

EMERGENCE OF AI DATA CENTERS AND WATER CRISIS IN INDIA: A LEGAL ANALYSIS

Authors:

**Abhay Gupta¹, Danshri Ghatole², Harshita Malviya³, Mili Aggarwal⁴, Shikha Maurya⁵,
and Vedika Sharma⁶**

¹Student, Gittarattan International Business School, Delhi

²Student, Maharashtra National Law University, Chhatrapati Sambhajinagar

³Student, National Law University, Jodhpur

⁴Student, Gittarattan International Business School, Delhi

⁵Student, Savitribai Phule Pune University

⁶Student, OP Jindal Global University

ABSTARCT

Water scarcity has been a major issue in India for past few decades, presenting serious environmental and socio-economic challenges including ongoing droughts, lowering groundwater levels, and unequal access to clean water where the economically weaker and marginalized communities, actually bear the brunt of these shortages. The implications go beyond just people; water depletion also poses risks to ecosystems, biodiversity, agricultural output, and overall environmental health. Meanwhile, India is diving into digital transformation with programs like Digital India and the India AI Mission and the recent AI Summit, aiming to make the country a frontrunner in Artificial Intelligence (AI). But while these technological initiatives focus on growth and innovation, there is active ignorance from officials on water usage by AI infrastructure, especially when it comes to data centers that depend on water-heavy cooling systems, power generation, and semiconductor production. This paper delves into water usage of AI data centers and examines if current environmental laws are enough to handle the heavy water needs of AI infrastructure. The paper also adapts the qualitative thematic review of existing literature along with doctrinal legal analysis, utilizing academic studies, policy papers, environmental reports, and legal texts. The focus is on water consumption in AI data centers, India's growing data center scene, current environmental regulations, and how

other countries are managing sustainable AI practices. Through this paper the researchers speculate that, even though India has constitutional rights, environmental laws, and water management systems in place for protecting the environment, these are not created to tackle the unique issues brought on by AI technologies. There are still some big gaps in regulations when it comes to water-use transparency, sustainability benchmarks, and specific environmental oversight for AI. The paper concludes by suggesting that India needs to enhance and update its legal and regulatory framework to make sure that as tech advances quickly, it doesn't compromise water security, environmental health, or social fairness.

Keywords: Artificial Intelligence (AI), AI Data Centres, Water Consumption, Water Scarcity, Environmental Regulation, Sustainable Development.

1. INTRODCUTION

The recent AI Summit held in India 2026, aimed at integrating AI in every technology such as in digital landscape, tech innovation and contributing to economic growth. The summit key points also have a section dedicated to sustainable use of AI and climate change, where there are several case studies for sustainable use of water but the implementations of these suggestions may take a long time. (AI_and_Climate, 2026). So, the question arises does India has legal support to back the claims discussed in the summit when the technology utilising AI is extremely water hungry and the nation has its water crisis going on.

Most of the research on AI efficiency, focuses on technical efficiency, sustainability practices, and general trends in resource use. However, there's not as much exploration when it comes to India, especially around whether the country's environmental and water governance systems are up to the task of managing the water-heavy demands of digital infrastructure. Plus, there are not many studies that take a deep dive into how things like environmental law, groundwater regulations, and sustainable development fit with the rapid growth of AI in developing nations like India.

With that in mind, this thematic review is taking a closer look at how India's AI expansion is linked to the growing need for water resources. The interconnected themes exploring the water use patterns, how AI is spreading in India, the environmental and socio-economic impacts, and whether the current legal and regulatory systems are sufficient. By exploring these themes, the review aims to assess if India's governance framework is ready to tackle the environmental

issues tied to AI growth while also ensuring that water sustainability is maintained in the long run.

2. LITERATURE REVIEW

India's current position to welcoming new technologies without having proper assessment on environment becomes more and more volatile for both the citizens and the environment itself. It directly conflicts with the SDG6 that the nation is trying to achieve by 2030. Authors have discussed that the rise of AI systems, large language models (LLMs), and powerful digital infrastructure is likely to make the water stress situation in urban India even worse. They point out that laws like the environment and water protection act are not set up to manage the water demands of today's AI infrastructure. But what's notable is that their study mostly looks at the tech and environmental aspects without really digging into whether India's legal framework is up to the task. (Dutta & Shome, 2025)

On a similar note, (Yañez-Barnuevo, 2025) shows how much freshwater AI data centers use for cooling systems, power generation, and making semiconductors. The author emphasizes that as the capacity of these data centers grows, it's putting more pressure on water resources, particularly in areas already facing water shortages. Their article discusses sustainable cooling tech and better water management practices, highlighting the environmental and operational issues.

