International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

The Ai–Climate Paradox: Balancing Innovation & Environmental Sustainability

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Abstract
Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century. Its applications extend from healthcare, agriculture and transportation to climate modelling, renewable-energy optimisation, disaster prediction and environmental monitoring. At the same time, the rapid expansion of AI infrastructure has created a less visible environmental burden. Large-scale AI systems require increasingly powerful computing infrastructure, resulting in substantial electricity consumption, water requirements for cooling, carbon emissions, mineral extraction, hardware production and electronic waste.
This creates an important paradox. AI may become one of the most powerful technological instruments available to humanity for addressing climate change, while simultaneously becoming a contributor to the environmental pressures that intensify the climate crisis. The problem is particularly significant for developing countries such as India, where AI infrastructure is expanding rapidly and where energy, water security and climate vulnerability are already major policy concerns.
This paper examines the dual environmental character of AI, with particular emphasis on India. It analyses India's emerging AI-governance framework, the *Digital Personal Data Protection Act, 2023, the Information Technology Rules, environmental legislation, data-centre regulation and the IndiaAI Mission.* It argues that India's present framework regulates many components of AI infrastructure indirectly but does not yet establish a comprehensive lifecycle-based environmental framework specifically for AI.
The paper further compares India's approach with the European Union's risk-based Artificial Intelligence Act and emerging approaches in the United States. It also examines the devastating August 2026 floods and glacial-collapse disaster in Nepal as a contemporary illustration of the increasing vulnerability of Himalayan societies and the potential importance of AI-enabled early-warning, satellite monitoring and disaster-response systems. Finally, the paper proposes a framework for sustainable AI in India based on mandatory environmental reporting, energy and water efficiency standards, renewable-energy requirements, climate-sensitive data-centre siting, lifecycle assessment and stronger integration between AI policy and environmental governance.

Keywords: Artificial Intelligence, Climate Change, Sustainable AI, Data Centres, India, AI Governance, Environmental Regulation, Energy Consumption, Water Consumption, Nepal, Climate Adaptation.

1. Introduction
Artificial Intelligence has moved rapidly from being a specialised technological field to becoming a general-purpose technology influencing almost every sector of the economy. Machine-learning systems can analyse enormous quantities of data, recognise patterns, generate predictions and automate complex

decisions. These capabilities have significant implications for climate change because climate policy itself depends increasingly upon the ability to process large volumes of environmental data.

AI can improve weather forecasting, identify patterns in extreme weather, optimise renewable-energy generation, detect deforestation, improve agricultural productivity, reduce industrial energy consumption and assist governments in responding to natural disasters. A recent systematic review examining more than 280 peer-reviewed studies identified applications of AI across energy and carbon management, buildings and cities, transport, industry, agriculture, ecosystem conservation, and weather and disaster forecasting[1]. However, the environmental consequences of AI cannot be understood only by looking at what AI does. They must also be examined through the physical infrastructure that makes AI possible.

The training and deployment of advanced AI models require specialised processors, large data centres, electricity-intensive computing and sophisticated cooling systems. Data centres consequently create demands for electricity, water, land, construction materials and network infrastructure. A 2026 assessment by the Council on Energy, Environment and Water estimated that Indian data centres consumed approximately 0.5% of India's national electricity consumption in 2025 and approximately 150 billion litres of water annually, with both expected to more than double by 2030.

India therefore faces a particularly important policy question:

Can India expand its AI ecosystem rapidly enough to achieve technological and economic benefits without transferring the environmental costs of AI onto its electricity grids, water systems and climate-vulnerable communities?

This paper argues that AI should not be understood simply as either a climate solution or a climate threat. Its environmental consequences depend on **how AI is designed, powered, deployed, regulated and geographically located**.

2. Understanding the AI–Climate Paradox

The relationship between AI and climate change operates in two opposite directions.

2.1 AI as an instrument of climate mitigation

AI can contribute to reducing greenhouse-gas emissions by improving the efficiency of existing systems. In the energy sector, AI can forecast electricity demand, predict renewable-energy generation and help balance electricity grids. This becomes particularly important as countries increase their dependence on intermittent sources such as solar and wind.

In agriculture, AI can assist with precision irrigation, crop monitoring, fertiliser optimisation and prediction of crop diseases. Such systems can potentially reduce water, fertiliser and energy consumption.

