AI DATA CENTERS AND GROUNDWATER DEPLETION IN URBAN AREAS: NEED FOR A SUSTAINABLE REGULATORY FRAMEWORK IN INDIA

AI DISCLOSURE STATEMENT

The writer only utilized an AI-based writing tool in order to edit the language, correct grammar, and format the paper. All legal research and analysis in this manuscript were carried out by the author herself.

Abstract

India races ahead to build its artificial intelligence (AI) future; however, water is fast becoming an area where there will be bills to pay. In this paper, the impact of water consumption by AI data centers, which are increasingly being located in metros such as Chennai, Mumbai, and Bengaluru experiencing water shortages, is analyzed to understand why India's existing constitutionally recognized right to clean water, centralized Groundwater Authority, and leading IndiaAI mission does not seem to include any provision for regulating water usage by data centers. Applying the doctrinal legal method based on empirical data on water consumption, urban groundwater pressure points, and a comparative review of the European Union, Chinese, and American policy frameworks, the paper reveals the lack of provisions concerning data center water usage in India's otherwise stringent environmental laws regulating pollution and agricultural exploitation of groundwater but not the evaporative loss by cooling. The main argument put forth in this paper is that India's current strategy of voluntary guidelines on energy efficiency and perfect power usage effectiveness (PUE) is unsustainable.

Keywords: AI data centres, groundwater depletion, urban water stress, water governance.

1. Introduction

In addition to using freshwater directly for cooling their servers, these centres also consume large volumes of freshwater (indirectly) to manufacture and provide electricity to their servers. Of the total volume of freshwater AI data centres withdraw, approximately 80% is evaporated back into the environment and 20% becomes wastewater that is primarily a burden on municipal sewage treatment facilities. Therefore, an important question to consider is how do AI data centres contribute to the depletion of groundwater in urban areas? When there are severe drought conditions and rapid urbanisation continues due to AI data centres, groundwater extraction from aquifers to support cooling systems at these sites can accelerate the depletion of aquifers faster than nature can replenish these aquifers, adversely impacting the supply of water to residents of urban areas in the near future. As a result of this situation, we must now look to India and consider two things, firstly are the laws already in place regarding the environment and groundwater sufficient to manage the depletion of these resources? Secondly are there sustainable regulatory measures that can be put into place by India? The current legal framework is deficient in its ability to govern the use of water by data centers, because it only regulates pollution and the extraction of groundwater for agricultural purposes. Consequently, there is no guidance for regulators surrounding this new threat. In order to mitigate both carbon and water footprints, approximately 56% of electricity consumed by data centers is generated from fossil fuels; therefore, switching to renewable sources of energy such as wind or solar will require much less water than fossil-fuel-burning power plants. India must set standards for water use efficiency, enforce a level of water recycling, and accelerate the deployment of clean energy to conserve freshwater supplies while continuing to pursue technological advancements effectively.

2. What are AI data centres?

2.1 Meaning and Role of AI Data Centres

Artificial Intelligence (AI) and Cloud Computing are two of the most critical components that are transforming today’s digital economy. The combination of these technologies will allow businesses to achieve incredible efficiencies, flexibility, and scale while providing new opportunities for innovation. The ability for AI to automate via intelligent means and to predict

trends via predictive analytics will be supported by cloud computing's ability to provide additional capacity to host and support the delivery of AI service offerings. The overlap between AI and cloud is already evident in the form of AI as a Service (AIaaS), Predictive Analytics and Energy Optimisation within Environmentally Friendly Data Centers[1].

Essentially, a hyperscale data centre refers to a very large building where the computing and networking hardware used in the current digitized world are housed. Companies such as Amazon, Google, and Microsoft depend on these facilities in order to operate their platforms and provide various services to the customers worldwide, including but not limited to e-commerce and cloud storage. However, there is an increasingly evident drawback. The hyperscale data centers belonging to the leading technology corporations and colocation data centers, which allow many companies to host their servers at one place, require huge amounts of electricity. As soon as such centers connect to the electrical network of a certain region, the cost of electricity increases significantly for all residents of the said area.

2.2 Why AI Data Centres Require Large Quantities of Water

Water is consumed by data centers in two primary forms: indirect water consumption from energy production in grid electricity (thermoelectric plants), and direct consumption via their cooling processes. By comparison, the same data center consuming about 15 megawatts consumes similar amounts of water as three mid-sized hospitals or more than two golf courses with 18 holes each, an astounding figure.

The reason for high water consumption comes from the heat generated by computing equipment and the need to cool them down. The conventional cooling process involves the usage of chiller plants that reduce temperatures by cooling air through circulation of cold water around 7 to 10°C, acting as a heat sink. Others use cooling towers that circulate air outside of them to facilitate evaporation. Fans then blow out the hot, humid air while the remaining cooled water cycles back through the system. Other facilities use adiabatic economizers, which spray water directly into the airflow or onto a heat exchange surface to cool the incoming air. In both cases,

[1] D.V. Bhavsagar, *Integration of Artificial Intelligence with Cloud Computing: Sustainable Approaches and Effects on Modern Industries*, 16 IJSAT 1, at 1 (2025).

evaporation leads to continuous water loss meaning once that water is gone, it doesn't come back.[2]

2.3 Water Footprint and Environmental Cost of AI

Estimating AI's global power demand is hard, but measuring its carbon and water footprints is even harder. By 2025, AI's carbon footprint alone could reach 32.6 to 79.7 million tons of CO_2 emissions, while its water footprint could hit 312.5 to 764.6 billion litres. Water is trickier to track than carbon because a company's total water consumption includes both direct use (on-site cooling) and indirect use (electricity generation). In 2023, the IEA estimated data centers consumed 560 billion litres of water total. Two-thirds (≈73 billion liters) came from indirect use, and about a quarter (≈140 billion liters) from direct cooling. The remaining 47 billion litres (about 8%) went into hardware manufacturing, which lies outside this study's scope.[3]

Generative AI (Gen-AI) is a type of AI that produces new content, for example, human-like discussions and realistic images. Generative AI creates seemingly original content by being trained on large datasets.

