



AI, climate change and justice: elements for a normative framework centring the Global South

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Abstract

AI's inextricable materiality is central to its environmental impact. From energy-intensive computation to the extractive demands of hardware and infrastructure, AI technologies are deeply embedded in global material and ecological systems. Examined through a socio-political lens, these environmental dimensions raise pressing justice concerns. This paper argues that discussions of AI's environmental impacts must move beyond efficiency metrics to incorporate a global climate justice perspective within AI ethics, with particular attention to unequal global impacts. The paper unfolds in three sections. First, it demonstrates how AI's environmental footprint across its full lifecycle, from development to deployment, constitutes a global climate justice concern. This includes analysis of energy use and water consumption in data centres, as well as the geopolitical implications of mineral extraction for hardware. Second, the paper examines what applying a climate justice perspective to AI ethics entails. Drawing on political philosophy, it focuses on two core dimensions of justice: distributional (who bears the costs and benefits of AI's environmental impacts) and procedural (who is included in, or excluded from, decision-making about AI development and deployment). Together, these dimensions inform a set of conceptual and normative tools for assessing the AI-climate nexus, with particular relevance to Global South contexts. Finally, the paper grounds this discussion in a case study of India, illustrating how AI development intersects with climate vulnerability and global environmental inequality. The paper concludes by reflecting on how a climate justice approach can clarify the ethical stakes of AI's environmental impacts and contribute to more inclusive and globally relevant AI governance.

Keywords Artificial Intelligence (AI) · Climate Justice · AI Ethics · Environmental Sustainability · Global South · Procedural and Distributional Justice

1 Introduction

The Climate Crisis and the Artificial Intelligence (AI) revolution stand as the two defining, interconnected challenges of the current era. They profoundly intersect, influence, and shape each other [138]. These dynamics demand persistent monitoring, with the most urgent focus being on how AI can exacerbate climate change. Acknowledging AI's environmental impact meets significant resistance: in political

circles, where the technology's perceived economic and sovereignty benefits are allowed to overshadow its environmental harms, and in industrial sectors, where climate impact is often dismissed or even countered with climate-denial rhetoric [82, 112]. Consequently, academia and civil society have taken the lead in researching and advocating for attention on this critical issue.

Strubell et al. [125] foundational work first quantified this impact, estimating high emissions for early Natural Language Processing (NLP) models. While more recent analyses of models like GPT-3 revealed training footprints reaching hundreds of metric tons of CO₂e [100], current research highlights a crucial shift. The continuous energy and water consumption of AI inference (millions of daily user queries) now dominates the environmental ledger. Moreover, the expansion of AI creates an escalating water crisis. Data centre consumption is growing so rapidly that it rivals the water use of a major beverage company, a risk

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directly amplified by climate-driven freshwater scarcity (Li et al. 78).

The severity of these quantified environmental impacts has compelled scholars and regulators to define AI through a materialistic lens. Seminal work by Kate Crawford in *The Atlas of AI* (2021 31) and Brevini [13] conceptualises AI not as abstract code, but as an extractive system grounded in physical resources, labour, and infrastructure. This focus on material reality is now reflected in key policy proposals, such as the proposed US Artificial Intelligence Environmental Impacts Act [134]. This legislation mandates studies of the full lifecycle of AI models and hardware, specifically listing concerns like energy consumption, pollution from raw material extraction, water use for data centre cooling, and e-waste production. This governmental attention solidifies the shift from viewing AI purely as software to recognising its deep societal and planetary effects.

Acknowledging this physicality, which introduces critical resource and infrastructural dimensions, demands a comprehensive political and social justice analysis. In response to this need, this paper argues that discussions on AI's environmental harm must move beyond basic efficiency metrics to formally incorporate a global climate justice lens within AI ethics. This approach ensures that the debate addresses the disproportionate and unequal ways in which AI's growing resource demands intensify and accelerate pre-existing climate injustices, thereby situating the critique of AI within the broader struggle for global equity. To this end, this paper proceeds in three key sections. The first section illustrates how AI's adverse environmental impact constitutes a fundamental global climate justice concern by analysing the full AI lifecycle (from development to deployment) and examining its environmental dimensions, including energy consumption, data centres' water use, and the extractive demands of hardware production.

