

ENVIRONMENT GS PAPER III

Global Nitrous Oxide (N₂O) Assessment Report

- The Global Nitrous Oxide Assessment has recently been published by the United Nations Environment Programme & the Food and Agriculture Organization.
- It is the first international report focused solely on N₂O in more than a decade.

Crucial Insights on the Global Nitrous Oxide (N₂O) Assessment Report

Key Findings

- **Global Warming Impact:**
 - N₂O currently contributes 0.1°C to global warming.
 - Its continued increase in emissions makes it impossible to limit warming to 1.5°C.
- **Anthropogenic Emissions:**
 - Increased by 40% since 1980, with 75% originating from agriculture (synthetic fertilizers and manure).
- **Ozone Depletion and Health Risks:**

The Gothenburg Protocol:

- The **Gothenburg Protocol (was adopted in 1999)** was established to address pollutants that cause acidification and ground-level ozone.
- It sets limits on air pollutants including sulfur dioxide, nitrogen oxide, ammonia and volatile organic compounds that are hazardous to human health and the environment

- N₂O is the leading ozone-depleting substance, increasing harmful UV exposure.
- Raises risks of cataracts (0.2–0.8%) and skin cancer (2–10%).
- **Abatement measures:** The report highlighted that currently, available abatement measures could reduce N₂O emissions by more than 40 per cent below current levels.
- **Emissions Sources:**
 - **Agriculture:** It is currently the source of 75% of those emissions, of which approximately 90% comes from the use of synthetic fertilisers and manure on agricultural soils and 10% from manure management.
 - **Industry:** Industrial sources account for approximately 5% of emissions, and the remaining 20% come from fossil fuel combustion, wastewater treatment, aquaculture, biomass burning, and other sources.
- **Rise in Emissions:** Atmospheric abundance of the gas has risen by over 20% since pre-industrial era; its mean annual growth rate over the past five years (2017–2021) was 1.2 parts per billion a year and was nearly twice that of the early 2000s (2000–2004).

Suggested Measures

- **Agriculture:** Use of enhanced-efficiency fertilisers, nitrification inhibitors, & slow-release formulations can reduce emissions.
- **Industry:** Industries can eliminate N₂O emissions by adopting existing and relatively low-cost abatement measures that could cost \$1,600-6,000 per tonne of nitrous oxide.
- **Fossil Fuel Reduction:** Transition to renewable resources in transportation & energy production.
- **Manure Management:** Balance nutrient inputs in animal feed, reduce grazing intensity, & apply anaerobic digestion of manure.
- **Multilateral Options:** Adopting targets like the **Gothenburg Protocol** on ammonia & nitrogen oxides under the Convention on Long Range Transboundary Air Pollution.
- **Transformations in food production:** Transformations in food production and societal systems could lead to even deeper reductions in Nitrous Oxide emissions.

Nitrous Oxide and Its Absorbent Sinks

About Nitrous Oxide (N₂O)

- It is a Greenhouse gas (GHG) **300 times more potent** than carbon dioxide (CO₂).
- It has the **third-highest concentration**, after CO₂ and methane (CH₄), in Earth's atmosphere among GHGs responsible for global warming.
- It can **live in the atmosphere for up to 120-125 years** and is approximately 270 times more powerful than carbon dioxide per tonne of emission at warming the Earth.

Absorbent "Sinks" of Nitrous Oxide

- **Soils:** Microbial processes in soils can consume and reduce N₂O emissions.
 - Denitrifying bacteria convert N₂O to nitrogen gas (N₂) under anaerobic conditions.
- **Oceans:** Deeper and subsurface oceans absorb N₂O from the atmosphere through dissolution at the air-sea interface.
 - Marine phytoplankton play a role in consuming dissolved N₂O

- **Stratosphere:** N₂O reacts with ozone (O₃) which leads to the formation of nitrogen oxides (NO_x) and ultimately nitrogen gas (N₂).

