input costs. These costs directly impact farmers' profitability.

- **Labour and Mechanization:** Labour costs, both hired and family-based, significantly contribute to the overall cost of farming. Additionally, farm mechanisation plays a crucial role. Adequate access to cost-effective machinery can help offset wage-push inflation in Indian agriculture.
- **Comprehensive Studies:** The **Central Sector Plan Scheme**, 'Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in India' has been in place since 1971. These studies provide valuable insights into the economic aspects of farming.

## Why Is MSP Important?

- **Price Stability:** MSP acts as a stabiliser, preventing sharp price fluctuations. When market prices dip, farmers can still sell their crops to the government at the MSP, avoiding distress sales.
- **Surety for Farmers:** Announced before the sowing season, MSP gives farmers clarity—they know what price they can expect for their produce. This helps them make informed decisions.
- **Crop Diversification:** By setting MSPs for various crops, the government encourages diversification. For instance, increased MSPs for pulses and oilseeds promote their domestic production, reducing import dependence.
- **Food Security:** Grains procured at MSP play a crucial role in government schemes like PM-POSHAN, ICDS, and TPDS. These programs rely on affordable food supplies.

## Challenges and Limitations

- **Lack of Legal Guarantee:** Unlike sugarcane, where MSP payment has some statutory backing, most other crops lack a legal basis for demanding MSP.
- **Cost of Production Calculation:** Critics argue that the formula (1.5 times the cost of production) should be applied more rigorously, considering comprehensive costs (C2) rather than just A2+FL (actual paid-out costs plus imputed family labour).



- **Data Gaps:** The body responsible for recommending MSP—the Commission for Agricultural Costs and Prices (CACP)—doesn't conduct field-based cost estimates itself.
- **Uneven Implementation:** MSP benefits are highly skewed across states. While Punjab and Haryana see extensive procurement, other states lag behind.
- **Awareness Gap:** Shockingly, only 10% of farmers are aware of MSP prices before the sowing season.

### Call for Legalisation

- In India, farm losses are not covered by Budgetary support or remunerative prices.
- **Farmers' Rights:** Enforceable through courts, legal MSP rights empower farmers.
- **Private Sector Participation:** Improved price realisation from private buyers could boost rural economies.
- **Smart Farming:** Diversification away from select crops helps manage input costs and promotes climate-smart agriculture.

### Moving Forward: Price of Food Must Figure in the Policy

- **Food Price and Poverty:** A high price of food affects not only farmers but also consumers. For poor households, food constitutes a significant portion of their budget. When food prices rise, it squeezes out spending on other essential items like health, education, and non-agricultural goods. This, in turn, hampers the growth of the non-agricultural economy.
- **Economy-Wide Impact:** The consequences of expensive food extend beyond individual households. In the long term, high food prices can hinder industrialisation. Fortunately, in countries that have grown economically, the relative price of food has tended to decline over time.
- **Balancing Profitability and Affordability:** India needs an agricultural policy that ensures farming profitability without burdening consumers with exorbitant food costs. The availability of food from domestic sources is crucial, but it should

not come at the expense of affordability for the average citizen.

### MASS CORAL BLEACHING EVENT

#### Context

- Since the start of 2023, more than two-thirds of the world's reefs have been subjected to unprecedented heat stress which could lead to the fourth mass coral bleaching event.

#### About the Coral Bleaching

- Coral reefs are the rainforests of the sea, hosting the highest biodiversity of any ocean ecosystem. It is estimated that about **one in four, or 25%, of all known marine species are associated with reefs** at some point in their lives.
- Corals are actually colonies of tiny animals called polyps. These polyps live in a symbiotic relationship with plant-like organisms called **Zooxanthellae**.
- The zooxanthellae provide food to the corals through photosynthesis, and in return, the corals offer shelter.
- When corals are stressed — often due to rising sea temperatures — they expel their zooxanthellae, leaving them pale and vulnerable.
- The **climate models** predict that **nearly every reef on the planet** will experience bleaching annually sometime **between 2040 and 2050**.