Having established the importance of viewing this issue through a climate justice lens, the second section explores what the integration of such a perspective into AI ethics entails and offers a range of conceptual tools that help to establish elements of a normative framework that can be helpful in a Global South context. Drawing on political philosophy, it unpacks the two core dimensions of justice, distributive and procedural, as they pertain to the AI-climate nexus, and derives normative principles to guide ethical assessment and action. The paper then presents a case study of India to ground this theoretical discussion, exploring the complexities and emergent novel power dynamics likely to arise in applying these normative principles. This vignette also demonstrates how the conceptual insights offered by a climate justice lens can illuminate concrete dilemmas at the intersection of AI development and climate vulnerability in the Global South. The paper concludes by reflecting on how

integrating climate justice theory into AI ethics not only clarifies the ethical stakes of AI's environmental impacts but also provides a more inclusive and globally relevant basis for ethical deliberation and policy-making.

The aim of this paper is not to advocate for one specific conception of climate justice, but rather to offer a range of conceptual and normative tools that can guide ethical reflection and policy discussion, particularly from the perspective of the Global South. By identifying relevant justice theories and applying them to the AI-climate nexus, the paper offers elements for a normative framework that can inform a more inclusive and context-sensitive understanding of justice in an era of rapid technological and environmental change.

2 AI as a global climate justice problem

To establish AI as a core climate justice concern, this section traces the various ways the technology harms the environment, affects climate change, and exposes underlying justice problems. We begin by analysing the full AI lifecycle, from raw material extraction and hardware production to model deployment and e-waste, to reveal the breadth of its material footprint. This provides the necessary evidence to illustrate how AI's adverse environmental impact constitutes a fundamental global climate justice concern. For the purpose of this paper, we will assume the definition provided in the EU's AI Act: an 'AI system' means a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. (109).

What is important in this context, however, is to note that AI as a system is always connected to other systems (for example, cloud technologies) and ecologies and natural environments. A thorough analysis of this interconnected AI lifecycle reveals several key dimensions of harm, each with associated justice issues, including: emissions, water demand, reliance on renewable energy, consumption-based harms, and hardware and e-waste disposal concerns. The subsequent analysis is structured according to this lifecycle, starting with the material burdens and proceeding through the operational costs to the final societal impacts. This flow begins with the upfront material burden (Hardware and E-waste), proceeds through the primary operational costs (Fossil Fuel Dependence and Emissions and Water Demand), and concludes with the broader systemic impact of AI applications (Consumption in Application). This structured approach will make the various environmental harms clear.