AI can also analyse satellite imagery to detect deforestation, illegal mining, land degradation and changes in ecosystems. Climate and environmental authorities can therefore use AI to monitor large geographical areas more efficiently than traditional manual systems.

In transportation, AI can optimise traffic flows, logistics routes and fleet management, potentially reducing fuel consumption.

AI is also increasingly important in weather and disaster forecasting. Machine-learning systems can process large quantities of atmospheric, satellite and historical weather data and provide faster predictions.

[1] L. Minh Dang et al., "Artificial intelligence for climate change mitigation and adaptation: A domain-structured review of methods, applications, and research gaps for seven high-impact domains," *Process Safety and Environmental Protection* (2026), doi:10.1016/j.psep.2026.109102.

The emerging academic literature therefore increasingly treats AI as a potential tool for both **climate mitigation and climate adaptation**.

3. The Hidden Environmental Footprint of Artificial Intelligence

The positive applications of AI should not obscure the environmental costs of producing and operating AI systems.

3.1 Electricity consumption

Modern AI systems rely heavily on high-performance computing. Training large models requires enormous computational resources, while the widespread deployment of those models means that electricity is consumed repeatedly during everyday inference.

The International Energy Agency has identified the growing deployment of high-performance accelerated servers as an important driver of electricity demand in data centres[2].

The environmental impact therefore depends partly on **where the electricity comes from**.

An AI system powered primarily by renewable electricity will have a substantially different carbon footprint from an equivalent system operating in a grid heavily dependent on coal or natural gas.[3]

This issue is particularly significant in India because India's electricity system continues to undergo a transition involving both rapid renewable-energy expansion and continued reliance on coal.

3.2 Water consumption

Electricity is not the only resource required by AI infrastructure.

High-performance computing equipment generates considerable heat. Data centres therefore require cooling systems, which may involve significant water consumption.

This creates a particularly important issue in India because several major data-centre hubs are located in areas already facing water stress.

The Indian government itself acknowledged the significance of this issue in a 2026 parliamentary response. It stated that AI data centres do not automatically require separate environmental clearance merely because they are AI data centres, although projects crossing specified building or township thresholds can require environmental clearance. Water availability, water balance, wastewater recycling and reuse are among the factors considered in environmental appraisal.

The same government response noted that groundwater extraction is regulated and that the Bureau of Energy Efficiency's District Cooling Guidelines, 2023 encourage treated water for cooling-tower make-up water where feasible.

This demonstrates that India already has regulatory tools capable of addressing parts of AI's environmental footprint. The problem is that these instruments are **not designed specifically around AI's lifecycle**.

3.3 Carbon emissions

AI's carbon footprint arises from several stages:

1. Manufacturing computing hardware;
2. Construction of data centres;
3. Electricity used during model training;
4. Electricity used during inference;
5. Cooling;

[2] International Energy Agency (IEA), *Energy and AI* (Paris: IEA, 2025).
[3] International Energy Agency (IEA), *Energy and AI* (Paris: IEA, 2025).

6. Hardware replacement;
7. Transportation and supply chains.

A 2025 study examining data-centre environmental footprints noted that available corporate reporting makes precise AI-specific carbon and water estimates difficult because companies frequently do not distinguish AI workloads from other data-centre activities. The study nevertheless found that the potential scale of AI's carbon and water footprint is sufficiently significant to require much greater environmental disclosure[4].

This lack of transparent AI-specific measurement is itself a regulatory problem.

4. What Recent Research Is Telling Us

Recent literature reveals an important shift in the debate.

Earlier discussions often concentrated on the energy required to train large AI models. Increasingly, researchers are recognising that **deployment and inference at enormous scale** can also become environmentally significant.

A 2025 benchmarking study examining the energy, water and carbon footprint of large-language-model inference found substantial variation among models and workloads. It emphasised that an apparently small environmental cost per individual query can become significant when multiplied across hundreds of millions of interactions.

This produces an important concept:

Efficiency per AI task does not necessarily equal efficiency at societal scale.

An individual AI request may become increasingly energy-efficient, but if AI usage expands dramatically, total resource consumption may continue to rise.

Recent research also suggests that AI's climate effects cannot be evaluated exclusively through its direct electricity consumption. AI may stimulate economic growth, alter industrial production, increase energy demand and change consumption patterns. A recent integrated assessment published in 2026 argues that under certain assumptions AI could have a net-warming effect, although its conclusions depend heavily on assumptions about future economic growth, emissions and technological development[5].