Generative AI comes with a staggering environmental price tag. In 2025 alone, the generative AI boom released roughly as much CO_2 into the atmosphere as New York City, home to over 20 million people does in an entire year, with annual emissions topping 50 million metric tonnes. By 2028, experts expect generative AI to account for about 19% of all data center power demand, and by 2030, the AI revolution will push data center electricity use up by 160%. By the end of 2025, generative AI alone could account for nearly half of all data center usage, requiring almost twice the power needed by the entire country of the Netherlands−23 gigawatts compared to the Netherlands' 12.4 gigawatts. To make matters worse, only about half of that surging energy demand is likely to come from renewable sources.[4]

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[2] David Mytton, *Data Centre Water Consumption*, 4 NPJ Clean Water, art. 11, at 1, 3 (2021).

[3] Alex de Vries-Gao, *The Carbon and Water Footprints of Data Centers and What This Could Mean for Artificial Intelligence*, 7 Patterns, no. 1, art. 101430, at 1, 5 (2026).

[4] *Environmental Impact of Generative AI - 30+ Stats & Facts*, AKEPA (Jan. 15, 2026), https://thesustainableagency.com/blog/environmental-impact-of-generative-ai/ (last visited Aug. 18, 2026) (on file with author).

2.4 Urban Concentration of Data Centres in India

India's data center industry has grown at breakneck speed in recent years, fuelled by more people getting online, the rise of e-commerce and fintech, and businesses shifting to the cloud. Industry estimates put the market at roughly 5.03 billion US dollars in 2024, with projections reaching about 12.85 billion dollars by 2033 a clear sign of massive investment in digital infrastructure. Most of this capacity is clustered in Mumbai, Chennai, Hyderabad, and the Delhi-NCR region, with more planned in Pune and Bengaluru. Government efforts toward data localization, digital infrastructure development, and programs such as Digital India, National AI Mission, and Digital Personal Data Protection Act (DPDPA 2023) have resulted in increased emphasis on local computing and data centers. Large corporates from India are also making efforts in that direction. The Adani group, in association with EdgeConneX from the USA under the partnership AdaniConneX, seeks to establish a platform with a capacity of a gigawatt in India. Reliance Jio is investing in cloud computing facilities, edge computing technology, and AI platforms owing to their large fiber optic network capabilities and 5G deployments. Reliance has associated itself with NVIDIA to create an advanced AI platform and create a massive-scale AI-enabled data center campus in Jamnagar with most of the energy coming from renewable sources such as solar power, wind farms, and green hydrogen plants.

The construction of these centers is being done in a country that holds 18% of the world's population, but it only has 4% of the world's freshwater supply. Hyperscale centers have cooling processes that use up a lot of water, which might end up competing for the same resource against other essential activities like farming and supplying potable water in areas that already have a problem with shortages of water like some parts of Maharashtra, Tamil Nadu, and Karnataka. For example, a 3,000 MW power plant can use 6 crore liters of water every day. If we continue relying on freshwater dependent cooling without checks, we could see rising water bills, forced water rationing, and growing conflicts between rural and urban areas over who gets access to water.[5]

[5] Moksha Jain et al., *The Rise of AI Data Centers in India: Strategic Growth Driven by Adani-Ambani Investments and National Digital Ambitions*, 12 IJIRT 5356, at 5356–5358 (2025).

3. Groundwater Depletion and Urban Water Crisis in India

3.1 Meaning and Importance of Groundwater

Ground water is the water that seeps through rocks and soil and is stored below the ground. The rocks in which ground water is stored are called aquifers.[6] Groundwater plays a fundamental role in shaping the economic and social health of many urban areas. However, no comprehensive statistics exist on the proportion of urban water supply world-wide derived from groundwater.

Groundwater is not subject to many of the same seasonal and external environmental changes that surface water sources are; therefore, it is considered to be a more dependable supply of water than surface water during periods of drought or limited water availability. Groundwater continually provides water to municipalities, which uses groundwater for drinking water; industrial processes; sanitary collection systems; and cooling power plant equipment. In addition to providing water to urban areas, groundwater is an important source of irrigation for agricultural production, helping to sustain agricultural production despite the loss of agricultural land due to urban development. As cities have expanded, the demand for groundwater has also increased. Careful management of groundwater resources is required to ensure that groundwater supplies are not depleted while meeting both the needs of urban areas as well as the natural environment.[7]

3.2 Causes of Urban Groundwater Depletion

a. Industrial Ground Water Usage

When it comes to water sources for Indian industry, surface water leads the pack at 41%, followed closely by groundwater at 35%. Municipal water makes up the remaining 24%, but

[6] Roopal Suhag, *Overview of Ground Water in India*, PRS Legislative Research (Feb. 2016), https://prsindia.org/files/policy/policy_analytical_reports/1455682937--Overview%20of%20Ground%20Water%20in%20India_0.pdf (last visited Aug. 18, 2026) (on file with author).

[7] Agnieszka Lewandowska, *The Importance of Groundwater for Urban Development and Infrastructure*, 14:06 J. Civil Environ. Eng. 1 (2024).

here's the catch it's only available to industries located in or near cities. Most industries actually use both surface water and groundwater together. They tend to lean on groundwater as a backup when surface water becomes scarce or too polluted to use in their processes.