ENVIRONMENT GS PAPER III

Adarsh Gaushala: India's first self-sufficient gaushala with Compressed Biogas (CBG) plant

The Adarsh Gaushala, Gwalior MP has achieved a landmark feat with the establishment of India's first modern, self-sufficient gaushala that houses a state-of-the-art **Compressed Biogas (CBG) plant**.

About Compressed Biogas (CBG)

- It is a **renewable gaseous fuel** produced through the anaerobic digestion of organic matter like agricultural residues, animal dung, food waste, and municipal solid waste.

About Gwalior's Compressed Biogas (CBG) Plant

- **Capacity:** It can process 100 tons of cattle dung daily to produce 2-3 tons of Bio-CNG. 10-15 tons of bio-manure for organic farming.
- It incorporates **windrow composting** for additional organic waste processing.
- **Windrow Composting:** It is a method of composting that involves piling organic waste into long rows, called windrows, and turning them regularly to improve the compost.

- **Production:** It requires purification of biogas (to remove impurities like carbon dioxide, hydrogen sulphide, and moisture).
- This refined and compressed gas, containing over 90% methane, becomes CBG, boasting properties similar to conventional compressed natural gas (CNG).
- **Properties:**
- Calorific value & properties similar to Compressed Natural Gas (CNG).
- Serves as a green, renewable fuel.
- **Applications:** It can replace CNG in automotive, industrial, & commercial sectors.

Government Initiatives for Compressed Biogas (CBG)

- **Phased Mandatory Blending of CBG:** It was announced in 2024 Interim Budget → CBG with CNG (transportation) and PNG (domestic use) → Transition to a green gas-based economy & Address environmental degradation and promote cleaner energy sources.
- **National Policy on Biofuels 2018:** It emphasises on promotion of advanced Biofuels including CBG.
- **Galvanizing Organic Bio-Agro Resources Dhan (GOBAR-DHAN) Scheme:** It aims to convert cattle dung and solid waste in farms to Bio-CNG (CBG) and compost.
- **Central Financial Assistance for Bio-CNG:** Notified by the Ministry of New and Renewable Energy.
- Financial assistance under the program is available for Biogas generation, Bio CNG generation, Power generation from MSW, Biomass Gasifier etc.
- **SATAT Initiative:** It promotes entrepreneurs to set up Compressed Biogas plants, produce and supply CBG to Oil Marketing Companies for sale as automotive & industrial fuels.
- **RBI priority sector lending:** It includes loans (up to ₹50 crore) for start-ups setting up CBG plants.
- **IREDA Business Plan (2022–2026):** It includes financial assistance for CBG in its disbursement targets.

GS PAPER 2- INTERNATIONAL RELATIONS-EFFECT OF POLICIES AND POLITICS OF DEVELOPED AND DEVELOPING COUNTRIES ON INDIA'S INTERESTS, INDIAN DIASPORA

Adani's Global Expansion and India's Reputation

The article discusses how the Adani Group's global expansion, supported by the Indian government, has raised concerns over crony capitalism, corruption, and reliance on foreign finance. It criticizes the government's involvement in backing the group's questionable practices, damaging India's global reputation.

What is the Adani Group's global strategy?

1. The Adani Group has expanded globally, investing in projects from Australia to Greece, Bangladesh to Kenya, and beyond.
2. Its ventures, like ports and power projects, are supported by the Indian government as part of India's geopolitical and geo-economic strategy.
3. For instance, the U.S. partnered with Adani, providing \$533 million in financing for a port project in Sri Lanka to counter China's influence.
4. An Indian diplomat even described this support as "geo-strategic," using Adani's projects to enhance India's foreign policy goals.
5. However, critics argue that this has promoted crony capitalism, where political connections benefit certain businesses. The Indian government has been compared to **South Korea's chaebol model**, supporting global expansion of large businesses with state backing. Critics argue that India's version lacks accountability compared to South Korea.