#### Factors Contributing to Coral Bleaching

- **El Niño:** During El Niño events, warm ocean currents move towards the western Pacific, causing sea surface temperatures to rise.
  - Since early 2023, water temperatures have risen significantly, with some areas experiencing up to 5°C increases.
  - The Great Barrier Reef, one of the most iconic coral systems, has been baking under unprecedented heat.
  - Warm water corals are sensitive creatures, and prolonged exposure to elevated temperatures can lead to widespread bleaching and even mortality.

- **Ocean acidification:** Increasing levels of carbon dioxide in the atmosphere weaken coral skeletons and hinder coral growth and reproduction.

### Impacts

- **Great Barrier Reef:** The fifth mass bleaching event on the Great Barrier Reef was confirmed in March 2024. The reef has been experiencing extensive bleaching events since 2016.
  - This natural wonder, stretching over 2,300 kilometres off Australia's coast, has suffered severe bleaching. While corals can recover if stress diminishes, prolonged events threaten their survival.
- **Pacific coast near Mexico:** The second major coral bleaching crisis of the decade affected reefs across 54 nations in all major ocean basins, with coral mortality reaching up to 93% in some areas.
- **Florida:** Some reefs in Florida have completely died off due to rising temperatures.
- **Atlantic, Pacific, and Indian Ocean basins:** Bleaching-level heat stress has been extensive across these basins.
- **Ecosystem Vulnerability:** Corals support a quarter of marine life, making them crucial for biodiversity. Their loss would be devastating for coastal fisheries and economies.

## Prelims

### SOAPSTONE MINING

#### Context

- Soapstone mining near Reema village in Uttarakhand's Bageshwar district has put the ecology and population at risk.

#### About Soapstone

- **Soapstone (aka steatite or talc)** is a **metamorphic rock rich in magnesium and silica**. It has been used for centuries in various applications due to its unique properties, including heat resistance, softness, and ease of carving.

### Soapstone Mining Locations in India

- **Rajasthan:** The state of Rajasthan is a significant producer of soapstone. Places like Udaipur and Alwar have active soapstone mines.
- **Uttarakhand:** The hills of Uttarakhand also yield soapstone. The region around Dehradun is notable for its deposits.

### Applications

- **Artistic and Craftsmanship:** Its softness and ease of carving make it popular for sculptures, ornaments, and handicrafts.
  - Archaeological excavations reveal that soapstone was used extensively in ancient India. Artefacts made from soapstone have been found in Harappan sites, indicating its use for utensils, figurines, and seals.
- **Architectural Applications:** Soapstone countertops, sinks, and fireplaces are valued for their heat resistance and natural beauty.
  - Soapstone has been a preferred material for carving intricate sculptures and temple architecture. The temples of Khajuraho, Elephanta Caves, and various South Indian temples feature soapstone carvings.
- **Cookware, Countertops Sinks, Lamps and Candle Holders:** Soapstone cookware, such as tawas (flat griddles) and kadhai (woks), is popular in Indian households. It distributes heat evenly and retains it for longer.

### AVIAN INFLUENZA (H7N5)

#### Context

- Germany reported the spread of a rare strain of avian influenza, H7N5 affecting 6,047 domestic birds.

#### About the Avian Influenza

- It is caused by influenza viruses that primarily infect birds. These viruses are divided into various subtypes, such as **H5N1, H5N3, and H5N8**.
- The genetic characteristics of these viruses evolve rapidly, making them a complex and ever-changing threat.

- Avian influenza occurs worldwide, but the prevalence of different subtypes varies across regions.

### Severity in Poultry

- **Low Pathogenicity Avian Influenza (LPAI):** This subtype typically causes little or no clinical signs in birds.
- **High Pathogenicity Avian Influenza (HPAI):** HPAI can lead to severe clinical signs and high mortality rates in infected poultry.