Encouragingly, India's industry is now starting to realize that water conservation is not someone else's responsibility but needs active participation from all users. The corporate entities we interacted with understand that this is an area where everyone must take responsibility. The firms we talked with feel that corporations must come together with their communities and governments to develop initiatives that include recharge of groundwater, treatment of effluents and maximum conservation of water.

b. Urbanisation

The urbanisation process brought about by the increase in the levels of industrialisation and economic development is causing rapid changes in India. With the Indian population increasing by 17 million individuals every year, it means there are approximately 31 babies born per minute. Assuming the same trend is maintained, by the year 2050, the total number of individuals living in India would be 1,620 million. On a global scale, more than half of the population on earth already resides in urban settlements, and by the year 2025, the ratio is expected to rise above 70%. Nonetheless, such urbanisation trends in India have been very environmentally costly due to severe shortages of houses, poor water quality, pollution, constant sounds, dust, heat, and increased problems with the disposal of hazardous wastes and garbage.

For example, consider groundwater systems. Urbanization modifies both the topography as hills are leveled out and valleys filled up to facilitate construction, as well as plant cover which affects evapotranspiration rates and the groundwater flow path. In addition, there is what is called the heat island effect whereby cities tend to be warmer than their neighboring rural areas, and this has an influence on groundwater temperatures as well. With respect to water table levels, they can either decrease or increase depending on the level of extraction, among other factors.

Let us now take into consideration construction activities and pumping. Building processes and underground engineering structures directly influence the groundwater. In case the groundwater table is near the Earth's surface or when constructing tunnels and subway stations, the city usually needs to pump groundwater, thus conducting the process known as dewatering or depressurization. Such pumping can decrease water tables for many years, in some cases even up to several years.

However, there is one irony to all this. While on the one hand, we pump groundwater, on the other hand, we create additional sources of it. Leaking from the water mains—special pipes which supply the water to different regions within cities—can be quite huge. It ranges from five percent up to sixty percent of water drawn from surface reservoirs or aquifers. The lowest percentage can be seen in case of special low-pressure system or in new constructions. Yet, with proper maintenance, leakage can be kept under ten percent. Thus, apart from pumping, urbanization also leads to recharging of the aquifer due to leaking pipes.[8]

c. Climate Change

Climate change is silently making the situation even more serious. Higher temperatures lead to increased evaporation rates both from soil and reservoirs. It has also led to the unpredictability of rainfall. All in all, this leads to an increase in drought frequency and a decrease in the refilling of groundwater aquifers due to rainfall. Besides, even if precipitation occurs, it happens during periods when it is not needed either by farmers or townspeople. Therefore, we can expect even more prolonged dry periods and an ever-increasing need for water in the future. Hence, it is vital to learn how climate change affects the world's groundwater as soon as possible and develop adaptive strategies in order to cope with the lack of resources.

The following information might be quite surprising. Groundwater issues in India may have an adverse impact on global warming since lowering the average level of groundwater in the country even by a single meter will result in an increase in carbon emissions by 1%. Why?

[8] Sharanappa, Abdulgani Nabooji & Santosh, *Impact of Urbanization on Ground Water Dynamics*, 2 Just Agric., no. 8, at 1–2 (Apr. 2022), https://justagriculture.in/files/newsletter/2022/april/26.pdf (last visited Aug. 18, 2026) (on file with author).

Pumping water from great depths requires more energy consumption, and most of the sources of energy are fossil fuels.

The bottom line? India is highly sensitive to climate change. If precipitation decreases and surface water inflows shrink, the demand for groundwater will only rise. That, in turn, reduces discharge elsewhere in the system. The sectors already struggling farming, drinking water supply, industry are likely to become even more vulnerable. And let's be honest: there are still huge uncertainties in how to deal with these climate-related vulnerabilities. Climate change hits aquifers in two ways: direct and indirect. Higher temperatures lead to more potential evapotranspiration. That means crops and plants need more water, which means humans will pump even more groundwater to keep up. It's a vicious cycle, and we're already in it.[9]

3.3 Environmental Consequences

The United Nations University has stated that the exhaustion of underground water resources is one of the six environmental tipping points on Earth. In other words, once this point is crossed, there is no easy return to the previous position. Several nations, including Saudi Arabia, have already passed this tipping point. The situation in India is such that the nation is standing dangerously close to that point due to its enormous consumption of ground water resources, which is mostly unregulated.

For instance, Uttar Pradesh is experiencing a severe impact from its excessive exploitation of groundwater. According to a district-level study, for every one-meter fall of the water table beneath its long-term average, an 8% decline in the yield of food grains takes place.

Coming to Gujarat, another Indian state where the water table is depleting, it is estimated that reducing water usage even by 30% will free up quite a lot of energy, which was being used for pumping. It may seem like a win-win situation, as this would allow the government to use all the

[9] Sunil Kumar, *Impact of Climate Change on Water Resources in India*, 7 Int'l J. Current Microbiology & Applied Sci. 3853, 3853–3858 (2018).

saved power for other purposes; yet, in reality, it would deprive citizens of their electricity supply.[10]

The Metro Water Board in Chennai has been the sole supplier of water and manager of sewage since it was established as an independent organization through the passage of an act in 1978. However, in 1987, the Chennai Metropolitan Groundwater (Regulation) Act empowered this body to regulate the quantity of groundwater that can be used for extraction and to ensure priority use for drinking water for the population. Chennai is faced with severe water shortage, especially during periods of low rainfall. The Metro Water Board provides only around 50% of the total requirement of water, which too is not consistent. What then is the source of the remaining quantity? Groundwater. Like most other Indian cities, Chennai relies heavily on its groundwater resources. However, with such high dependence on its groundwater, the city of Chennai has to face the bitter truth. It is facing over-exploitation of its groundwater resources. Groundwater has been depleted to very low levels, and saltwater intrusion due to high tidal action is becoming common in coastal areas. This has left the majority of the underground water non-potable as various water quality parameters have verified. Therefore, the case of Chennai is a clear lesson on how, when urban water supply schemes fail to cope with water needs, the people revert to groundwater. Once overexploited, even this water will become non-potable.[11]

So why is all this so important? The reason is that ground water irrigation lies at the heart of agricultural operations in India. When aquifers deplete rapidly in so many areas as they are now, it means more than parched wells; it means an assault on food production, and hence food security, in this country. This isn't theoretical. This may consequently contribute to food insecurity and adversely affect food availability.