This disagreement is important. It demonstrates that there is currently **no universally accepted conclusion that AI will necessarily be either environmentally beneficial or environmentally harmful**.

The appropriate policy response is therefore not to prohibit AI, but to ensure that its environmental benefits are maximised while its environmental externalities are measured and controlled.

5. India at the Crossroads of AI Expansion and Climate Vulnerability

India presents a particularly interesting case because it is simultaneously:

- a rapidly growing AI market;
- a major developing economy;
- a country with substantial energy demand;
- vulnerable to extreme heat, floods, droughts and cyclones;
- experiencing rapid expansion of digital infrastructure.

[4] Nidhal Jegham et al., “How Hungry is AI? Benchmarking Energy, Water, and Carbon Footprint of LLM Inference,” arXiv, 2025.

[5] Huiying Ye, Richard S. J. Tol, and Fangzhi Wang, “AI Worsens Climate Change, Integrated Assessment Shows,” arXiv, 2026.

The Indian government's data-centre capacity increased from approximately 375 MW in 2020 to around 1,500 MW by 2025[6]. The government has also established AI compute capacity, with 38,231 GPUs onboarded through 14 empanelled service providers and data centres under its AI compute framework as of March 2026[7].

This expansion creates an obvious economic opportunity.

But it also means that AI policy can no longer be separated from:

energy policy + water policy + environmental policy + infrastructure policy.

India's AI future will therefore depend not merely upon access to computing power but upon the sustainability of the physical infrastructure supporting that computing power.

6. India's Emerging AI Governance Architecture

India currently does not have a single comprehensive AI statute comparable to the European Union's AI Act. Instead, AI governance is developing through a combination of policy frameworks, existing laws, sectoral regulation and intermediary rules.

This approach has advantages: it allows regulation to evolve without immediately creating a highly rigid legal framework. However, it also creates fragmentation.

6.1 IndiaAI Mission

The IndiaAI Mission represents India's principal institutional effort to develop domestic AI capabilities and infrastructure.

The government has emphasised access to compute, datasets, innovation, skills and responsible AI development. The mission is therefore fundamentally developmental as well as regulatory.

The challenge is ensuring that **AI infrastructure policy incorporates environmental sustainability from the beginning rather than treating environmental impacts as a later compliance issue.**

6.2 India AI Governance Guidelines, 2026

In February 2026, India released its AI Governance Guidelines.

The framework adopts a principle-based approach and proposes institutional mechanisms including an AI Governance Group, a Technology & Policy Expert Committee and an AI Safety Institute. It emphasises safe, trusted and inclusive AI while seeking to maintain technological innovation.

Importantly, the guidelines recognise climate action and responsible AI within India's broader AI policy vision.

However, there is an important distinction between **recognising environmental sustainability as a policy objective** and creating enforceable environmental obligations for AI developers.

The latter remains comparatively underdeveloped.

7. Existing Indian Environmental Laws and Their Relevance to AI

Although India does not yet possess a dedicated environmental statute for AI, existing environmental legislation can regulate parts of AI infrastructure.

Environmental Impact Assessment framework

Large construction projects associated with data centres may fall within categories requiring prior environ-

[6] Government of India, Ministry of Electronics and Information Technology, data on India's data-centre capacity, 2025.
[7] Ministry of Electronics and Information Technology, Government of India, *Annual Report 2025–2026*, 2026, p. 113.

mental clearance depending on their size and nature. The government confirmed in 2026 that AI data centres themselves do not automatically require environmental clearance merely because they use AI, but large building and construction projects may trigger the EIA framework.

Water regulation

The **Water (Prevention and Control of Pollution) Act, 1974** can apply to water use and wastewater discharge associated with data-centre operations.

Air regulation

The **Air (Prevention and Control of Pollution) Act, 1981** becomes relevant to emissions associated with infrastructure, including backup-generation systems in applicable circumstances.

Groundwater regulation

Groundwater extraction for commercial infrastructure is subject to regulatory guidelines issued by the Ministry of Jal Shakti.

Energy efficiency

The **Energy Conservation Act, 2001**, together with standards and efficiency initiatives administered through the Bureau of Energy Efficiency, provides another regulatory foundation.

The difficulty is that these laws regulate **physical infrastructure**, not the environmental characteristics of an AI model itself.