(Huang & Gopal, 2025) point out the ecological impact that comes with AI infrastructure, especially the need for sufficient energy and water to keep data centers running. At the same time, they acknowledge how AI could help meet Sustainable Development Goals focused on clean water, clean energy, responsible consumption, and climate action. They also emphasize the need for ethical governance and regulatory measures, offering comparisons from the EU, the U.S., China, and India.

3. METHODOLOGY

Review Question: Is India's environmental legal framework adequately equipped to regulate the water-intensive demands of AI infrastructure?

Review Objective: To critically examine how India's current laws for the environment and water management handle the water needs of AI infrastructure and data centers while addressing sustainable growth and protecting the environment.

Review Design: In this paper, the researchers are using a qualitative literature review approach to look at the environmental and legal issues surrounding India's growing AI infrastructure, especially how it's affecting water resources. The research is mostly based on secondary sources like academic articles, policy documents, environmental research, and legal materials concerning AI data centers, water usage, and environmental governance. This paper utilizes doctrinal legal analysis by exploring important areas of environmental law, including groundwater regulations and key constitutional principles like sustainable development and the precautionary principle. It also incorporates insights from international studies and policy discussions to compare worldwide issues related to water consumption and sustainability in the context of AI. The research is based on secondary data and refers to already available materials online like journals, books, blogs, and research paper that are relevant to this paper. *The sources were selected by each topic of the theme it covers*, such as what are AI data centers, how do they work, what is the rate of water depletion in India, what are laws covering environmental degradation and international legal codes addressing the same issue, etc. and later combining all the sources and verifying the lack of legal context, the researches decided on the research gap and limitations.

Limitation: The research is purely library based and does not take involve any primary or empirical study; thus, no new information or findings can be collected.

4. THEMATIC REVIEW

4.1 WATER CONSUMPTION AND COOLING MECHANISMS IN AI DATA CENTRES

In simplest way the distribution of water consumption by be described as direct and indirect where, in direct consumption the data centers mainly consume water through cooling processes which are required to operate high performance data centres. Here, the artificial intelligence models are trained and operated using a number of powerful processors such as Graphical Processing Units (GPUs) and Tensor Processing Units (TPUs), which generate huge amounts of heat during the function of complex computations. If this heat is not controlled, the devices may slow down, malfunction or may be permanently damaged. To prevent this, they use cooling systems that depend heavily on water. The method through which water is used to resolve this problem is called evaporative cooling, in which water absorbs heat from the air surrounding the devices and then evaporates to remove the heat from it. Large cooling towers continuously circulate water through pipes and heat exchangers, which in turn causes a large

amount of freshwater to evaporate every day. Thus, the direct consumption of water takes place on site. (Yañez-Barnuevo, 2025).