1. *Hardware and e-waste:* The resource demands of AI hardware do not create material injustice, but rather accelerate and intensify pre-existing global issues related to extraction, pollution, and disposal. The material reality of AI's hardware is central to our climate justice concerns. The microchips that power AI require rare earth minerals, which are sourced through practices known for causing environmental damage [131], human rights abuses [46], and holding on to the legacy of colonialism [33]. These activities include community displacement [81] and patterns of predatory extraction [110], which create significant climate justice issues related to the AI hardware lifecycle. Severe labour abuses are a major part of these concerns, especially in sourcing essential materials like cobalt, which is necessary for semiconductor chips and data centre batteries. While estimates of child labour in the copper and cobalt mines of the Democratic Republic of the Congo vary, a UNICEF representative estimated in 2024 that up to 361,000 children are involved in these hazardous operations [103]. Apart from the labour issues, extracting these critical materials also causes significant pollution. For every ton of rare earth produced, the mining process can generate up to 2000 tons of toxic waste [92]. Additionally, the manufacturing of this hardware is highly energy intensive. The carbon footprint from manufacturing AI accelerators (GPUs) alone is escalating dramatically, projected to increase 16-fold between 2024 and 2030, reaching 19.2 million metric tons of CO₂e by the end of the decade. The disposal of this specialised hardware further raises justice concerns. The resultant electronic waste frequently contains hazardous elements, such as mercury and lead (UNEP 131). The sheer volume of this waste stream is also a significant problem. A record 62 million tonnes (Mt) of e-waste was produced globally in 2022—a surge of 82% since 2010. (UNITAR, 6) Crucially, global e-waste generation is rising five times faster than documented recycling efforts. (UNITAR 2024) Brevini [12] points out that the scale of this disposal burden requires routine offshoring, turning developing countries, often the Global South, into digital dumping grounds. This dynamic creates compounding injustices, including health issues, labour rights abuses, localised pollution, and greenhouse gas emissions [59].
2. *Fossil fuel dependence:* Moving from the upfront material costs, the next stage of the AI lifecycle introduces profound justice issues related to operational energy sourcing, specifically the sector's heavy dependence on fossil fuels. The high emissions noted for AI are exacerbated by the industry's dependence on non-renewable energy sources. While the industry remains heavily reliant on fossil fuels, which supply nearly 60% of global data centre power [63], major actors are concurrently exploring nuclear energy [15]. It is important to note that nuclear energy is generally classified as “clean” but not renewable, as its fuel source (uranium) is finite [91]. Furthermore, even a transition to renewable energy does not resolve all environmental costs, since it still carries a substantial environmental cost due to the rest of the AI supply chain and life cycle [76]. This dependence is complicated by the fact that AI is also heavily deployed within the oil and gas (O&G) sector. While AI assists O&G companies in efficiency, leak detection, and methane emission reduction, the primary goal of this application is often optimisation of fossil fuel extraction and operational lifetime [64, 65]. This prioritisation creates a dangerous structural commitment: by increasing the efficiency and profitability of fossil fuel production, AI serves to extend the fossil fuel economy and deepen carbon lock-in (UNEP 131). This reliance on non-renewables intensifies fundamental climate justice issues concerning the right to affordable clean energy and the ability to enable a just transition to renewables. Marginalised communities consistently suffer the worst impacts of climate change globally [2, 39]. Therefore, the placement of data centres, energy choices, investment into developing sustainable energy-efficient computing, and ensuring its availability to all for a just transition are all central to this discussion. This is powerfully demonstrated by Big Tech's geographical disparities: while Google's data centre in Finland operated on 97% carbon-free energy in 2022, its centres in Asia showed a staggering 4–18% figure [54]. This imbalance reflects a structural distributive injustice where the environmental burden is aggravated and offloaded onto regions with carbon-intensive grids. This effect is further compounded by the existence of fossil fuel subsidies in the Global South, frequently maintained to encourage economic development [5]. The resulting environmental cost is, therefore, doubly unjust: *first*, because the reliance on fossil fuels affects these regions the worst in a global sense, and *second*, because their own developmental needs compel them to invite further localised impacts. The question of AI's energy consumption must then be examined through this broader lens of climate justice.
3. *Emissions:* The dependence on fossil fuels immediately translates into the sector's primary direct environmental impact: its quickly escalating Greenhouse Gas (GHG) emissions and growing contribution to the global carbon burden. Strubell et al. [125] first quantified this initial concern, finding that training an early NLP model produced emissions equivalent to 300 metric tons of

Carbon Dioxide Equivalent (CO₂e). However, this figure is now understood to be a severe understatement of the modern problem's scale. Subsequent analysis of Large Language Models (LLMs) like GPT-3 confirmed this exponential rise, finding that single training runs alone produced up to ≈550 metric tons of CO₂e [100]. This continuous, high-intensity demand is a major factor driving the rapid increase in energy consumption. The IEA [63] projects that this demand from data centres worldwide will more than double by 2030, reaching approximately 945 terawatt-hours. This volume of energy, which slightly exceeds Japan's current total electricity consumption, is projected to consume nearly 3% of the world's total electricity supply by 2030 [63]. Similarly, Big Tech companies like Google and Microsoft have been reporting increases in their total annual emissions directly due to this AI expansion. For example, Microsoft reported that its overall emissions (Scope 1,2, and 3) increased by 23.4% over its 2020 baseline in Fiscal Year 2024, explicitly attributing the failure to its massive investments in AI and cloud expansion [84]. Google also reported a 27% year-over-year increase in data centre electricity demand driven by AI, leading its total emissions to rise 51% since 2019 [55]. While forecasting long-term emissions remains difficult due to the sector's rapid technological and economic pace (UNCC 132), current data demonstrates that the growth of AI's energy consumption introduces significant pressure on the grid and jeopardises global carbon reduction goals by requiring massive, rapid increases in generation capacity.