How has crony capitalism evolved in India?

1. Crony capitalism in India began during the licence-permit-control era and later shifted to public-private partnerships and regulatory policies.
2. Political-business ties remain strong, with businesses relying on political support to secure contracts domestically and abroad.

What legal and financial issues has the Adani Group faced?

1. Unlike China, which uses its own funds to expand globally, Indian firms depend on Western financial markets.
2. This dependence exposes them to foreign laws and legal risks, like anti-bribery regulations. A U.S. grand jury indictment highlights these issues.
3. Similar concerns have arisen globally:
4. **Sri Lanka:** Reviewing an Adani power project.
5. **Kenya:** Plans to cancel an Adani airport expansion project.
6. **Bangladesh:** High Court ordered a probe into Adani's power agreement.

What are the broader implications for India?

1. The government's overt support for Adani has blurred the line between promoting national business interests and enabling unethical practices.
2. Indian firms like Tata and Infosys built strong global reputations through ethical practices and consistent effort. In contrast, Adani's issues have harmed "Brand India," undoing decades of progress in building the global equity of Indian businesses.
3. Critics call for action to restore trust and ensure ethical practices in business-government relations.

GS PAPER 3-SCIENCE AND TECHNOLOGY – DEVELOPMENTS AND THEIR APPLICATIONS AND EFFECTS IN EVERYDAY LIFE

Concerns about Big Tech's dominance in AI

The article highlights concerns about Big Tech's dominance in AI due to high costs, data monopolies, and integrated services. It suggests shifting focus from "bigger is better" AI models to smaller, purpose-driven AI guided by theory, expertise, and progressive goals.

What is the concern about Big Tech's dominance in AI?

1. **High Computational Costs:** Building deep learning models is expensive. For instance, the Gemini Ultra model cost \$200 million to train, making it nearly impossible for smaller companies to compete.
2. **Dependence on Big Tech:** Smaller players rely on Big Tech for compute credits, deepening their dominance.
3. **End-to-End Services:** Big Tech offers integrated tools for tasks like data preparation and algorithm access, making their platforms more convenient and cost-effective.
4. **Data Monopoly:** Big Tech collects vast, continuous data streams across domains and geographies, creating a competitive edge. Open data initiatives often fail as Big Tech leverages public data more effectively.
5. **Control Over Research:** Big Tech now leads academic research, surpassing universities in publications and citations, influencing AI's direction.
6. **Missed Opportunities:** Initiatives like the Global Development Compact fail to rethink the paradigm, reinforcing the "bigger is better" model without addressing systemic issues.

What is the Proposed Shift in AI Development?

1. **Emphasis on Small AI:** The shift suggests moving away from massive data-driven models, like Gemini Ultra, which costs about \$200 million to train, towards smaller, targeted models that focus on specific societal needs.
2. **Theory of Change:** This approach advocates for AI development guided by causal relationships and hypotheses testing, rather than sheer data volume.
3. **Domain Expertise:** It prioritizes the use of domain knowledge and lived experiences to inform AI development, ensuring that models are relevant and effectively address real-world challenges.
4. **Purpose-Driven Models:** By focusing on specific goals, these smaller models can be more sustainable and democratic, offering alternatives to Big Tech's monopolistic practices.

GS PAPER II INDIAN POLITY AND GOVERNANCE

Govt. notifies Telecom Cybersecurity Rules

Recently, the Ministry of Communications notified the Telecommunications (Telecom Cyber Security) Rules, 2024 introducing stringent security measures and increased accountability for telecom entities.

Cybersecurity

- It is the **practice of protecting systems, networks, and programs** from digital attacks.
- These cyberattacks are usually **aimed at accessing, changing, or destroying sensitive information;** extorting money from users through ransomware; or interrupting normal business processes.

Key Provisions under Telecom Cybersecurity Rules

- **Key Measures:**
 - Specifies timelines for telecom companies to report security incidents & make disclosures.