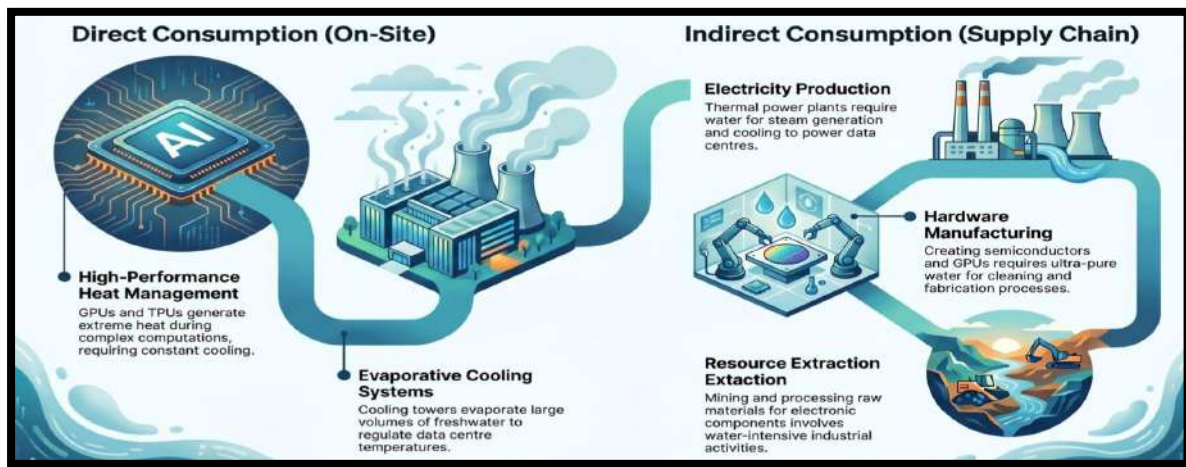


Figure 1. Direct and Indirect consumption of Water

Meanwhile data centres indirectly consume water through electricity production because the high demand of AI infrastructure increases the operation of thermal power plants. Thermal Power plants require water for steam generation, cooling purposes and maintaining operational efficiency. Since, AI data centres operate continuously and require uninterrupted electricity supply, they contribute to increased power generation, because of which water consumption increases at energy-producing facilities, such consumption also occurs during the manufacturing of hardware components used in AI infrastructure. The production of semiconductors, microchips, GPUs and other electronic components require large volumes of ultra-pure water for cleaning, etching and fabrication processes. Before a processor is even installed in a data centre, significant quantities of water have already been used in its manufacturing. The extraction and processing of raw materials used in electronic equipment also involve water intensive industrial activities. Therefore, the water usage is extended beyond on site cooling systems and includes the entire supply chain supporting AI operations, making their overall water consumption considerably larger than what is observed within the facilities themselves. (De Vries, 2023).

4.2 THE RAPID EXPANSION OF DATA CENTERS

In recent times, there has been an expansion of the horizons in the field of artificial intelligence by the Indian tech industry, which is owing to schemes like Digital India and India AI Mission. (IndiaAI, 2024). These initiatives are targeted towards improving the digital infrastructure, increasing the connectivity on the Internet, innovating on AI, and computing capability in the

nation. As a result of increased activities through digital transactions, services, and applications of AI, there has been an overwhelming demand for data storage and processing. It has resulted in an accelerated growth of data centers, which has become a necessity for digital services in sectors such as banking, health care, education, commerce, and governance. Resulting in India becoming one of the fastest growing countries in the world with regard to data centers. The capacity rose from around 375 MW in 2020 to more than 1,500 MW by 2025 and will likely surpass 3 GW by 2028. The industry is forecasted to attract investments between US\$20 and 25 billion by 2030. (IT, 2026).