3.4 Effect on local communities

[10] Amit Kapoor & Mukul Anand, *Addressing Groundwater Depletion Crisis in India: Institutionalizing Rights and Technological Innovations*, Economic Advisory Council to the Prime Minister (Mar. 2024), https://eacpm.gov.in/wp-content/uploads/2024/05/Addressing_Groundwater_Depletion_in_India.pdf (last visited Aug. 18, 2026) (on file with author).

[11] S. Janakarajan et al., *Urban Water Conflicts in Indian Cities: Man-Made Scarcity as a Critical Factor*, UNESCO, SC-2006/WS/19 (2006).

Whenever the topic of groundwater depletion in India arises, the discussion inevitably revolves around wells without water and parched farmlands. However, the impact is much wider — it affects the community in ways people do not foresee.

In addition to the quantity, the quality of groundwater resources also deteriorates as a result of water table decline. Falling water tables tend to increase contamination with toxic substances like salts. As a result, the little groundwater that remains is often unfit for consumption. Another issue relates to the growing costs associated with deeper extraction and pumping. The cost of energy increases significantly because the pumps require extra electricity or diesel to function properly.

Now imagine the problem from an even broader perspective. Groundwater depletion leads to rising sea levels since extracted groundwater finds its way to the oceans eventually. For coastal areas, this means additional pressure as excessive pumping leads to seawater intrusions into groundwater basins. Once the saltwater intrusion occurs, the water becomes unfit for use in agriculture or for consumption.

Land subsidence, which involves subsidence of the very land, initiates on land. Subsidence makes buildings crack, breaks roads, and causes flooding. Indian metropolises of Chennai, Delhi, and Kolkata have already experienced land subsidence, which is the initial stage.

Another element connected with groundwater depletion is rivers. Rivers suffer significantly due to excessive groundwater extraction since the baseflow of the Ganga River is decreased in summer months due to pumping. Shallow groundwater decline due to pumping in the Arkavathy sub-basin in southern India has occurred in the last fifty years and caused an abrupt decrease in streamflow. Streamflow decline persists far downstream despite no pumping in areas downstream of the river.

Forest ecosystems can also suffer from the effects of excessive groundwater extraction due to their deep rooting. Trees draw groundwater from a significant depth and pass it on to other plants having shallower rooting systems. However, if the groundwater level goes down too much, deep rooting will become useless, and trees will dry out.

Hence, it becomes clear that groundwater depletion has more negative effects for Indians than simple lack of water supply, including increased salinity of water, increasing well depths, increased electricity expenses, subsiding land, death of rivers, and disappearance of forests.

a. Water Inequality in Indian cities

Accessibility, affordability, and sustainability of WASH (short for water, sanitation, and hygiene) are a vital public health concern in international development. They are mentioned in Targets 6.1 and 6.2 of Sustainable Development Goal 6. Target 6.1 refers to universal and equitable access to safe and affordable drinking water for all people, and Target 6.2 addresses equal and sufficient sanitation and hygiene. Thus, "access to WASH" can be described by the presence of drinking water, adequate sanitation facilities, and appropriate education about hygiene.

Previous studies conducted by Indian authorities revealed that 70.1%, 21.4%, and 6.7% of urban households used municipal water, tube wells, and open wells respectively. Yet, according to the results of this research, the overwhelming majority of respondents, 92%, in major Indian cities use municipal water; however, 9.5% use community municipal tap water and 90.5% private municipal water. The share of households using only municipal water is significantly smaller except for those in Mumbai. What is the reason? Unstable water supply! 84.5% in Kanpur, 82.3% in Madurai, 60.3% in Hyderabad, 31.5% in Kolkata, and 28.6% in Delhi do not use municipal water due to instability of its supply. Only 5.6% do not use municipal water in Mumbai.

What are those other sources? Mostly groundwater. In Delhi, 24.5% use tube wells, and 7.5% depend entirely on groundwater. In Kanpur, tube wells serve 80% of households, and 41% rely solely on groundwater. In Ahmedabad and Hyderabad, tube well use is 38.5% and 48.5%, respectively. Across all seven cities, two-fifths of households use groundwater, and about 7% depend on it completely. As cities like Delhi, Kanpur, and Hyderabad grow, groundwater tables are falling fast. Over 85% of households say shortages become acute in summer.

Consequences are dire. Arsenic levels are increasing in wards in Kolkata. Fluoride pollution affects Rajasthan and Gujarat. Private water suppliers flourish; 11% of residents in Hyderabad rely on tankers, and 46% of those are private. Packaged water sales have increased as well; in Delhi, 2.2%; in Mumbai, 1%; and in Madurai, 1.5%. It's a vicious cycle; irregular municipal water forces people into private sources.[12]

b. Public health impacts of water shortage in India

The Constitution of India includes provisions related to safe water for drinking purposes. Article 21 is about the Right to Life, interpreted by the Supreme Court to mean safe water provision. Article 47 obliges the State to promote public health and provide safe drinking water, although it is not legally binding. Article 51A mandates citizens to protect water resources as their responsibility.