8. Data, Privacy and AI Governance

The **Digital Personal Data Protection Act, 2023** is another important part of India's digital regulatory framework.

The Act establishes a framework for processing digital personal data and recognises individuals' interests in protecting their personal information while allowing lawful processing.

The 2025 DPDP Rules subsequently provided more detailed implementation requirements.

However, data protection and environmental sustainability are different regulatory questions.

An AI company may comply with privacy requirements while operating an extremely energy-intensive model.

This demonstrates why India's AI framework should eventually move from a narrow question of **"Is AI lawful?"** to a broader question:

Is the entire AI lifecycle responsible, transparent and environmentally sustainable?

9. The Indian Regulatory Gap

India's existing approach has an important strength: it does not leave AI completely unregulated.

However, it also contains a significant structural gap.

Current laws can regulate:

- pollution;
- water discharge;
- groundwater extraction;
- construction;
- electricity efficiency;
- personal data;
- online content;
- cybersecurity;

- consumer protection.

But there is no comprehensive framework requiring an AI developer to calculate and disclose the **complete environmental lifecycle of an AI system**.

For example, India could ask:

- How much electricity was used to train this model?
- How much electricity does inference consume?
- How much water is consumed by the associated infrastructure?
- What percentage of electricity comes from renewable sources?
- What is the carbon intensity of the electricity supply?
- How much electronic waste is generated?
- Where is the data centre located?
- Is it located in a water-stressed region?
- What is the expected environmental footprint over the model's lifecycle?

At present, there is no unified national AI-specific mechanism requiring all of these questions to be answered.

10. The Nepal Disaster: A Warning From the Himalayan Region

The devastating disaster that struck Nepal in August 2026 provides a powerful contemporary case study for this paper.

On 26 August 2026, a major glacial-collapse-related event near the Nepal–Tibet border triggered catastrophic flooding and debris flows. The disaster devastated communities, infrastructure and hydropower facilities. By early September, more than 1,300 people had been reported dead and thousands remained missing.

The event has also highlighted the increasing vulnerability of Himalayan regions to climate-related hazards. Experts have linked the wider Himalayan risk environment to warming temperatures, unstable slopes, melting ice and changing precipitation patterns, although individual disasters have complex and event-specific causes[8].

This distinction is crucial for responsible research.

It would be scientifically incorrect to state:

“Climate change caused the Nepal disaster.”

A more defensible formulation is:

Climate change is increasing the background vulnerability of Himalayan ecosystems and communities to extreme cryospheric and hydrological hazards, while individual disasters result from interacting geological, climatic and infrastructural factors.

11. Why Nepal Is Relevant to Artificial Intelligence

At first glance, Nepal's disaster may appear unrelated to AI.

In reality, it illustrates one of the most important arguments of this paper:

AI should not merely be judged by the environmental resources it consumes; it should also be evaluated by the environmental and human benefits it can generate.

[8] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis*, Chapter 10, “Linking Global to Regional Climate Change”; IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Chapter 6, “Cities, Settlements and Key Infrastructure.”

AI can contribute to Himalayan climate adaptation through:

Satellite monitoring

Machine-learning systems can analyse satellite imagery to detect changes in glaciers, snow cover, landslides and unstable terrain[9].

Flood prediction

AI can analyse rainfall, river levels, terrain and historical flood data to improve forecasting.

Early-warning systems

AI-supported systems can identify unusual environmental patterns and potentially issue warnings before hazards reach vulnerable communities.

Search and rescue

Following disasters, AI-assisted image analysis, drones and satellite systems can help identify damaged infrastructure and possible survivors.

Infrastructure resilience

AI can help identify areas where roads, bridges, hydropower projects and settlements face heightened climate-related risks.

Therefore, the Nepal disaster provides an argument for **AI as a climate-adaptation technology**.

At the same time, it raises an ethical question:

If AI infrastructure consumes enormous quantities of electricity and water while vulnerable communities face increasingly severe climate impacts, **how should society determine whether the benefits justify the costs?**

That is the central AI–climate paradox.

12. Nepal and the Question of Climate Justice

The Nepal disaster also introduces a climate-justice dimension.

Nepal contributes only a very small share of global greenhouse-gas emissions but is highly vulnerable to climate-related hazards. Recent reporting on Nepal's response has highlighted its demand for international support and compensation for climate-related loss and damage[10].