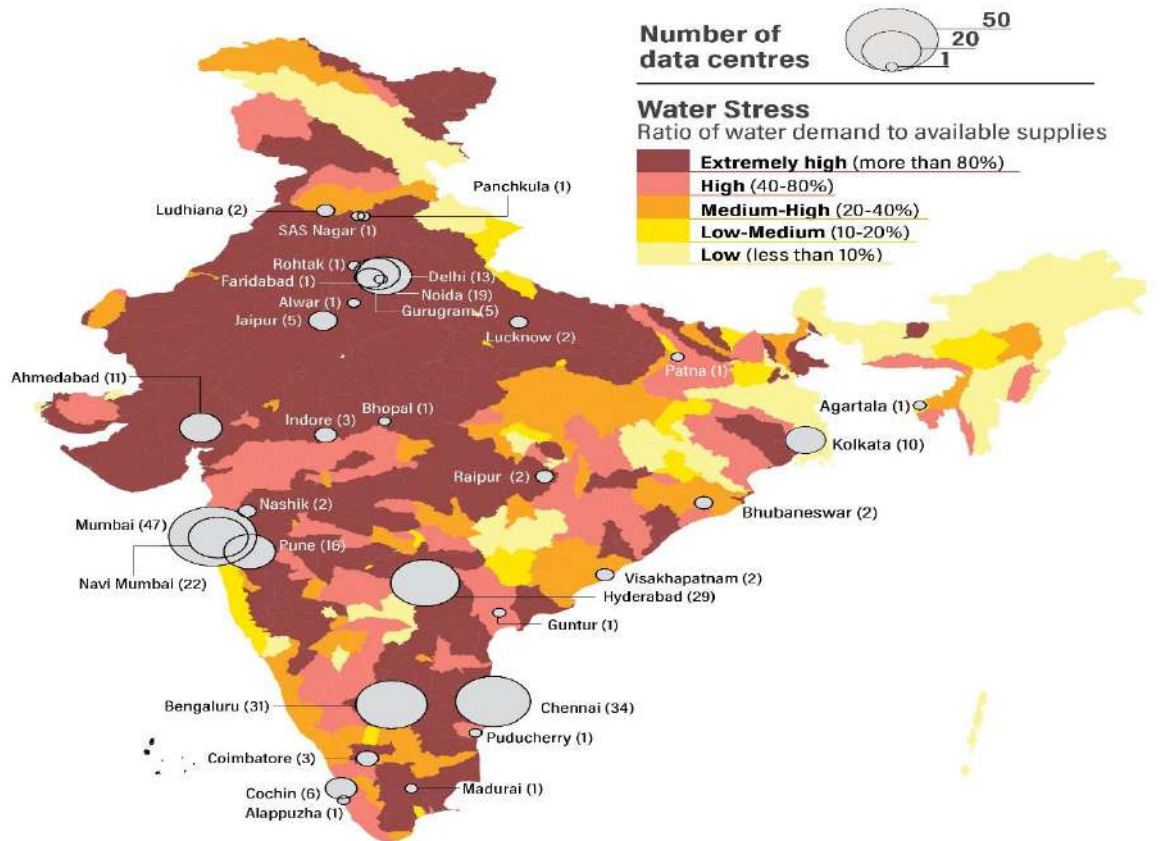
4.3 THE ENVIRONMENTAL IMPACT

One major aspect of India's data center boom is how it's mainly happening in big cities like Mumbai, Chennai, Hyderabad, Bengaluru, Noida, and Pune. These places are great for data centers because they offer consistent power, fast internet, skilled workers, and solid business environments. (Tripathi, 2026). Coastal cities, especially Mumbai and Chennai, are really key since they connect to global submarine cable networks. But with so many data centers popping up in urban areas, it's also putting a strain on local infrastructure and natural resources. (Tripathi, 2026). The growth in data centers is also fuelled by the increasing demand for cloud computing and AI services. Modern AI needs a ton of computing power and big data processing, while businesses and governments are leaning more on cloud services. This means most data centers will be and are located near water bodies, contributing to the depletion of fresh and groundwater.

The result of blindly utilizing limited water sources affects several sectors such as farming, public health, social fairness, and the overall well-being of communities. UNICEF reported in 2021 that water shortages hit low-income and marginalized groups the hardest, making it tough for them to get safe water for drinking, sanitation, and hygiene. (UN-Water, 2021). As AI technology goes after limited water supplies, people in these areas might end up paying more for water and facing a bigger risk of conflicts over resources. The result of not having clean water is leading to severe health issues and slow down social progress. The World Health Organization pointed out in 2023 that everyone needs access to safe drinking water to be healthy and to contribute to the economy. When water runs short, it heightens the chances of disease and lowers quality of life. (UN-Water, 2021).

More than half of India's data centres are located in water-stressed regions

Five states—Maharashtra, Tamil Nadu, Karnataka, Telangana, Uttar Pradesh—account for 75% of the country's 278 data centres, which require large amounts of water for cooling.



Note: Water stress measures the ratio of total water demand to available renewable surface and groundwater supplies. Water demand include domestic, industrial, irrigation and livestock uses. Higher values indicate more competition among users.

Source: **Datacentermap and WRI Aqueduct**, accessed on April 12, 2026. Analysis and visualisation: Rajit Sengupta
Disclaimer: The map is for illustrative purposes and does not imply the expression of any opinion on the part of WRI India concerning the legal status of any country or territory or the delimitation of frontiers or boundaries. Bubble sizes are illustrative, may exceed geographic boundaries and can overlap.

Figure 2. WRI India

4.4 REGULATORY FRAMEWORK IN INDIA

There is increasing usage of AI technology coupled with increased growth of data centers which creates a concern regarding their effect on natural resources such as water. The environmental laws in India are pre-existing laws prior to the development of AI technologies. However, these laws are significant when addressing environmental challenges posed by AI technologies.

4.4.1 Constitutional Foundations for Environmental Protection

Article 48A directs the State to protect and improve the environment and safeguard forests, wildlife, and other natural resources reflecting the responsibility of the government to ensure environmental conservation.

Similarly, Article 51A(g) places a duty on every citizen to protect and improve the natural environment, including rivers, lakes, forests, and wildlife. Together, these provisions demonstrate India's commitment to environmental protection and sustainable development.