For better contextualization of the climate justice concerns this raises, we must note that the resource demands of AI are set against a backdrop of stark global carbon inequality. Data from the World Inequality Lab reveals that the richest 10% of global emitters are responsible for about 48% of global CO₂e emissions, while the poorest half of the global population is responsible for only around 12% [19]. The urgency of this disparity is confirmed by a recent Oxfam analysis, which estimates that, by 2030, the richest 1% of humanity will have emissions 30 times higher than the level compatible with the 1.5 °C target [98]. This disparity is also intensifying—while historically driven by gaps between countries, 63% of the global inequality in individual emissions is now attributed to gaps between high and low emitters *within* countries [19]. By accelerating consumption in the high-income segments of society, such as those who benefit most from the AI boom, AI's energy and resource footprint intensifies this existing inequality and adds burden to the high-emitter demographic.

Besides carbon inequality, further climate justice concerns exist over the question of collective responsibility towards emissions reduction. Climate justice fundamentally addresses the problem that emissions disproportionately harm marginalised communities, both globally and locally. Globally, this manifests as countries in the Global South suffering the most severe climate impacts (Christensen, 21). Locally, marginalised communities similarly bear the brunt of environmental harm [9]. Therefore, climate justice demands emissions reduction based on the core principles of equity and common but differentiated responsibilities and respective capabilities (CBDR-RC) of all actors [105].

In the AI emissions context, applying this lens creates three core demands. First, it requires Developed Nations (the Global North) to prioritise emissions reductions within their AI infrastructures and operations. Second, such policies must not compromise the energy and developmental needs of the Global South for AI innovation. Third, knowledge and access to energy-efficient models and practices must be made available to the South. This perspective directly aligns with research on the “*hidden costs*” of AI, which links resource extraction and unequal compute access to global disparities [139]. Similarly, contemporary research demonstrates that the environmental impact is not only tied to scale but also to the geographic location and clean energy access. For example, the BLOOM model, a 176-billion-parameter LLM, was trained on a low-carbon grid in France, which resulted in emissions 20 times lower than GPT-3 [79]. This highlights that access to clean energy is a primary factor in reducing AI's carbon footprint. Access to clean energy is itself another climate justice concern. Furthermore, the paper also establishes that a significant portion of a model's impact comes from embodied emissions: the energy and resources used in the manufacturing of hardware like GPUs [79]—a hidden cost that raises issues of material resource equity. Therefore, a simplistic, blanket precept on emission reductions in AI ethics ultimately fails, as it misses key climate justice principles that aim to balance the developmental and resource rights concerns of the Global South in the climate fight.

4. *Water demand:* Beyond energy consumption, the operational phase of AI infrastructure poses intensifies pressure on another vital natural resource: freshwater supply, exacerbating acute localised justice concerns. Water is used both directly for cooling data centres and indirectly for generating the electricity they require. Research led by Li et al. (78) established the magnitude of this problem, projecting that global demand could

account for a staggering 4.2–6.6 billion cubic meters of water withdrawal by 2027. While this volume represents less than 0.2% of the total global annual freshwater withdrawal, it is a critical percentage of regional and municipal supplies. This projected water demand is comparable to the entire annual water usage of four to six countries the size of Denmark (Li et al. 78). The high-water intensity of the sector reinforces this strain. In Texas, the total water demand intensity of data centres is estimated at approximately 793 gallons per MWh in a conservative scenario; it can reach as high as 45,701 gallons per MWh in a worst-case scenario [124]. This immense water strain is immediately confirmed by corporate disclosures. Google, for example, reported a 28% year-over-year increase in its data centre water consumption in 2024, acknowledging that AI demand directly challenges its commitments to water positivity [55].

The competition for this critical resource has immediate social and ethical consequences. This high-intensity water use is likely aggravate pre-existing challenges for vulnerable communities where water scarcity is already a challenge (UNCC 132). One such instance is in the American Southwest, AI infrastructure intensifies a direct, localised threat to water security. Investigative reports confirm that two-thirds of new U.S. data centres are being constructed in already water-stressed areas [93], directly forcing tech giants to compete with local farmers and residents for municipal drinking water. The strain is quantifiable. In Texas, data centre water consumption is projected to rise to 399 billion gallons by 2030, a volume that one estimate suggests could account for 6.6% of the state's total water usage [115, 124]. While in Arizona, the data centre construction boom continues in the severely water-stressed Phoenix region, which faces increasing water scarcity due to dwindling groundwater supplies [18]. This rapid expansion of AI infrastructure introduces immense, localised strain that directly competes with existing public and agricultural water demands, complicating regional resource management and development plans [18].