This produces an important global inequality:

Countries and communities with relatively low historical emissions can experience disproportionately severe climate consequences.

The same principle can be applied to AI infrastructure.

If data centres are concentrated in areas where electricity or water resources are already constrained, the benefits of AI may accrue nationally or globally while the environmental costs are experienced locally.

Consequently, sustainable AI policy must consider **environmental justice**, not merely technological efficiency.

13. The European Union: A More Explicit Environmental Approach

The European Union provides an important comparison.

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[9] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis*, Chapter 10, "Linking Global to Regional Climate Change"; see also IPCC, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Chapter 2, "Terrestrial and Freshwater Ecosystems."

[10] World Bank, *Nepal Development Update*, October 2022, p. 37; United Nations Sustainable Development Group, "Flood-Ravaged Nepal Calls for Climate Justice," 9 September 2026.

The **EU Artificial Intelligence Act** is currently the world's most comprehensive horizontal AI law. It's stated objectives include protection of health, safety, fundamental rights and the environment[11].

The EU framework is significant because it does not treat environmental protection as entirely separate from AI regulation.

For general-purpose AI models, providers are subject to transparency and documentation requirements. The EU framework also provides for disclosure concerning energy consumption, with particular requirements concerning general-purpose models and additional scrutiny for models presenting systemic risks.

The European Commission has also identified energy-efficient AI development and resource-performance standards as areas requiring further standardisation.

This represents an important difference from India's present framework.

India's position

India:

AI policy → development + safety + innovation

Environmental law:

Data-centre infrastructure → pollution + water + construction + energy

EU direction

AI regulation → risk + rights + safety + environment + transparency

The EU therefore provides a useful model for integrating environmental considerations directly into AI governance.

14. The United States: A Different Model

The United States provides a contrasting example.

Rather than having one comprehensive federal AI law equivalent to the EU AI Act, the US approach has historically been more fragmented, involving executive policy, sectoral regulation, state legislation and technical standards[12].

However, the scale of US AI infrastructure has made energy consumption a major policy issue.

The US Department of Energy reported in 2026 that data centres could account for approximately **11.8% of total US electricity consumption by the end of the decade**, with scenarios ranging from 9.5% to 15.3%[13].

This demonstrates that even where AI regulation is less comprehensive, governments are increasingly treating AI infrastructure as an energy-policy issue.

The US therefore offers India a different lesson:

AI regulation cannot be separated from energy planning.

15. Where India Currently Falls Behind

India should not simply copy the European Union. India's developmental circumstances are different.

Nevertheless, several gaps are visible.

[11] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024, *Artificial Intelligence Act*, OJ L, 2024, Article 1.

[12] Tatevik Davtyan, "The U.S. Approach to AI Regulation: Federal Laws, Policies, and Strategies Explained," *Case Western Reserve Journal of Law, Technology & the Internet* 16, no. 2 (2025): 223–[page range].

[13] Sarah Josephine Smith et al., *United States Data Center Energy Usage Report: 2025 Update*, Lawrence Berkeley National Laboratory, June 2026.

15.1 Lack of mandatory AI environmental disclosure

India does not yet have a comprehensive requirement for AI developers to publish model-level environmental footprints[14].

15.2 Weak integration between AI policy and environmental policy

AI governance and environmental governance largely operate through separate institutional structures.

15.3 Limited model-level measurement

There is insufficient standardisation regarding how companies should calculate energy, carbon and water consumption associated with AI.

15.4 Data-centre regulation rather than AI-lifecycle regulation

Existing environmental rules largely regulate the physical facility rather than the complete AI lifecycle.

15.5 Insufficient location-based environmental assessment

A data centre located in a water-rich region is environmentally different from an identical facility located in a severely water-stressed region.

15.6 Transparency problems

Without standardised disclosure, consumers, regulators and researchers cannot reliably compare the environmental footprints of different AI models.

16. The Environmental Costs Beyond Energy

The AI debate should not be reduced to electricity.

Water stress

Cooling systems may place additional pressure on local water resources.

Mining

AI hardware requires semiconductor materials and various minerals whose extraction can have significant ecological impacts.

Electronic waste

Rapid technological obsolescence may increase discarded servers, GPUs and other electronic components.

Land use

Large data-centre campuses require substantial physical infrastructure.

Backup power

Diesel generators and other backup systems may create local air-pollution and emissions concerns.