Another important constitutional provision is Article 21, which guarantees the right to life and personal liberty. Through judicial interpretation, the Supreme Court has recognised that the right to life includes the right to live in a clean drinking water and healthy environment. As a result, environmental protection has become closely connected with the protection of fundamental rights.

Although these provisions were not drafted with AI technologies in mind, they can still support government action where technological activities create pressure on environmental resources such as water.

4.4.2 The Environmental Acts

The Environment (Protection) Act, 1986, gives broad powers to the Central Government to protect and improve environmental quality. Under Section 3, the government can take necessary measures to protect natural resources and prevent environmental degradation.

That way when the operation of data centres requiring large amounts of water for cooling affects local water resources, the government can rely on the powers granted under the Act to regulate their activities and promote sustainable resource use.

The main act governing pollution and control of water bodies is **Water (Prevention and Control of Pollution) Act, 1974** where the primary objective is to prevent water pollution and maintain the quality of water bodies. In Plachimada, Kerala it was observed that as soon as coca cola bottling industry was set up, the ground water depleted rapidly leading to shortage of water for the small community and the industry giant vehemently denying any allegations and attributing the shortages to natural causes such as drought. Only after several protests and legal proceedings was the plant shut down. (Johnson, 2016). This shows that in current time, most people are not aware of the dangers that lurk by blindly allowing such water consuming industries in their community and the consequences are only realised after the loss.

Another relevant mechanism is the **Environmental Impact Assessment (EIA)** process where, before the major infrastructure projects are approved, their likely environmental consequences are examined. As data centres continue to expand in India, environmental assessments can help evaluate their water requirements and possible impact on local communities and ecosystems.

4.4 INTERNATIONAL PERSPECTIVE ON SUSTAINABLE AI GOVERNANCE

In international zones the negative effects of data centers are not only discussed but actually experienced by several people where approximately 30 million gallon of water of used up in 15 months without general public's knowledge. (Shukla, 2026). It has been observed that training just one large language model can produce as much carbon as "the lifetime emissions of five automobiles." (Strubell et al, 2019). Fast forward to now, and the International Energy Agency (2025) warns that by 2030, global electricity usage from data centers might hit around 945 terawatt-hours, about what Japan consumes in a year. And often in policy discussions, a model's lifetime carbon footprint is around 80 to 90 percent that comes from inference, which is the ongoing computing needed to run AI applications is missed (AI_and_Climate, 2026). So, if governance only focuses on the training phase, it's really only tackling part of the issue. Suggestions such as 'Green AI' is discussed, arguing that industries should prioritize computational efficiency right from the start, rather than treating it as something secondary. (Schwartz et al, 2020). But, improving efficiency can lead to a rebound effect, where better hardware performance fuels increased usage because AI services become cheaper and more widespread. Without proper regulation, this could sabotage any genuine environmental protection that the regulators are aiming.

4.4.1 ESG and Green Data Initiative

Environmental, Social and Governance (ESG) reporting plays a central role while discussing the environmental costs of AI and making general public aware of the bigger picture, in U.S itself it was observed that only the legal requirement and several protests from citizens forced the big tech giants to become more transparent about their carbon emissions, energy sources, and water usage. Such as Google's annual sustainability reports and Microsoft's bold promises where they aim to be "carbon negative, water positive, and zero waste by 2030." In such way ESG requirements have shifted from being optional gestures to important governance tools that carry both reputational and financial weight (Microsoft, 2024). Though issues have been observed in ESG framework, which is its's voluntary nature, which provides transparency but lacks enforceability. To tackle this issue, the European Union has introduced the Corporate

Sustainability Reporting Directive, making sustainability reporting a mandatory and audited requirement for larger companies. Additionally, Article 53 of the EU AI Act requires developers of general-purpose AI models to reveal "known or estimated energy consumption," pushing transparency requirements into the realm of AI regulation (2024/1689, 2025). Together, these initiatives mark a legislative push to turn ESG from just a market-signaling tool into a binding governance mechanism.