Water shortage is estimated to affect up to four billion people on an annual basis. There is bound to be an immense increase in the coming two decades, particularly among urban populations. The implications include increased incidences of disease, malnutrition, and social unrest. Diseases such as cholera, dysentery, and typhoid tend to become more prevalent due to lack of access to clean water sources. Reduced agricultural output, scarcity of food, and malnutrition result from water shortage. Moreover, energy and commodity prices increase, deepening any prevailing economic recession, and even causing civil unrest. While the rich can afford bottled or filtered water, the poor cannot access these resources.

3.5 Role of Data Centres in Intensifying Urban Water Stress

Though India is inhabited by 18% of the world's population, it has only 4% of the total volume of water in the world – mostly underground water. However, it is responsible for more than 25% of the total extraction of underground water in the world. The underground water in India is responsible for more than 60% of its irrigation water, 85% of rural water and 45% of urban water needs.

[12] Abdul Shaban, *Water Poverty in Urban India: A Study of Major Cities* (2008) (unpublished seminar paper, UGC-Academic Staff College, Jamia Millia Islamia) (on file with Jamia Millia Islamia University Library).

Now add AI data centres to the mix. As of early 2026, India had over 1,800 Global Capability Centres (GCCs) operational. The country's data centre capacity is set to jump from 1.5 gigawatts to about 6.5 gigawatts by 2030, backed by billions in investment. But water problems will only get worse.

For context, a typical US data centre in 2023 used 1.8 billion litres of water directly for cooling, about 5 million litres per day, plus another 10 billion litres indirectly to generate its electricity. One of Google's AI data centres in Iowa alone used 3.8 billion litres in 2024 (10 million litres per day), enough to cover an entire US state's water needs for a week. Unsurprisingly, an estimated 67% of all data centres now face water stress.[13]

a. Data centre water usage in Indian cities

India is racing to expand its data processing capabilities, with hyperscale data centres sprouting up everywhere. Metro cities like Chennai, Mumbai, Bangalore, and Delhi are already saturated, so operators are now turning to Tier II and Tier III cities for cheaper land and labour.

In March 2024, the government partnered with NVIDIA to acquire 10,000 GPUs for startups to boost AI capabilities. It also announced a $1.25 billion investment in AI projects to improve computing infrastructure and develop large language models. Mumbai is expected to handle 40% of new data centre capacity, Chennai 25%, and Hyderabad 15%. The government also approved ₹10,371.92 crore for the national AI mission, standardising computing access, improving data quality, attracting top talent, and ensuring ethical AI use.

Some of the global behemoths, such as Microsoft, have already started setting up their data centres in Maharashtra and Telangana, requiring hundreds of millions of gallons of water annually. It is projected that around 40-50% of India's data center capacity will be deployed for AI operations and GPU processing by 2030, with total capacity surpassing 6 GW. Cloud service providers intend to deploy more than 1 GW of capacity in the next five years.

[13] Ateesh Tankha, *View: Data Centres May Drain Us Dry*, Econ. Times (Feb. 11, 2026), https://m.economictimes.com/opinion/et-commentary/view-data-centres-may-drain-us-dry/amp_articleshow/128861794.cms (last visited Aug. 18, 2026) (on file with author).

Yotta in Uttar Pradesh signed an agreement worth ₹39,000 crores ($4.39 billion) to construct six data centers within five to seven years. However, the local villagers say that they have not gotten anything from the company—neither employment nor better living standards. “One laborer says, Once the construction is done, we won't be needed anymore.”

India has 18% of the world's population but only 4% of its water resources. A 1 MW data centre consumes about 26 million litres of water annually for cooling. Yotta's 30 MW Greater Noida facility uses roughly 780 million litres yearly—equivalent to the daily needs of 15,830 urban residents. Scale that to 160 MW across a park, and water use hits 4.2 billion litres per year, matching a town of 85,000 people.[14]

4. Constitutional Framework

In India, the right to clean drinking water flows from Article 21 (right to life). The Supreme Court has interpreted Article 21 to include the right to a clean environment, and from that, the right to clean water. Article 39(b) of the Directive Principles recognises equal access to material resources for the common good, though it is non-justiciable.

So far, courts have protected clean water mainly as a negative right: the right not to have water sources polluted. This began with *Bandhua Mukti Morcha v. Union of India*[15] where the Court first articulated the right to a healthy environment under Article 21.

In *Narmada Bachao Andolan v. Union of India,*[16] Justice Kirpal observed: "Water is the basic need for survival and is part of the right to life under Article 21. The right to a healthy environment and sustainable development are fundamental human rights implicit in the right to life."

[14] Shivani Dutt et al., *Silent Thirst: Water Footprints of AI Data Centres in India and Routes to Resilience*, 7 IJCAI 31, at 33–34 (2026).
[15] *Bandhua Mukti Morcha v. Union of India*, (1984) 3 SCC 161 (India).
[16] *Narmada Bachao Andolan v. Union of India*, (2000) 10 SCC 664 (India).

In *Vellore Citizens' Welfare Forum v. Union of India*[17], tanneries in Tamil Nadu had polluted the Palar river and contaminated groundwater. The Court recognised the common law right to a clean environment, awarded compensation based on the precautionary principle and polluter pays principle, and held that the burden of proof lies on the industrialist to show their action is environmentally benign. The Court concluded that constitutional provisions protect the right to clean water, but the source is the inalienable common law right to a clean environment.

4.1 Groundwater Regulation

The central government has tightened control over groundwater. In 1972, it created the Central Ground Water Board (CGWB), empowered under the Environment Protection Act, 1986, to enforce national regulations. The Central Ground Water Authority (CGWA) can declare "notified areas" where industrial extraction is sharply restricted. Permission is rarely granted except for schools, hospitals, and government agencies.

In a 2004 judgment, the Supreme Court applied the public trust doctrine to groundwater. In 2006, it banned bore wells around two Andhra Pradesh lakes. Yet no statute overrides landowner dominion.