- Empowers the central government or its authorised agency to seek traffic data (excluding message content) from telecom entities for cybersecurity purposes.
- **Obligations for Telecom Entities:**
 - Must appoint a Chief Telecommunication Security Officer.
 - Required to report security incidents within six hours of discovery, along with relevant details of the incident.
- **Incident Reporting:** Within 24 hours, telecom entities must provide detailed information, including:
 - Number of users affected.
 - Duration and geographical area impacted.
 - Network or service functionality impact.
 - Remedial actions taken or planned.
- **IMEI Registration Rule:**
 - Manufacturers of equipment with International Mobile Equipment Identity (IMEI) numbers must register the number of such equipment with the government before their first sale in India.

Indian Telecom Sector & Associated Laws

- **Sub-sectors of The Telecommunications industry:** Infrastructure, Equipment, Mobile Virtual Network Operators, White Space Spectrum, 5G, Telephone service providers, & Broadband.
- India's Telecom industry is the **second largest in the world** with a subscriber base of 1.19 Bn (Sept 2024)
- **Primary Laws:**
 - **The Indian Telegraph Act, 1885:** In 2003, the Universal Service Obligation Fund (USOF) was set by amending the Indian Telegraph Act, 1885.
 - The Indian Wireless Telegraphy Act, 1933.
 - **The Telegraph Wires (Unlawful Possession) Act, 1950** was repealed by the Repealing and Amending Act, 2023 to reflect regulatory adaptability.
- **Regulatory Authorities:** The TRAI Act, 1997 established Telecom Regulatory Authority of India (TRAI) for tariff regulation and created the Telecom Disputes Settlement and Appellate Tribunal (TDSAT).
- **Licensing Authority:** Central Government.
- **Government Initiatives in Telecom Sector:**
 - **Prime Minister Wi-Fi Access Network Interface (PM-WANI), 2020:** It aims to create public Wi-Fi hotspots, especially in rural and remote areas.
 - **Bharatnet Project, 2011:** It aims to provide broadband connectivity to all Gram Panchayats in India.
 - **Production Linked Incentive (PLI) Scheme, 2021:** It aims to boost domestic manufacturing
 - **Bharat 6G Alliance, 2023:** It aims to position India as a global leader in 6G technology R&D.

PRELIM FACTS

1.S.C statement on Socialism and secularism in India and the Preamble Amendment

Recently, the Supreme Court recently gave statement on a challenge to the inclusion of the terms “socialist” and “secular” in the Constitution’s Preamble, added by the 42nd Amendment during the Emergency era. However, the final judgement is still awaited.

About the court’s observation

Chief Justice of India (CJI) Sanjiv Khanna emphasized that:

- i) Socialism in India signifies a welfare state ensuring equality of opportunity and is not akin to dictatorial ideologies.
- ii) It accommodates both individualism and private sector growth alongside public sector contributions, as reflected in various constitutional Articles.
- iii) Secularism is a fundamental aspect of the Constitution’s Basic Structure, alongside socialism and cannot be detached. The Preamble, amendable under Article 368 is an integral part of the Constitution and evolves to align with national welfare goals.
- iv) The judgment reaffirmed that secularism which is rooted in principles like equality and fraternity and is intrinsic to the Constitution’s ethos and cannot be compromised.
- v) In the previous judgements also, the court emphasized secularism is intrinsic to the Constitution’s Basic Structure with terms like ‘equality’ and ‘fraternity’ reflecting its essence.

Concept of socialism and secularism in Preamble

1. The concepts of **socialism** and **secularism** are explicitly mentioned in the **Preamble of the Indian Constitution**. Both principles emphasize the democratic and inclusive framework of the Constitution. These terms were added through the 42nd Amendment Act, 1976.

2. **Socialism** signifies the commitment to social and economic justice, aiming to reduce inequality in wealth, status, and opportunities.