The European Union handles sustainable digital infrastructure by **precautionary principle**. Here the legal idea basically says that if there's a chance of environmental harm, it's reasonable to step in with regulations, even if we don't have all the scientific proof just yet. Instead of looking at data centers as somehow above the environmental laws just because they're digital, the EU has brought them into the mix with regulations like the Energy Efficiency Directive and the Renewable Energy Directive, as well as the wider European Green Deal. This framework sets clear sustainability requirements that can be measured and enforced, making it clear that digital growth needs to respect our ecological limits. On the other hand, the situation in the United States is a bit more complex where regulation varies from state to state, California has made significant strides toward improving energy efficiency and water conservation, while at the federal level, there's been a tendency to let the market take the lead. Still, private companies have stepped up and made some impressive changes. Big names like Amazon Web Services, Google, NTT Data, and Microsoft have all put in place strategies for sourcing renewable energy, integrating battery storage, and recovering waste heat, showing real innovation in their operations. (AI_and_Climate, 2026).

4.4.2. SDG Goals in Environmental Governance Approach

The United Nations Sustainable Development Goals (SDGs) offer a widely accepted framework to tie these together. For instance, SDG 6, which focuses on Clean Water and Sanitation, is really relevant to how data centers pull water in areas that are already stressed. SDG 7, about Affordable and Clean Energy, which emphasizes the need for AI infrastructure to get its energy from renewable sources that everyone can access fairly. SDG 12 deals with Responsible Consumption and Production and supports ideas around the circular economy things like recovering waste heat, using recycled water, and properly disposing of hardware. The EEG Report pinpoints these as practical and worth governing, (AI_and_Climate, 2026). Lastly, SDG 13, which promotes Climate Action, directly links AI infrastructure to the responsibilities that countries have under the Paris Agreement. The GOI has made its aim to

achieve the goals by 2030, but with the pace and lack of enforceability of sustenance, makes the goals nothing more than check boxes to be ticked yes whenever small achievements are met.

4.4.3 Comparative Analysis

Dimension	India	EU / United States
Environmental laws	General; not AI-specific	Specialised sustainability frameworks
Disclosure obligations	Limited; largely voluntary	Mandatory (EU EED); ESG-driven (US)
Water governance	Emerging; no AI-specific standard	WUE targets; recycled water mandates
Governance maturity	Nascent; principles-based	More developed; compliance-oriented
SDG alignment	Aspirational (Summit Declaration)	Operationalised in law and reporting

Table1. Comparison between India and EU/ USA

5. DISCUSSIONS

The thematic literature from above tells us that the water usage of AI data centers is becoming a major environmental issue, especially in places like India where water shortages are already a problem. Most studies agree that these AI setups use a lot of water, both directly for things like cooling and indirectly through the electricity needed for operation and chip manufacturing. The rapid growth of AI tech is putting even more strain on freshwater supplies, particularly in cities where these data centers tend to cluster. At the same time, experts point out that our current environmental regulations aren't keeping up with the pace of tech advancements, making it tough to manage resources sustainably.

That said, there's some debate about how well existing regulations can tackle these issues. Some research focuses on tech-based solutions like better cooling systems, using recycled water, and adopting Green AI practices. Other scholars believe we need to see stronger laws and governance measures. International sources, especially from the EU, are moving toward requiring sustainability reporting and resource transparency, while India is still mainly depending on broad environmental laws and voluntary approaches. This highlights a significant gap in governance when it comes to balancing tech growth with environmental responsibility.

6. POLICY RECOMMENDATION

A staged policy recommendation after the comparative analysis would thus look like this: First, requiring the reporting of energy and water consumption by AI/data centers in India, based on the EU style of reporting but tailored according to the ability of the Indian state to enforce it such as 'data center operators have to publicly share details about their freshwater usage, where the water comes from, and how they recycle it and boosting transparency and accountability in the sector'. Secondly, formulating water governance guidelines specific to AI use, such as Water use effectiveness (WUE) criteria and recycled water usage, alongside, introducing AI-focused Environmental Impact Assessments (EIAs) that assesses future water needs, impacts on groundwater, and effects on local ecosystems before large facilities get the green light.; and finally, working on all the suggestions mentioned in the AI summit such as closed-loop cooling systems, and other low-water technologies through regulatory incentives and sustainability goals. The reason behind these recommendations is that India has only a rudimentary level of governance at the moment, which makes it necessary to introduce a graduated regulation regime that does not allow regulatory arbitrage (under-regulation leading to the environmentally unsustainable use of AI).

7. IMPLICATIONS

If we take only the recommendations from the AI summit 2026, there are chances that the implementations of all the case studies mentioned in the report for sustainable use of water will remain as textual presentation only. The loss of clean and drinking water will directly affect the millions of people living around the water bodies, and soon the rest of nation. The reason most of the world is against these data centers is not only due the dirty water that is directly let into rivers but the heat produced in the process which is directly affecting the earth itself. The

impact of which is experienced in real time, as the current year of 2026 itself saw record breaking numbers in summer heat, where the data centers are indirectly part of it.