The Model Bill (first proposed in 1970, revised in 1992, 1996, and 2005) creates state authorities but does not sever land rights from extraction rights. It ignores decentralization under the 73rd and 74th Amendments and fails to prioritise drinking water over irrigation or incorporate polluter-pays principles.

States have power to make laws on "water". Goa, Kerala, Tamil Nadu, and West Bengal have regulations; Karnataka, Madhya Pradesh, and Maharashtra have limited drinking water laws. Himachal Pradesh requires royalties for extraction. The 2011 Draft Model Bill addresses gaps, but states have not adopted it.

[17] *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 SCC 647 (India).

4.2 Data Centre and Digital Infrastructure Policies

On 7th March 2024, the Cabinet approved the IndiaAI Mission. Its goal is to harness AI across sectors by democratizing computing access, improving data quality, fostering indigenous AI, attracting talent, supporting startups, and ensuring ethical AI use.

As of 31st August 2025, here's what has been achieved. Over 38,231 GPUs are now available to startups and researchers at subsidised rates. A secure GPU cluster with 3,000 next-generation GPUs is also being built for sovereign applications. AIKosh has onboarded 1,500 datasets and 217 AI models from 34 entities across 20 sectors, with permission-based access. Four startups are being supported in the first phase to develop India's sovereign models, receiving funding covering up to 25% of compute costs—split as 40% grants and 60% equity. "The India AI Application Development Initiative has taken 30 sectoral applications to the prototyping stage. The Committee recommends empowering the IndiaAI Mission, line ministries, regulators, and state governments to implement enablement-focused initiatives. For MSMEs, the government should provide tax rebates on certified solutions, AI-linked loans through SIDBI and Mudra, and subsidised GPU access, supported by sector-specific toolkits for textiles, retail, logistics, and food processing.[18]

5. Regulatory Gaps and Challenges

5.1 Absence of AI-Specific Environmental Regulation

India is racing ahead with AI infrastructure, backed by the IndiaAI Mission and PLI schemes, but environmental laws haven't kept pace. A medium-sized data centre consumes roughly 110 million gallons of water yearly for cooling equivalent to 1,000 households. In India, most AI data centres sit in tier-1 cities that are already water-stressed, making a terrifying situation worse.

Legally speaking, the Environment (Protection) Act, 1986 provides the state with a wide array of power to control pollution. Right to life, according to courts, also includes the right to freedom from the effects of climate change. The National Green Tribunal recently addressed issues

[18] Press Information Bureau, *India AI Governance Guidelines: Enabling Safe and Trusted AI Innovation* (Nov. 5, 2025), https://static.pib.gov.in/WriteReadData/specificdocs/documents/2025/nov/doc2025115685601.pdf (last visited Aug. 18, 2026) (on file with author).

around the waste generated in Moradabad, declaring severe contamination of groundwater due to burning circuit boards and issuing a National Action Plan under the E-waste Rules, 2022. These rules prohibit hazardous content above 0.01%, restrict storage to 180 days, and levy stiff penalties.

However, these rules do not deal directly with AI data centers. There is no environmental law regarding AI that requires the establishment of water efficiency standards or restriction on the extraction of groundwater or even lifecycle measures for the hardware used in AI.

5.2 Poor Monitoring of Groundwater Extraction

Groundwater is being pumped much faster than it can be naturally replenished, placing India under heavy pressure due to its lack of water. Drought-ridden areas are suffering more than others. According to a study carried out jointly by the Central Groundwater Board and state governments, 14.7% of India's groundwater units have become over-exploited, with extraction exceeding recharge capacity. Further, another 3.9% are termed 'critical', meaning that water is being extracted at between 90-100% of capacity. These percentages are set to increase every year. Among some of the states that have many over-exploited units are Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, and Tamil Nadu.

The socio-economic consequences are severe. As water tables deplete, shallow tubewells run dry, leaving poor farmers without water, while big farm owners can drill deeper wells. Besides depletion, the quality of water has deteriorated considerably, with over-pumping bringing up arsenic, fluoride, and iron from the bedrock. Where water is near sea level, seawater percolates, making the water salty. Additionally, three-quarters of urban wastewater is dumped untreated, causing widespread diseases. Further, industrial wastes pollute groundwater since there is little regulation of such activities[19]. To make matters worse, there is widespread groundwater extraction from illegally constructed borewells that have not been authorised, with the perpetrators being mostly farmers, industrialists, and land developers operating in India.

[19] Attar Singh & Vinita, *Groundwater Crisis and Reforms in India*, 5 JETIR 130, at 130 (2018).

5.3 Conflict Between Digital Growth and Sustainability

India is rushing to create its digital future through more data centers, more artificial intelligence and electronics. Yet, the cost to our planet is enormous. Each new data center and chip manufacturing plant consumes vast amounts of energy, water, and produces mounds of e-waste. The cities where all these innovations are happening Chennai, Mumbai, Bengaluru, Delhi are running out of clean water and struggling with pollution. On the other hand, legislation formulated years ago did not foresee the rise of AI or hyperscale data centers. Hence, we are stuck in a vicious cycle – choose one, either digital growth or resource preservation.

6. Comparative International Perspective

Europe takes data centre sustainability seriously. Under the 2023 European Green Deal and Energy Efficiency Directive, most data centres must report energy use, PUE, water use, and waste heat annually, while improving efficiency and recovering waste heat. The EU also has a sustainability rating system. The voluntary Climate Neutral Data Centre Pact commits operators to 100% carbon-free power by 2030 and PUE targets of ≤1.3 in cool climates and ≤1.4 in warm ones.