3. **Secularism** ensures that the state treats all religions equally without favoring or discriminating against any faith.

Socialism and secularism in Indian Constitution

1. Fundamental rights: The Indian Constitution reflects its commitment to socialism and secularism through various provisions. Socialism is upheld via Fundamental Rights like Article 14 (equality before law), Article 21 (right to life and socio-economic rights), and Article 23 (prohibition of forced labor).

2. Directive Principles of State Policy (DPSP): It is also mentioned as Directive Principles of State Policy (DPSP) such as Article 38(1) (justice-based social order), Article 39 (equitable wealth distribution), Article 41 (right to work and education), and Article 46 (upliftment of weaker sections). Public sector undertakings and welfare schemes under Articles 39(b) and 39(c) further embody socialism.

3. Fundamental rights: Secularism is supported by Fundamental Rights like Article 15 (no religious discrimination), Article 25 (freedom of religion), Article 27 (no taxes for religious promotion), and Article 28 (restrictions on religious instruction in state institutions).

4. Directive Principles of State Policy (DPSP): Article 44 in the DPSP advocates a Uniform Civil Code, and Article 51A(e) emphasizes harmony beyond religious divides.

2. Marine Fisheries Census 2025

On World Fisheries Day 2024, the Centre launched transformative initiatives in the fisheries sector, including the **Marine Fisheries Census 2025** and the **National Plan of Action on Sharks**

About Marine Fisheries Census:

- **History of Census:**
 - **1948-49:** Initial survey by CMFRI on village-wise fishing data.
 - **1980 Census:** Covered **2132 villages, 333,038 households**, and **1442 fish landing centers**.
 - **2005 Census:** Collaboration between CMFRI and DAHDF, covering **3202 villages**.
 - **2010 Census:** Expanded coverage to **3288 villages**, emphasizing socio-economic data.
 - **2016 Census:** Joint effort by CMFRI and DAHDF, encompassing **1.2 million households**.
- **Department Involved:**
 - Conducted by CMFRI and the **Union Ministry of Fisheries**, with support from **3,500 staff** for the 2025 census.
- **Features of 2025 Census:**
 - Fully **digital** process using **mobile apps** and virtual servers for real-time data collection.
 - Covers **1.2 million households** across India's coastline, including remote locations like **Bitra Island** and **Campbell Bay**.
 - Collects data on **household sizes, socio-economic status, and fisherfolk engagement**.
 - **80% faster** data processing compared to previous censuses.

National Plan of Action on Sharks (NPOA-SHARKS):

- This is a follow-up of the International Plan of Action for Sharks, a **voluntary instrument** adopted by the **Food and Agriculture Organization** of the United Nations in
- **Scope:**
 - Conservation and sustainable management of shark populations based on an **Ecosystem Approach to Fisheries (EAF)**.
 - Covers **sharks, skates, rays, and chimaeras** within India's **EEZ**, territorial waters, and the High Seas by Indian-flagged vessels.
 - Aims to bridge research gaps, understand socio-economic implications, and manage negative impacts of shark fishing.

3. International Criminal Court

The International Criminal Court issued arrest warrants for the Israeli Prime Minister and his former defense chief, as well as a Hamas leader, for alleged war crimes and crimes against humanity in the Gaza conflict.

About International Criminal Court (ICC):

- **Establishment:** Created by the Rome Statute in 1998; began operations in 2003.
- **Headquarters:** Located in The Hague, Netherlands.
- **Purpose:** Prosecutes individuals for **genocide, war crimes, crimes against humanity, and crimes of aggression**.
- **Membership:** 123 countries recognize ICC authority; key non-members include the **US, China, Russia, and India**.
- **Structure:**
 - **Judges:** 18 judges elected for non-renewable nine-year terms.
 - **Presidency:** Comprises a President and two Vice-Presidents.
 - **Registry:** Manages administrative and operational support.
- **Jurisdiction:**
 - Covers crimes committed in **member states or by nationals** of member states.
 - Operates only when national courts are unable or unwilling to act.