### Transmission and Spread

- **Movement of Infected Birds:** Birds shed the virus in their faeces and respiratory secretions. Direct contact with these secretions, contaminated feed, or water can lead to transmission.
- **Live Bird Markets:** Farming and sale of live birds in markets can facilitate virus transmission.
- **Wild Birds and Migratory Routes:** Migratory waterfowl, in particular, serve as natural reservoirs for avian influenza viruses.
  - Changes in ecology and epidemiology have led to infections in various wild bird species, which then spread the virus along established migratory routes.

### Impact on Humans

- While avian influenza primarily affects birds, sporadic cases in humans have been identified.
- When avian influenza viruses circulate in poultry, there's a risk of transmission to humans.
- However, human infections are relatively rare and often associated with close contact with infected birds.

### Economic Consequences

- Outbreaks of avian influenza have devastating consequences for the poultry industry. When outbreaks occur in domestic birds, the policy often involves culling all poultry—whether infected or healthy—to contain the spread.
- Unfortunately, this results in heavy economic losses for farmers and long-lasting impacts on their livelihoods.

## BIODIVERSITY BEYOND NATIONAL JURISDICTION AGREEMENT

### Context

- Recently, India signed the Biodiversity Beyond National Jurisdiction Agreement (aka High Seas Treaty).

### About the BBNJ Agreement (aka High Seas Treaty)

- It is a landmark international agreement aimed at the conservation and **sustainable use of marine biological diversity** in areas beyond national jurisdiction.
- It is a **significant step** towards protecting the ocean, promoting equity and fairness, tackling environmental degradation, and preventing biodiversity loss in the high seas.
- It was **adopted by consensus** at the **5th BBNJ Intergovernmental Conference** in New York in March 2023.
  - Currently, it has been signed by representatives from more than 80 countries.
- It is **expected** that the treaty can **enter into force** by the June 2025 **UN Ocean Conference in Nice, France**.

### Key Provisions of the Treaty

- It sets up a procedure to establish large-scale marine protected areas in the high seas.
- It establishes the sharing of benefits from marine genetic resources.
- Clear rules to conduct environmental impact assessments before human activities take place in the high seas are also part of the agreement.
- It foresees capacity building and the transfer of marine technology between the Parties.

### Importance of High Seas

- **Areas beyond national jurisdiction** (often referred to as the high seas) comprise around two-thirds of the ocean's surface and 95% of its volume.

- These areas provide invaluable ecological, economic, social, cultural, scientific, and food-security benefits to humanity.
- Despite their importance, these areas have been vulnerable to over-exploitation and degradation due to the lack of a comprehensive legal framework.



**TRIBES IN TARAL METTA MOUNTAIN**

**Context**

- Tribal communities of Alanar village in **Dantewada, Chhattisgarh**, held a protest against the granting of a lease for mining in **Taral Metta mountain** in their area.

**About**

- **Taral Metta Mountain**, located in the **Dantewada district of Chhattisgarh**, holds immense **cultural and ecological significance** for the tribal communities residing in the region.
- These communities have a deep-rooted connection to the mountain, considering it not only as their ancestral land but also as a sacred space associated with their deities.

**Concerns and Struggle**

- **Environmental Degradation**: The potential mining activity threatens the delicate ecological balance of Taral Metta. The mountain harbours diverse flora and fauna, and any mining operation could irreversibly harm this fragile ecosystem.

- **Cultural Heritage**: Beyond environmental concerns, the mountain holds cultural and spiritual significance for the tribal communities.
  - It is home to their deities, and any disruption caused by mining would be a direct assault on their cultural identity.

**GLOBAL CLIMATE RISK INDEX**

**Context**

- The latest Global Climate Risk Index, prepared by **Germanwatch**, identifies **India as among the seven countries** that suffered most from extreme weather events during 2000-19.