Water consumption and extraction for data centre cooling result in highly localised impacts, immediately raising water justice concerns based on infrastructure location and water source. Water injustice leads to vulnerability to climate change, and climate change entrenches extant water injustices [86]. This cyclical vulnerability immediately complicates the ethics of AI's water use—the technology's rising demand intensifies the strain on communities already struggling with a climate-driven scarcity crisis. Data centre water access also carries human rights considerations [56],

especially when companies struggle to replenish water where local supplies are already stressed. Moreover, the politico-economic motivations driving AI development often lead countries to ignore the data centre expansion's effect on already stressed regions. A stark example in the Global South is Bengaluru, India, which recently faced its worst water crisis in 500 years [41], yet remained largely silent on the resulting impact of the local data centre expansion [121]. Ultimately, AI's rising water use exacerbates existing injustices, risking disproportionate effects on marginalised communities and accelerating climate vulnerability.

5. *Consumption in application:* The final dimension of AI's environmental footprint is the most diffuse, stemming not from the infrastructure itself, but from the algorithmic acceleration of resource consumption and societal behaviour driven by AI applications. While AI's environmental impact during training is substantial, a higher overall impact can be noted in its application and deployment. Rolnick likens AI to a hammer, underscoring that the technology's primary environmental impact lies in what is being hammered [80]. In this sense, the continued growth of AI applications in the fossil fuel industry intensifies existing structural risks. This alliance between AI and O&G is predicted to reach approximately 9.34 billion by 2032—a nearly triple jump from 3.19 billion dollars in 2023 [140]. This financial expansion confirms the dominant market motive, which is to maximise extraction and operational lifetime. Even when AI applications optimise energy use or assist renewable integration, total emissions could still be exacerbated due to the Rebound Effect [45] where efficiency gains drive increased consumption and production. Beyond the energy sector, the application of in resource-heavy areas like forestry, land management, and farming also aggravates complex, resource-based climate justice concerns [29].

Notably, even applications of AI aimed at addressing and dealing with the climate crisis (“AI for climate”) aggravate their own host of concerns. Van Wynsberghe [136] pointed out the oft-missed element of climate harm that is embedded in the development of these very solutions. This technological intervention intensifies the Anthropocene problem, asserting that continual interference with Earth's ecological systems may accelerate environmental damage [24, 25]. Additionally, climate applications of AI carry the risk of epistemic and representational injustices being exacerbated. Since relevant data for climate-vulnerable areas is often incomplete, models can reinforce unjust top-down decision-making dynamics. Lastly, such applications are noted to worsen

climate misinformation and denial [51], making the overall addressal of the crisis far more challenging.

It is important to acknowledge that the discussion surrounding AI's environmental role is complex and not solely focused on negative outcomes. A substantial body of "AI for Good" literature argues that the technology offers significant scientific and environmental benefits, often framing AI as a necessary tool for mitigation and adaptation. For example, Galaz and Schewenius [53] highlights AI's potential in key areas, such as improving climate modelling accuracy, accelerating materials discovery for sustainable energy, and optimising smart grids for renewable energy integration. This literature suggests that AI is crucial for tackling the challenges of a planet under pressure. While we recognise these potential scientific benefits, this paper's primary focus remains on the structural inequalities and exacerbated injustices introduced by AI's rapidly growing resource demands and hardware lifecycle.

Taken together, the material and operational findings from the AI lifecycle, from mining and manufacturing to energy and consumption, demonstrate that AI's environmental impact is fundamentally defined by structural inequalities, not just aggregate volume. In light of the imminent climate justice dimensions of AI and climate problems, incorporating a climate justice lens is necessary for both understanding and responding to the issue in the AI and ethics space. Works such as Tamara Kneese's report on Climate Justice and Labour Rights [76] offer one such framework. Ignoring this lens risks not only inappropriate problem mapping, but also creating new justice problems through the solutions offered. For instance, AI and climate solutions emerging from developed nations can adversely affect the developmental and sovereignty rights of the Global South regarding AI, risks that recreate and exacerbate the existing global justice problems inherent in climate mitigation.

Effectively addressing these exacerbated global justice problems requires, first and foremost, a precise and updated mapping of global power dynamics and key actors. For example, the rise of China in the AI sector challenges the traditional Global North/South divide in climate justice discussions. The climate justice framework can accommodate these shifting global dynamics because it examines how current inequities, such as the adverse impacts of globalisation, are linked to colonial histories and their neocolonial legacies [62]. This conceptual alignment is reinforced as scholars are progressively advocating for a decolonial lens in ethics, specifically highlighting its role in addressing structural inequalities embedded in data governance and algorithmic decision-making [90]. Integrating these decolonial

and climate justice perspectives provides a necessary, comprehensive framework for analysing and addressing AI's full systemic impact.