- Jurisdiction applies only to crimes committed after July 1, 2002.
- **Relationship with UN:**
 - **Not a UN body** but cooperates through agreements.
 - The UN Security Council can refer cases to the ICC if outside its jurisdiction.

4.Nova, An AI-Powered Humanoid

Nova, an AI-powered humanoid, is revolutionizing education at a government school in Punalur, Kerala. With multilingual capabilities and a focus on improving communication skills, the humanoid provides an engaging, interactive learning experience, introducing children to advanced technology.

About Humanoid Robot:

- **Nova:** AI-powered humanoid designed to assist in education.
- **Capabilities:** Speaks four languages (English, Malayalam, Hindi, Arabic) and interacts with students using GPT-4o technology.
- **Focus:** Enhances communication skills, encourages curiosity, and familiarizes students with technology.

UPSC Relevance:

- **GS Paper II (Governance):** Role of technology in education and skill enhancement.
- **GS Paper III (Science & Tech):** AI applications in education and social sectors.
- **Essay:** Technology and its transformative impact on learning.

5.Ranthambore Tiger Reserve

The recent conflict between tigers and villagers near the Ranthambore Tiger Reserve in Rajasthan highlights the challenges of human-wildlife coexistence.

- **Overcrowding, habitat overlap, and inadequate management** have led to tragic incidents, emphasizing the need for balanced conservation strategies and human safety measures.

About Ranthambore Tiger Reserve (RTR):

- **Location:** Situated at the confluence of the Aravallis and Vindhyas, near Sawai Madhopur, Rajasthan.
- **Area:** Covers 1,411 sq. km, making it one of northern India's largest tiger reserves.
- **History:** Former royal hunting grounds of Jaipur's Maharajas; designated a Project Tiger Reserve in 1973.
- **Geography:** Includes steep rocky hills, Padam Talab, Raj Bagh Talab, rivers Chambal and Banas, and the Great Boundary Fault.
- **Flora:** Tropical dry deciduous forests and thorny landscapes dominated by Dhok trees and grasslands.
- **Fauna:** Home to Bengal tigers, leopards, sloth bears, striped hyenas, marsh crocodiles, and over 250 bird species.
- **Tourism Significance:** A popular destination for wildlife enthusiasts, contributing significantly to local livelihoods.

6.High-Altitude Sickness

The recent death of a trekker in Uttarakhand due to respiratory failure highlights the critical dangers posed by high-altitude sickness in the Himalayas.

What is High-Altitude Sickness?

- **Definition:** High-Altitude Sickness, also known as Acute Mountain Sickness (AMS), occurs when the body struggles to acclimatize to low oxygen levels at elevations above 8,000 feet (2,400 meters).
- **Types:**
 - **HAPE:** High-Altitude Pulmonary Edema (fluid in lungs).
 - **HACE:** High-Altitude Cerebral Edema (fluid in brain).
- **Symptoms:** Headache, nausea, fatigue, shortness of breath, confusion, and, in severe cases, coma.

Why Does It Happen?

- **Low Oxygen Levels:** Reduced oxygen in the air leads to hypoxia in body tissues.
- **Physiological Strain:**
 - Hyperventilation increases breathing rate.
 - Thicker blood due to increased red blood cell production strains the heart.
- **Rapid Ascent:** Climbing too quickly without acclimatizing exacerbates risks.

Preventive and Mitigative Measures:

- **Gradual Ascent:**
 - Rest every 3-4 days at altitudes above 3,000 meters.
 - Avoid sleeping elevation increases of more than 500 meters per day.
- **Medications:**
 - **Acetazolamide:** Enhances acclimatization.
 - **Dexamethasone:** Reduces severe inflammation.
 - **Nifedipine:** Preventive for those prone to HAPE.