**About the Global Climate Risk Index**

- It is an annual analysis that assesses the extent to which countries have been affected by weather-related loss events such as storms, floods, and heat waves.
- Unfortunately, there was no Climate Risk Index compiled in 2022 and 2023 due to a temporary lack of data.

**Key Highlights of the Report**

- **Extreme Weather Impacts**: The index highlights the impact of extreme weather events on different countries and regions. It serves as a warning, urging nations to be prepared for more frequent and severe events in the future.
  - Even high-income countries are feeling the effects of climate change more acutely than ever before. This underscores the urgency of global climate action.
- **Countries Most Affected**: In 2019, Mozambique, Zimbabwe, and the Bahamas were among the countries hit hardest by weather-related losses.
  - When considering data from 2000 to 2019, Puerto Rico, Myanmar, and Haiti ranked highest in terms of vulnerability to climate impacts.
- **Climate Change Performance Index (CCPI)**: Apart from the Climate Risk Index, Germanwatch also publishes the Climate Change Performance Index. This index evaluates and compares the climate protection efforts of 63 countries and the European Union, which

together account for over 90% of global emissions.

- CCPI monitors progress in climate mitigation and provides insights into how countries are addressing climate change.
- **Global Boiling:** In 2022, India experienced extreme events on 314 of the 365 days. The number increased to 318 days in 2023.
  - According to the **‘Economic Survey 2023-24’**, it is alarming as agriculture employs 42.3% of the country’s population and has a share of **18.2% in its GDP**.
  - Consecutive, large-scale crop losses, triggered by unpredictable and extreme weather, are becoming increasingly common as the planet enters the era of **‘global boiling’**.

**NATIONAL INITIATIVE ON CLIMATE RESILIENT AGRICULTURE (NICRA)**

**Context**

- Farmers find it difficult to adopt measures that require financial and technical support. Agro-chemical-based solutions show sustainability concerns.

**About the NICRA**

- It is a significant project launched by the Indian Council of Agricultural Research (ICAR) in 2011.

- Its primary goal is to enhance the resilience of Indian agriculture to climate change and variability through strategic research, technology demonstrations, and capacity building.
- **Districts at climate risk:** Across India, 310 districts may be majorly vulnerable to climate impacts in 2020-49. The impacts include changes in precipitation, floods, rise in temperature, drought and land degradation.

**Key Objectives**

- **Adaptation and Mitigation Research:** NICRA strategically investigates adaptation and mitigation measures. This includes identifying the most vulnerable districts or regions, developing climate-resilient crop varieties, and assessing the impact of climate change on livestock, fisheries, and poultry.
- **Technology Demonstrations:** Location-specific technologies are demonstrated in climatically vulnerable districts. These demonstrations aim to showcase practical solutions that farmers can adopt to cope with climate challenges.
- **Awareness and Capacity Building:** NICRA conducts extensive training programs across the country to educate stakeholders—farmers, extension workers, and policymakers—about climate change and resilient technologies. The goal is to enable wider adoption of climate-resilient practices and improve agricultural yields.

**Achievements**

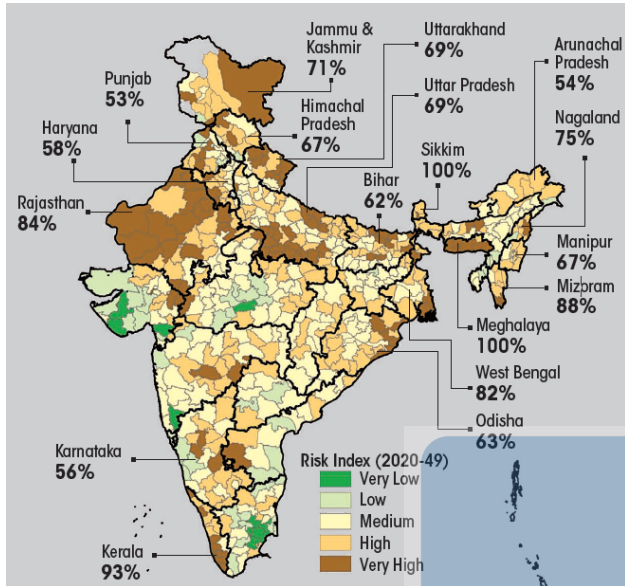
- **Climate-Resilient Varieties:** NICRA has developed seven climate-resilient crop varieties that can withstand adverse climatic conditions.
- **District Agricultural Contingency Plans:** NICRA has created 650 district agricultural contingency plans, which serve as guidelines for managing climate-related risks.
- **Infrastructure Facilities:** State-of-the-art infrastructure facilities have been established across various ICAR institutes. These include High Throughput Plant Phenomics, Free Air Temperature Enrichment (FATE), Free Air CO2