Heat

Data centres produce waste heat, requiring further cooling and potentially contributing to local environmental burdens.

Supply-chain emissions

The carbon footprint of AI begins before a model reaches a data centre, including manufacturing and transportation.

These impacts demonstrate why **"green AI" cannot simply mean using renewable electricity**.

17. AI Can Also Reduce Environmental Harm

A balanced analysis must recognise the opposite side.

[14] Ministry of Electronics and Information Technology, Government of India, *India AI Governance Guidelines*, 15 February 2026; Ministry of Environment, Forest and Climate Change, Government of India, "Parliament Question: Environmental implications of AI," 2 April 2026.

AI can potentially:

- optimise electricity grids;
- increase renewable-energy integration;
- reduce industrial waste;
- improve building efficiency;
- optimise transport routes;
- reduce agricultural water consumption;
- detect forest loss;
- improve climate modelling;
- predict floods and cyclones;
- assist disaster management;
- improve biodiversity monitoring.

Therefore, banning or excessively restricting AI because of its environmental footprint could eliminate technologies capable of delivering substantial climate benefits.

The policy objective should instead be:

More climate-positive AI and less environmentally wasteful AI.

18. Toward a Sustainable AI Framework for India

India should develop a dedicated **Sustainable AI Framework** integrated with its broader AI governance architecture.

18.1 Mandatory environmental reporting

Large AI developers and data-centre operators should disclose:

- electricity consumption;
- renewable-energy percentage;
- carbon emissions;
- water consumption;
- cooling efficiency;
- hardware lifecycle;
- electronic waste;
- geographical location.

This information should use standardised methodologies so that companies can be meaningfully compared[15].

18.2 Environmental impact assessment for high-compute AI

AI systems above defined computational or infrastructure thresholds should undergo environmental assessment[16].

The threshold could be based upon:

- computational requirements;
- electricity consumption;

[15] Bureau of Indian Standards (BIS), Indian Standards on Power Usage Effectiveness (PUE), Carbon Usage Effectiveness (CUE), Cooling Efficiency Ratio (CER) and Water Usage Effectiveness (WUE) for data centres.

[16] Ministry of Environment, Forest and Climate Change, Government of India, "Parliament Question: Environmental implications of AI," 2 April 2026.

- water consumption;
- data-centre capacity;
- geographic vulnerability.

This would prevent small AI applications from facing disproportionate regulation while imposing stronger requirements on extremely resource-intensive systems.

18.3 Water-sensitive data-centre policy

India should introduce geographic criteria for data-centre development.

Facilities in water-stressed regions should face stricter requirements concerning:

- recycled water;
- closed-loop cooling;
- groundwater extraction;
- wastewater treatment;
- water-efficiency targets.

The government's existing emphasis on treated water and cooling efficiency provides a foundation for such a framework.

18.4 Renewable-energy requirements

Large AI facilities should progressively increase their use of renewable electricity.

However, merely purchasing renewable-energy certificates should not automatically be treated as equivalent to physically reducing local fossil-fuel dependence.

India should encourage:

renewable generation + storage + efficient transmission + demand management.

18.5 Climate-sensitive location planning

AI infrastructure should not be located solely according to:

cheap land + cheap electricity + connectivity.

Planning should additionally consider:

water availability + heat risk + climate vulnerability + grid capacity + ecological sensitivity.

18.6 Green AI standards

India could develop national standards for:

- energy-efficient model development;
- efficient computing;
- model compression;
- efficient inference;
- hardware utilisation;
- cooling;
- water management;
- carbon reporting.

The Bureau of Indian Standards could play an important role in developing these standards.

18.7 Environmental labelling for AI models

A future possibility is an **AI Environmental Label**.

For example:

Model A

- Energy intensity: Low
- Water intensity: Low

- Carbon intensity: Medium

Model B

- Energy intensity: High
- Water intensity: High
- Carbon intensity: Low

Such information would allow businesses and consumers to choose more environmentally efficient systems.

19. Using AI to Fight Climate Change in India

Regulation alone is insufficient.

India should simultaneously invest in AI applications that directly address climate vulnerability.

Priority areas should include:

Himalayan monitoring

AI-assisted glacier and landslide monitoring should be expanded across the Himalayas.

Flood prediction

River systems such as the Ganga, Brahmaputra and their tributaries could benefit from integrated AI-based forecasting systems.