Some EU countries go further. Germany requires data centres to source at least 50% renewable power. From 2026, new centres must have PUE ≤1.2 and reuse at least 10% of waste heat. From 2027, all must use 100% renewable power, and new centres must reuse at least 15% waste heat. By 2030, all must have PUE ≤1.3, and new centres must reuse at least 20% waste heat. Ireland imposed a moratorium on new data centres and now considers requiring on-site or nearby dispatchable generation equal to load. Denmark now lifts price caps on waste heat and requires centres over 100 kW to assess heat recovery feasibility.

There have been aggressive actions taken in China too. New data centre facilities were required to meet the PUE ≤1.3 target by the end of 2023. The average national PUE target is 1.5 by the end of 2025. As stated in the Special Action Plan, issued in July 2024, renewable energy is to be increased by 10 percent per annum. Some provinces, including Inner Mongolia, support combining data centres with renewables. The "Eastern Data, Western Computing" project, which

was launched in 2022, relocates computing workloads from crowded eastern cities to western provinces abundant in wind, solar, and hydro energy.

India, however, perceives data centres as critical infrastructure and provides tax exemptions and expedited approvals. Some states provide incentives for using renewable energy. For example, data centres operating in Tamil Nadu, which use 30 percent or more renewable energy, qualify for tax exemptions. In 2010, the Bureau of Energy Efficiency and CII issued guidelines for improving the energy efficiency of Indian data centres. The Indian Green Building Council advocates for the ideal PUE of 1.4 – 1.5. Unlike Europe and China, however, India lacks national PUE requirements, renewable energy targets and waste heat recovery legislation for data centres.

7. Need for a Sustainable Regulatory Framework in India

7.1 Mandatory Water Usage Disclosure

However, the country has been steadily crafting a relatively robust system mandating industries to make a complete disclosure about their water withdrawal activities. One of the main reasons behind such requirements is the business responsibility and sustainability report (BRSR), made mandatory by SEBI for the top 1,000 companies listed on the stock exchanges . It can be called an annual confession report on the company's contribution to environmental degradation. For example, such documents require information about the amount of water withdrawn by industries from river sources, underground resources, or supplied by local municipalities, as well as their further treatment.

In addition to financial disclosure obligations, the most intensive consumers of groundwater are required to have a specific permit issued by the Central Groundwater Authority (CGWA). For any industry withdrawing over 100 kilolitres of water per day, obtaining a no objection certificate (NOC) is compulsory. Specific obligations that accompany such certification include the need for an annual audit, installation of telemetered digital flow meters, and twice-a-year third-party audit of water consumption. Overexploited groundwater zones forbid new industrial projects, except small-scale ones.

As for industries that need the largest quantities of water, the Central Pollution Control Board applies zero liquid discharge (ZLD) guidelines, especially in areas such as Tamil Nadu and Gujarat where resources are under stress. Industries will be obligated to use every last drop of the wastewater without allowing anything to escape into rivers or groundwater.

The latest additions to the existing laws include the Environment Audit Rules, 2025. Notified in August 2025, they oblige registered environmental auditors to audit industries for their compliance with water laws, air pollution laws, as well as waste regulations, with severe penalties for any fraudulent reporting.

In summary, despite India not having one consolidated "water disclosure" law, a tiered regulatory framework now obliges industries to disclose, audit, and limit their water usage on paper.

7.2 Groundwater Licensing and Environmental Audits

It's not easy to dig a borewell and extract groundwater in India, particularly for commercial purposes. There is an authority called the CGWA (Central Ground Water Authority), and you need their permission, known as 'No Objection Certificate' (NOC). It's a certificate showing that water extraction will not cause environmental hazards.

This permission is necessary for all projects which include industries, infrastructure, mining projects, or even big residential complexes, if the water is being extracted more than domestic purposes. This permission is most important in those areas that are marked 'over-exploited' or 'critical', meaning that in these places the water levels have been lowered to alarming positions. No industries can be permitted to extract water from such zones, whereas small-scale industries might be given a concession. This permission is granted for a period of two to five years only, but it should be renewed well in advance.

Compliance does not stop at obtaining the permit. It entails constant monitoring of the water table levels, providing water audits annually and conducting regular inspections. Violations such as unregulated pumping or the absence of water metering equipment may result in penalties as high as ₹2 lakh per month and even sealing of your borewell.

India's groundwater permit system strives for a balance between economic development and preservation, but its success is reliant primarily on proper enforcement and reporting.

In relation *to Perumatty Grama Panchayat v. State of Kerala*[20]

Plachimada is regarded as the most famous case of water dispute in India. Hindustan Coca-Cola Beverages, the Indian branch of The Coca-Cola Company, was exploiting large quantities of groundwater on its premises. Villagers, especially those who belong to the tribe of Perumatty Panchayat and surrounding villages, witnessed dry wells. They sued the company and demanded that its license should not be renewed.

In the terms of agreement between Coca-Cola and the Kerala State Pollution Control Board, the corporation was given an opportunity to exploit up to 1.5 litres of water commercially through six borewells situated within the limits of factory premises. In other words, the corporation received an authorization to use groundwater to fulfill its production requirements which implied consumption of 3.8 litres of water for each single litre of Coca-Cola.

Panchayat approached the Kerala High Court claiming that besides exploitation of the groundwater, it was polluted by the company. Coca-Cola rejected both allegations. First of all, there was only one judge who ruled that exploitation of such amounts of groundwater by a private company contradicts public interests.

However, in this instance, the company appealed the ruling. Unfortunately, in this case, the Court failed to find substantial grounds for revocation of the license. This is because the Court argued that the company was pumping groundwater from the wells within its rights and not illegally doing so. The Court cited English Common Law according to which a person who owns the land is legally permitted to pump groundwater from it. It was on this premise that the Court allowed Coca-Cola to extract water at a rate of 50,000 liters per day because there were no issues regarding its assessment.

Simply put, the community had no choice but to lose to the law.

[20] *Perumatty Grama Panchayat v. State of Kerala*, (2004) 1 KLT 731 (India).