**Climate-induced weather vagaries will be detrimental for Indian agriculture**

<p><b>70%</b> rural Indian households depend on agriculture for livelihood</p>	<p><b>86%</b> of farmers own less than 2 hectares of land</p>
<p><b>55%</b> of net sown area is rainfed</p>	
<p>Rainfed regions support <b>44%</b> of food requirement</p>	
<p><b>60%</b> of livestock needs</p>	
<p><b>61%</b> of farmers primarily depend on rain for agriculture</p>	

Enrichment (FACE), and other specialised equipment for climate change research.

- **Custom Hiring Centers:** NICRA has set up custom hiring centres in 121 villages to ensure timely availability of farm implements for efficient operations.



**Climate-Resilient Practices**

- **Tolerant Crops:** Developing and promoting drought-tolerant crop varieties is crucial. For instance, early maturing and drought-tolerant cultivars of green gram, chickpea, and pigeon pea have been successfully introduced in specific regions, resulting in higher yields.
- **Livestock and Poultry Breeds:** Identifying and promoting breeds that can thrive in varying climatic conditions is essential. Local or indigenous breeds often exhibit better foraging abilities and resilience.
- **Soil Health Management:** Practices like conservation agriculture and building soil organic carbon contribute to climate resilience. Healthy soils enhance plant growth and productivity.

**PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY)**

**Context**

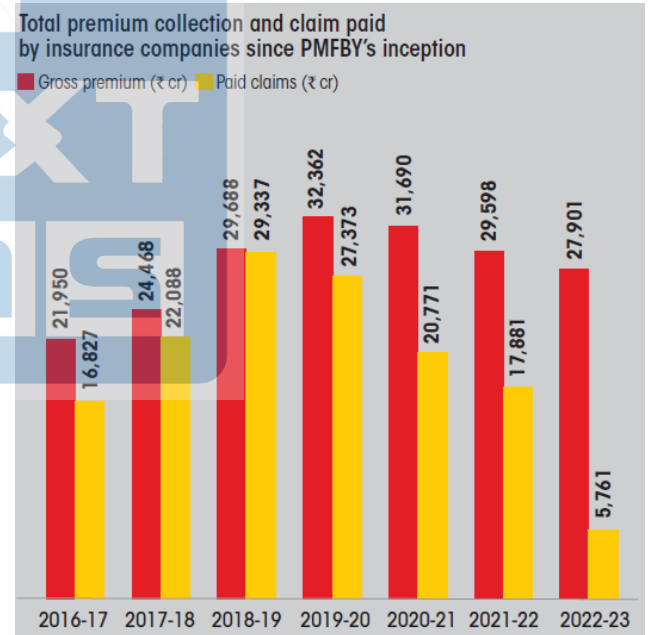
- Only 30% of the gross cropped area in the country is insured under Pradhan Mantri Fasal Bima Yojana (PMFBY). Paid claims under the scheme have dipped over the years even as premiums remain high.

**About the PMFBY**

- It aims to provide financial support to farmers who face crop loss or damage due to natural calamities.
- It covers both pre-harvest and post-harvest losses arising from events like cyclones, unseasonal rains, pests, and diseases.

