Dark Side of Artificial Intelligence

Why in news?

A recent study by Yale School of Environment sheds a darker light on the new-age technology's energy use, especially in terms of immediate environmental impact.

Artificial Intelligence
• Artificial Intelligence (AI) refers to the development of computer systems of performing tasks that require *human intelligence*. • AI aids, in processing amounts of data identifying patterns and making decisions based on the collected information. • **Techniques**-AI can be achieved through techniques like Machine Learning, Natural Language Processing, Computer Vision and Robotics. • **Range of abilities**- It includes learning, reasoning, perception, problem solving, data analysis and language comprehension. • **Ultimate goal**- To create machines that can emulate capabilities and carry out diverse tasks, with enhanced efficiency and precision.

What are the key highlights of the study on AI's carbon footprint?

- **Impact on environment**- The unregulated carbon footprint of artificial intelligence (AI) could significantly undermine the progress towards Sustainable Development Goals (SDGs) and emission reduction targets.
- **Reverse global efforts**- The unchecked growth of AI could lead to increased energy and resource consumption, potentially reversing global efforts to combat climate change.
- **Hinders SDG-** The energy intensive nature of training and operating AI models contribute to GHG emissions, which if not managed properly can hinder the achievement of SGGs, particularly those related to
    - **SDG 7**- Affordable and clean energy
    - **SDG 13**- Climate action
    - **SDG 12-** Responsible consumption and production
- **Excessive water consumption-** There is a need of substantial water usage by AI computing systems, particularly for cooling purposes and to generate electricity for AI.

  The study states that 10 to 50 responses from ChatGPT-3 use up around half a litre of water.

- **Use of clean water**- The larger the AI system, the greater the need for water to maintain operational temperatures and functionality.

- **Water usage by tech giants**- . In 2022, Google's water consumption for cooling its data centres reached nearly 20 billion litres, this was a 20% increase from the previous year. Similarly, Microsoft's water usage rose by 34%.
- **Impact on India**- As the number of data centres by such tech giants around the world increases and AI is expected to be embedded in all aspects of life, the freshwater stock is likely to be gravely hit, especially in countries like India.
- **World Water Development report, 2023**- The UN states that the world is looking at an *"imminent risk of global water shortage"* with two to three billion people worldwide fighting the issue.
- **Environment cost-** The carbon emissions from the energy required to run these centres, and the environmental toll of manufacturing and disposing of electronic waste, the overall impact is indeed significant.
- **Energy consumption-** According to the International Energy Agency, the data centres (around 9000 to 11,000 in the world) electricity consumption by 2026 will reach up to 1,000 terawatts roughly equivalent to Japan's current total electricity consumption.

As per London-based International Electrotechnical Commission (IEC) by 2027, the AI industry could be using up as much natural resources and energy as a country the size of the Netherlands.

- **Lack of transparency**- The lack of comprehensive data and the absence of standardized regulations make it challenging to develop effective measures to monitor and manage AI's energy use.

What are the consequences of AI's carbon footprint?

- **Climate change**- AI's carbon footprint contribute to GHG emissions, this can lead to more *frequent and severe weather events*, disruption to ecosystems and adverse effects on human health and livelihoods.
- **Resource depletion-** The energy and resources required to train and deploy AI models contribute to resource depletion, including water, minerals, and *fossil fuels*.
- **Economic costs-** The environmental impact of AI's carbon footprint can lead to economic costs associated with climate mitigation and adaptation efforts.
- **Social inequities-** The consequences of climate change disproportionately *affect vulnerable populations* including low income communities and marginalized group.
- **Technological lock-in**- Heavy reliance on *energy-intensive AI models and infrastructure* can create technological lock-in, making it challenging to transition to more sustainable alternatives.

What lies ahead?

- **Sustainable AI-** Polices and regulations must incentivize the adoption of sustainable AI practices such as investing in renewable energy sources and energy-efficient technologies.
- **Promote transparency**- There are calls for the *establishment of standards* for

measuring AI's environmental impact and creating a voluntary reporting framework for AI developers.

- **Holistic approach**-The need of the hour is fostering *interdisciplinary collaboration* and promoting awareness of the environmental impacts of AI can help drive positive change towards a more sustainable future.
- **Google's 4M approach**- The approach (Model, Machine, Mechanization and Map optimization) is commendable and eco-friendly approach to reduce carbon and energy footprints of AI.
- **Informed decisions**- International Electrotechnical Commission (IEC) and the International Organisation for Standardization (ISO) are set to release this year the world's first report with international standards for sustainability in AI.'
- **India's approach**- It's initiative to subsidize private companies for setting up AI compute *capacity* is undoubtedly aimed at boosting technological development, but it's crucial to ensure that this growth is sustainable, considering India's significant water stress.
- **Innovative solutions**- Balancing technological advancement with *environmental stewardship* will be key for India and other nations facing similar challenges.

References

1. Indian Express- Growing environmental footprint of AI
2. Google Research- Good news about carbon footprint of ML