ANSWER WRITING

Q. "The growing dominance of Big Tech companies in AI development poses significant challenges to smaller players." Analyse the key factors contributing to Big Tech's dominance in AI and propose measures to counter this trend.

Big Tech companies like Google, Microsoft, and Amazon dominate the AI ecosystem, leveraging their vast resources, data, and infrastructure. While their advancements drive innovation, this monopoly creates significant barriers for smaller players.

Challenges Posed by Big Tech Dominance in AI

- **High Computational Costs:** The development of advanced AI models demands exorbitant computational resources, unaffordable for smaller players.
For example: Training models like **Gemini Ultra (2023)** costs over **\$200 million**, leaving new entrants reliant on Big Tech for compute credits.
- **Data Monopolies:** Big Tech's access to vast datasets enables them to create superior AI models, disadvantaging smaller players.
For example: Google's use of **search engine data** gives it a unique edge in developing language models like **Bard**.
- **Infrastructure Dependency:** Comprehensive developer tools and cloud infrastructure offered by Big Tech create a lock-in effect.
For example: **AWS** and **Microsoft Azure** dominate more than **50%** of the **global cloud market**, making it expensive for smaller players to operate independently.
- **Decline in Academic Role:** Big Tech's dominance in AI publications shifts research priorities from public good to commercial interests.
- **Barrier to Public Data Initiatives:** Commercial capture of public data initiatives often benefits resource-rich Big Tech over smaller entities.
For example: Open data platforms often struggle to ensure equitable access, allowing Big Tech to disproportionately reap benefits.

Key Factors Contributing to Big Tech's Dominance

- **Economies of Scale:** Big Tech's capacity for large-scale AI investments gives them a significant edge over smaller competitors, driving faster innovation and deployment.
For example: **Microsoft's \$13 billion** investment in **OpenAI** highlights the financial gap in the AI ecosystem.
- **Global Reach:** Their broad market presence enables swift global deployment of AI solutions, ensuring wide-scale adoption and impact.
For example: **Google Maps** integrates AI into **120+ countries**, enhancing its services and user data acquisition.
- **Vertical Integration:** Big Tech dominates the entire AI pipeline, managing everything from data collection and processing to model development and deployment.
For example: **Amazon's Echo** devices gather user data to improve the performance and personalization of its AI-powered assistant, **Alexa**.
- **Talent Acquisition:** Big Tech attracts the best talent, leaving smaller players with limited access to skilled professionals.
For example: **OpenAI** pays their AI researchers up to **\$10 million** a year, creating a brain drain from startups and academia.
- **Regulatory Gaps:** The lack of robust policies allows **Big Tech** to consolidate power without adequate oversight or accountability.
For example: Lack of global AI regulation allows companies to shape AI development without accountability.

Measures to Counter Big Tech Dominance

- **Promote Digital Public Infrastructure:** Governments must create accessible AI platforms and resources to level the playing field.
For example: India's **Digital India initiative** aims to foster innovation through sovereign data platforms.
- **Support Startups and SMEs:** Incentivize AI startups through funding, tax benefits, and public-private partnerships.
For example: **France's La French Tech** program supports over **10,000 startups**, driving local innovation.
- **Foster Open-Source Development:** Encourage the use of open-source AI tools and datasets to democratise access.
For example: The **Hugging Face** platform enables small developers to use pre-trained models.
- **Enforce Antitrust Regulations:** Implementing stricter competition laws can **curb monopolistic practices**, promoting fair market competition and protecting consumer interests.
For example: The **EU's Digital Markets Act** targets Big Tech dominance by ensuring fair market competition.
- **Encourage Localised AI Solutions:** Develop AI tailored to regional needs to reduce reliance on global giants.
For example: India's **Bhashini Project** promotes AI development focused on **local languages**, aiming to enhance language inclusivity and improve digital accessibility across diverse linguistic communities.