7.3 Sustainable Cooling Technologies

Increased energy consumption is not the only issue associated with data centers; they also have a voracious appetite. Annually, in the United States, approximately 660 billion liters of water are consumed for cooling purposes. A single data center could consume about 10 to 20 million liters of water per day—the equivalent of what a small city consumes.

However, there are a variety of methods that can be applied to lessen the ecological impact of data centers. The following are some of those measures: Containment of hot and cold aisles involves designing a layout of the servers that would result in enclosed hot and cold aisles. Low-power servers offer a good compromise between performance and consumption.

Ultrasonic humidification helps data centres run efficiently, and using ultrasound is estimated to use about 90% less energy than conventional humidification methods.

Seawater heat sinking uses circulation of nearby seawater or even places data centres underwater to cool them naturally.

Modular centres are portable data centres that allow rapid rollout while reducing carbon output.

Underground data centres take advantage of lower year-round temperatures, cutting the need for cooling equipment.

Waste heat reduction matters because 98% of data centre electricity is released as heat. That heat can be recycled in a closed-loop system—for heating homes, local swimming pools, or even lobster farming in Norway.

Fuel cells using hydrogen offer energy storage with relatively easy refuelling and zero carbon emissions.

Evaporative cooling uses water evaporation to reduce heat in an energy-efficient manner.

Liquid cooling uses fluid either "direct-to-chip" or through a cold plate to transfer heat via a cooling loop.

LNG regasification recovers cold energy released during the regasification process and uses it to cool data centres.

Wind cooling uses natural wind instead of air conditioning, when weather conditions permit.

Artificial intelligence helps by predictively identifying system overloads and overheating risks before they happen.[21]

7.4 Sustainable AI infrastructure policy

The AI boom in India is being developed through the establishment of a policy framework that will help protect our environment. The government's major initiative, called IndiaAI Mission was approved in March 2024. Its objective is to democratise computer access and develop indigenous capabilities in Artificial Intelligence, with special emphasis placed on ethics and sustainability. In accordance with the mission, the India AI Governance Guidelines were also published by the government in November 2025. The guidelines provide a detailed framework for developing and using AI technologies, based on seven 'guiding principles' or 'Sutras.' The guiding principles include 'Trust is the Foundation of AI', 'People First', 'Innovation over Restraint', and most importantly, 'Safety, Resilience and Sustainability', which attempts to outline the requirement for AI systems to be safe, reliable and sustainable from an environmental standpoint.

How will this play out for data centre and infrastructure? The Indian government has recognised the high energy consumption of AI systems and data centres. Based on estimates from the Ministry of Power, electricity consumption of data centres will reach approximately 13.6 GW by 2031-32 . To minimise the impact of energy consumption on India's power infrastructure, the Bureau of Energy Efficiency (BEE) has recently amended building codes (ECSBC 2024) to establish Energy Conservation & Sustainable Building Code provisions specific to water and energy uses for large-scale facilities.

As we continue to expand our economies through disruptive technologies purposeful use of resources and increasing users have created unprecedented demands for data centers. In India,

[21] Thomas Dutka & Justin Webb, *Green Data Centres*, Patrizia Mag., 2023, at 3.

the National Solar Energy Federation of India's (NSEFI) Green Data Center Coalition (a collaboration between NSEFI and the Aspen Institute) has committed to transitioning data centers to carbon-free energy sources through the combined use of solar-plus-energy storage systems. Their vision is to utilize dramatically lower costs of solar-plus-energy storage systems in order to deliver dependable power to operating data centers.

As operators have begun implementing advanced cooling strategies, such as using liquid immersion cooling systems along with AI-optimized building automation systems to reduce the amount of water consumed by data centers (an average 1 MW data center could use up to 25 million litres/67 million gallons of water each year), some facilities located in India have achieved PUE ratios of 1.3 or lower. As a result, organisations are voluntarily adopting WUE targets established by the Indian Green Building Council (IGBC) of less than 2.2 litres of water used per kWh of electricity consumed, and cities like Chennai and Mumbai have begun requiring new data centers to have water impact assessments conducted.

As such, India's two goals are to support digital economic growth while conserving natural resources. The ongoing emphasis by authorities on developing policies that encourage the implementation of mandatory energy efficiency standards, increased use of renewable energy sources, and reduction of water consumption for all data center operations indicates that these changes are imperative for any company seeking to build a successful digital future". The only uncertainty that remains is whether such legislation will be enforced uniformly across many states. However, hopefully the long-anticipated launch of a comprehensive data centre energy management program will provide enough grounds for ensuring future success for data centers, because one cannot build a digital future on dry wells and an unfeasible electrical infrastructure.

8.Conclusion

The study highlighted the direct link between power consumption and water consumption by AI data centers. While a typical 30 MW AI center consumes as much water as 780 million liters annually, which is sufficient to quench the thirst of over 15,000 people living in cities and more than 70% of water ends up evaporated. These centers are installed in cities like Chennai,

Mumbai, Bengaluru, and Delhi and hence compete with other stakeholders to secure a share of scarce water resources. India accounts for 18% of global population while it has only 4% of the fresh water available in the world. Moreover, the country is using more ground water resources than being replenished by mother nature. However, it appears that no legislative mechanism exists which addresses such concerns. Under Article 21, right to access water is protected by Indian constitution but there is no provision regarding the amount of water required by any artificial intelligence data center. Environment Protection Act, 1986, CGWA regulations, and Model Bill all ignore any mention related to digital infrastructure. This is already being done in Europe, Germany, and China. Guidelines and a perfect figure of 1.4 won't do. There’s no doubt about that because failure to take action now will see our digital paradise sucking dry our most precious resource. It can be achieved if we regulate ourselves in such a way that we achieve a win-win situation for ourselves.