**Key Features**

- **Area Approach Basis:** PMFBY operates on an area-based approach, ensuring comprehensive risk cover for crops across regions.
- **Affordable Premiums:** The scheme significantly reduces the burden of premium payments for farmers.
- **Expanded Coverage:** It covers a wide range of crops and integrates multiple stakeholders, including farmers, insurance companies, and government departments.



- **Advanced Technologies:** PMFBY promotes the use of technology to estimate losses accurately and expedite claim payments.
- **Increased Sum Insured:** The sum insured is now closer to the actual cost of production, providing better compensation to farmers in case of losses.
- **Farmer-Friendly Provisions:** PMFBY reduced premiums and expanded coverage, making it more accessible to farmers.

## Challenges

- **Assessment of Crop Loss:** Some gaps exist in assessing crop losses. Inadequate sample sizes and lack of ground-level sampling can compromise accurate evaluation.
- **State Disparities:** While some states have seen improvements, others still face low sum insured relative to production costs.
- **Flawed Execution:** The CSE study found shortcomings in Haryana, Tamil Nadu, and Uttar Pradesh. These included inadequate sampling and corruption during implementation.
- **Vulnerable Regions:** Farmers in vulnerable areas like Bundelkhand and Marathwada may not receive claims even if more than half of their crops are damaged.

## SUBJECTIVE QUESTIONS

1. How effective have government policies and initiatives been in addressing the escalating air pollution crisis in India? What potential improvements are needed?
2. To what extent has monoculture farming contributed to the decline of biodiversity and soil health in India? Discuss the long-term implications of this practice and potential strategies for promoting more sustainable agricultural systems.
3. How can agricultural practices be modified to promote biodiversity conservation while ensuring food security in India? Discuss the challenges and potential solutions, considering factors such as land use, crop rotation, and agroforestry.
4. What are the primary factors contributing to the alarming rate of groundwater depletion in India, and what are the long-term consequences of this trend for agriculture, water security, and the overall environment?
5. How accurately do current methods measure the true cost of farming in India, considering factors such as externalised environmental costs, unpaid family labour, and government subsidies?

## MCQS

1. With reference to the *National Mission for a Green India (GIM)*, consider the following statements:
  1. It is a part of the National Action Plan on Climate Change (NAPCC).
  2. It aims to improve air quality in Indian cities.
 Which of the statements given above is/are correct?
  - (a) 1 only
  - (b) 2 only
  - (c) Both 1 and 2
  - (d) Neither 1 nor 2
2. Recently a report '*Navigating New Horizons: A Global Foresight Report on Planetary Health and Wellbeing*' has announced emerging challenges that may disrupt life on Earth, was published by:
  - (a) World Wide Fund for Nature
  - (b) International Union for Conservation of Nature
  - (c) Intergovernmental Panel on Climate Change
  - (d) UN Environment Programme
3. With reference to *Soapstone*, consider the following statements:
  1. It is a metamorphic rock rich in magnesium and silica.
  2. Rajasthan and Uttarakhand are the major producers in India.
 Which of the statements given above is/are correct?
  - (a) 1 only
  - (b) 2 only
  - (c) Both 1 and 2
  - (d) Neither 1 nor 2
4. Recently, the *Taral Metta Mountain* was in news, is located in:
  - (a) Rajasthan
  - (b) Chhattisgarh
  - (c) Odisha
  - (d) Madhya Pradesh

5. The 'Global Climate Risk Index' was prepared and released by:
- Germanwatch
  - World Meteorological Organisation
  - Food and Agriculture Organisation
  - United Nation Environment Programme
6. With reference to the 'Biodiversity Beyond National Jurisdiction Agreement', consider the following statements:
- It is also known as the High Seas Treaty.
  - It aimed at the conservation and sustainable use of marine biological diversity.

Which of the statements given above is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

**Answer Key :**

1. (c) 2. (d) 3. (c) 4. (b) 5. (a) 6. (c)