Heatwave prediction

AI can improve urban heat forecasting and help authorities prepare vulnerable populations.

Agricultural resilience

AI can help farmers adapt to changing rainfall and temperature patterns.

Renewable energy

AI can improve solar and wind forecasting and electricity-grid management.

Forest protection

Satellite-based AI can identify deforestation and ecosystem degradation more rapidly.

In other words, India should pursue **AI for climate resilience at the same time as climate-responsible AI infrastructure**.

20. A Proposed Regulatory Model

The future Indian framework could be organised into five layers:

Layer	Regulatory objective
AI model	Energy/carbon/resource efficiency
Data centre	Electricity, water and cooling standards
Supply chain	Hardware, minerals and e-waste
Deployment	Environmental and social risk assessment
National system	Transparency, monitoring and enforcement

This would transform India's approach from regulating individual pieces of AI infrastructure to regulating the **AI lifecycle**.

21. The Central Policy Dilemma

The most difficult question is not:

“Is AI good or bad for the environment?”

The better question is:
"Under what conditions does AI produce a net environmental benefit?"
The answer depends upon at least five variables:
AI efficiency
energy source
water intensity
scale of deployment
actual climate benefit
An AI system that uses substantial computing power but dramatically reduces industrial emissions may have a positive overall environmental effect.
Conversely, an AI application with no meaningful social or environmental benefit but enormous computational requirements may represent an unnecessary environmental burden.
This suggests that future regulation should focus not only on **how much AI consumes**, but also on **what that AI accomplishes**.

22. Conclusion

Artificial Intelligence represents both an opportunity and a risk in the global response to climate change.
Its ability to analyse complex datasets, improve forecasting, optimise infrastructure and support climate adaptation could make AI an important instrument in addressing environmental challenges. At the same time, the physical infrastructure supporting AI is creating rapidly increasing demands for electricity, water, cooling systems, minerals and hardware[17].
India stands at a particularly important point in this transition.
The country is simultaneously attempting to become a major global AI power and confronting serious environmental pressures involving water security, electricity demand, extreme heat and climate-related disasters. India's current regulatory framework contains several mechanisms capable of addressing parts of the environmental footprint of AI, including environmental-clearance requirements, water and air pollution laws, groundwater regulation, energy-efficiency measures and data-protection legislation[18]. However, these instruments were largely developed before the present scale of AI infrastructure and therefore do not constitute a comprehensive sustainable-AI regime.
The European Union demonstrates the possibility of integrating environmental protection directly into AI regulation, particularly through its Artificial Intelligence Act and requirements concerning energy consumption and resource performance[19]. The United States demonstrates another important lesson: even without a single comprehensive AI law, the enormous electricity requirements of data centres have become a matter of national energy policy.
India therefore need not choose between **AI growth and environmental protection**.
Instead, it should attempt to create a third path:

[17] International Energy Agency, *Energy and AI*, 2025; International Telecommunication Union, *Greening Digital Companies and Data Centres*; Nidhal Jegham et al., "How Hungry is AI? Benchmarking Energy, Water, and Carbon Footprint of LLM Inference," 2025.
[18] Government of India, Ministry of Environment, Forest and Climate Change, parliamentary responses on environmental implications of AI/data centres, 2026; Bureau of Energy Efficiency, *District Cooling Guidelines*, 2023; Government of India, *Digital Personal Data Protection Act, 2023*.
[19] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024, *Artificial Intelligence Act*, Article 1 and relevant provisions concerning general-purpose AI models and environmental reporting.

environmentally responsible AI growth.

The recent Nepal disaster makes the stakes particularly clear. Himalayan communities face increasing exposure to complex climate and environmental hazards despite contributing relatively little to global emissions. AI could help monitor glaciers, predict floods, improve early-warning systems and support disaster response. But these benefits will have little meaning if the expansion of AI infrastructure itself proceeds without adequate environmental safeguards.

The objective should therefore not be to slow technological development for its own sake. It should be to ensure that the next generation of AI is **efficient by design, transparent in its environmental footprint, powered increasingly by clean energy, sensitive to local water and ecological conditions, and deliberately deployed toward socially and environmentally valuable purposes**.

The ultimate measure of sustainable AI should consequently not be the number of models developed, the number of GPUs deployed or the volume of computing capacity created.

It should be whether AI can **increase human and economic resilience to climate change without intensifying the environmental pressures that created the crisis in the first place.**

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