The question of whether India should stop their progress just to meet the demands of people should not be between choosing one option than other, but rather how can the progress of nations be met along side making sure that the vulnerable population of the nation do not get exploited. Just like the rules of foreign bodies, India should focus on transparency and accountability from these industries, than just sticking a law on their face which can be exploited through loopholes or just mere fines.

8. CONCLUSION

Thus, the study concludes that technological growth and environmental sustainability are increasingly linked. The thematic review revealed that as AI infrastructure grows, so does the demand for water, and the surge in data centers in India is adding even more pressure on urban resources. While we have environmental laws, constitutional protections, and water governance structures in place, they haven't kept up with the pace of AI advancements. Meanwhile, international efforts are putting more emphasis on sustainability reporting, transparency, and precautionary measures.

For future research, it would be beneficial if researchers take an interdisciplinary approach that blends legal, environmental, technological, and socio-economic viewpoints. Policymakers could think about implementing AI-specific environmental standards, requiring mandatory disclosures of water use, conducting sustainability assessments, and enhancing monitoring processes for data centers.

In the end, this study finds that right now India is at starting point of implementing these AI centered policies. If the country brings environmental protections into AI governance early on, it could fulfil its digital goals while also safeguarding water resources and maintaining ecological health. But, if these measures aren't implemented seriously the push for tech growth will come at the cost of limited water supplies, hitting already vulnerable communities hard and threatening long-term sustainability efforts.

REFERENCES

2024, M. (2024). *Environmental Sustainability Report*. Microsoft.

2024/1689, A. A. (2025). Article 53: Obligations for Providers of General-Purpose AI Models. In E. A. Act. Future of Life Institute.

AI_and_Climate. (2026). *Recommendations Report of the Expert Engagement Group on AI and Climate*. New Delhi. (p. 34). New Delhi: Dalberg Global Development Advisors and Council on Energy, Environment and Water (CEEW). 2026. Retrieved from https://d19ob9sqegt2wc.cloudfront.net/stage/uploads/AI_and_Climate_99fdafb910.pdf

De Vries, A. (2023, October 18). The Growing Energy Footprint of Artificial Intelligence. *Joule*. Cell Press.

Dutta, M., & Shome, N. (2025). Increasing Water Stress in Urban India: Impact of AI, LLMs and High-powered infrastructures. *SSRN*, 16.

Huang, J., & Gopal, S. (2025). Green AI - A multidisciplinary approach to Sustainability, Environment Systems and Decisions. *National Library of Medicine*, 2.

IndiaAI. (2024, March 7). *IndiaAI*. Retrieved from IndiaAI: <https://indiaai.gov.in/>

IT, M. o. (2026, March 13). Data centre capacity in the country has increased from about 375 MW in 2020 to around 1500 MW by 2025. *The industry is adopting advanced cooling technologies to minimise water usage*. PIB Delhi: PIB Press Release.

Johnson, K. (2016). Extraction of Local Groundwater for Consumer Consumption: The Crimes of Coca-Cola. *Research Gate*.

Mustafa et al. (2025, July 24). The Convergence of Artificial Intelligence and Sustainability Reporting: A Systematic Review of Applications, Challenges and Future Directions. *Business Strategy and the Environment*, pp. 9761-9784.

Schwartz et al. (2020). Green AI. *Commun. ACM*, 54-63.

Shukla, P. (2026, May 13). Data center used 30 million gallons unnoticed — is America's AI boom quietly pushing local water systems toward crisis?

Strubell et al. (2019). Energy and Policy Considerations for Deep Learning in NLP. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, (pp. 3645-3650). Italy: Association for Computational Linguistics.

Tripathi, V. e. (2026). *Scaling India's Data*. New Delhi: COUNCIL ON ENERGY, ENVIRONMENT AND WATER (CEEW).

UN-Water, 2. (2021). *Progress Update 2021 – SDG 6 – water and sanitation*. GENEVA, SWITZERLAND: UNICEF.

Yañez-Barnuevo, M. (2025, June 25). *Data Centers and Water Consumption*. Retrieved from Environmental and Energy Study Institute (EESI): <https://www.eesi.org/articles/view/data-centers-and-water-consumption>