To counter Big Tech's dominance in AI, India is advancing initiatives like the GI Cloud (MeghRaj), the National AI Strategy, and the IndiaAI Mission. These efforts aim to democratise access, foster an inclusive ecosystem, and ensure equitable AI development and global competitiveness.

MCQ

1. Consider the following statements about the Global Alliance Against Hunger and Poverty:
 1. It was launched during the Brazil G20 Summit in 2024.
 2. Membership includes countries, international organizations, financial institutions, and NGOs.
 3. Operational funding is solely provided by the Food and Agriculture Organization (FAO).
 How many of the above statements is/are correct?
 - a) Only one
 - b) Only two**
 - c) All three
 - d) None
2. Consider the following statements regarding Solar Energy Corporation of India (SECI):
 1. It was established under the Ministry of Power.
 2. It is responsible for implementing the National Solar Mission (NSM).
 3. Its mandate was expanded to include the entire renewable energy sector.
 How many of the above statements is/are incorrect?
 - a) Only one**
 - b) Only two
 - c) All three
 - d) None
3. Which of the following is a unique feature of the Marine Fisheries Census 2025?
 - a) Exclusive focus on marine fish species diversity.
 - b) Use of drones for mapping fishing zones.
 - c) Fully digital data collection using mobile apps and virtual servers.**
 - d) Collection of data limited to the economic status of fisherfolk.
4. Consider the following:
 1. Statement-I: The United Nations Security Council (UNSC) can refer cases to the ICC even if the crimes occurred outside the jurisdiction of the ICC.
 2. Statement-II: The ICC is a judicial body under the United Nations and operates within its framework.
 Which one of the following is correct in respect of the above statements?
 - a. Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
 - b. Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
 - c. Statement-I is correct but Statement-II is incorrect**
 - d. Statement-I is incorrect but Statement-II is correct
5. Consider the following statements regarding the actions under National Plan of Action on Sharks (NPOA-SHARKS):
 1. It advocates species cataloging through genetic coding and indicator development.
 2. It encourages the unrestricted promotion of shark fishing for export revenue.
 Which of the above statements is/are correct?
 - a) 1 only**
 - b) 2 only
 - c) Both 1 and 2
 - d) Neither 1 nor 2
6. Socialism in India includes which of the following?
 1. Providing equality of opportunity for all citizens
 2. Ensuring the well-being of the population
 3. Individual rights and freedoms
 4. Prioritizing state-led economic growth over private enterprise
 Select the correct answers using the codes given below:
 - a. 1 and 2 only
 - b. 1, 2 and 3 only**
 - c. 1, 3 and 4 only
 - d. 1, 2 and 4 only
7. India has recently launched the first indigenous antibiotic drug named 'Nafithromycin' for:
 - a. Treating drug-resistant bacterial infections**
 - b. Treating tuberculosis (TB)
 - c. Treating viral infections
 - d. Treating fungal infections
8. Consider the following statements:
 1. Coking coal is a key raw material for steel production.
 2. India is heavily dependent on imports of coking coal.
 3. Coking coal is included in the list of critical minerals.
 Which of the statements given above are correct?
 - a. 1 and 2 only**
 - b. 2 and 3 only
 - c. 1 and 3 only
 - d. 1, 2 and 3
9. Blue Transformation Initiative aims to:
 - a. Promote the expansion of deep-sea mining activities for economic growth.
 - b. Establish exclusive marine zones for industrial fishing operations.
 - c. Focus on improving traditional fisheries management practices without integrating new technologies.
 - d. Enhance sustainable aquatic food systems to ensure food security and livelihoods.**
10. Consider the following statements:
 - a. Organic waste is the third largest source of anthropogenic methane emissions.
 - b. The Global Methane Pledge (GMP) aims to increase methane capture and utilization in agriculture by 50% by 2025.
 Which of the statement(s) given above is/are correct?
 - a. 1 only**
 - b. 2 only
 - c. Both 1 and 2
 - d. Neither 1 nor 2