3 Climate justice and AI ethics

In this section, we demonstrate the climate justice lens' efficacy by identifying the major justice theories and discussing their implications for climate, AI, and climate and AI. Moreover, we explore possible solutions emerging from the application of these theories, along with the justice challenges that these solutions could pose. In this way, we offer a normative framework for identifying and dealing with these challenges. This section constitutes the core of the paper's normative framework. By engaging with and applying diverse justice traditions: distributional, procedural, and recognitional, it builds conceptual foundations for assessing AI's climate implications, particularly from a Global South perspective.

At the outset, **AI** raises a number of justice-related concerns, including bias and discrimination, transparency, accountability, privacy, job displacement, economic inequality, and the digital divide. For example, AI systems can inherit and amplify the biases present in training data, leading to unfair treatment in hiring, lending, insurance, and policing. It may also be difficult to hold someone accountable if AI decisions are made intransparently. Automation by means of AI may also disproportionately affect low-income and marginalised communities and widen existing social divides and inequalities. **Climate**, in turn, also raises justice-related issues that are particularly important to address, as they link directly with justice issues arising from the intersection of AI and climate. Climate Justice, at its core, is aimed at naming and resolving the tension where those most affected by climate change are the least responsible and have the least resources to address or adapt to it. This unequal distribution of environmental harm affects the Global South and economically disadvantaged groups the most, despite their contribution to carbon emissions being the least. Additionally, climate justice concerns also encompass concerns for intergenerational justice and animal justice in the context of the climate problem, as neither actor has made sizeable contributions to the creation of the problem, yet are affected by it immensely.

AI and Climate's justice concerns have been discussed above. They are interconnected, and in some cases exacerbate each other. For instance, justice issues regarding climate interact in various ways with justice issues raised by AI. For instance, already disadvantaged groups and climate change-vulnerable communities might experience injustices

exacerbated by a combination of AI and climate change, leading to less distributive justice, limited capabilities, and human flourishing.

3.1 Justice-related concerns: Some theories of justice and their application possibilities

Building on this, we now integrate both the climate and AI justice perspectives. This involves identifying the key justice theories and examining their implications for AI and climate justice. We categorise fundamental normative justice issues into two main areas: (1) procedural and recognition-based concerns, typically framed as the representation of diverse perspectives, and (2) concerns related to resource and capacity allocation, framed within the context of distributive justice and capabilities.

(1) Concerns about allocation of representation and procedure

The first category of fundamental normative justice concerns is procedural and recognitional concerns, which fall under the broad representational justice umbrella. Procedural justice refers to the fairness of processes and methods used to make decisions or allocate resources. Recognitional justice (also known as recognition of status) refers to the fair representation and acknowledgement of diverse identities, knowledge systems, and social groups within decision-making processes.

(a) *Procedural justice*: In the AI context, procedural justice has been noted as a key issue in automated algorithmic decision-making. While distributive justice focuses on fair outcomes, procedural justice ensures that these outcomes are perceived as fair by prioritising equitable processes and methods to reach them [75]. AI's "black-box problem" for the opaqueness of decision-making especially raises concerns in this regard [99]. Moreover, globally, a procedural justice concern also exists with AI regulations [114]. This is because, due to their economic and developmental wherewithal, only the EU, US and to some extent, China create the AI regulatory frameworks that the rest of the world *de facto* agrees to, despite their lack of input in their creation [114].

A similar parallel can be noted in procedural justice concerns regarding climate change issues. The demand for procedural justice remains consistent across both prevention and adaptation efforts at the international and local levels [118]. For instance, even though UNFCCC has a one-country-one-vote structure for consensus, more powerful countries still yield considerable influence through diplomatic means. [47, 58] Underlying

this unequal representation is the influence of the Global North in climate change decision-making. [60] Procedural justice issues permeate the climate change discourse, from decision-making processes at bodies like the UNFCCC to the provision of solutions such as climate financing, where the Global South is often unfairly portrayed as an incompetent actor. [3] At the local level, marginalised communities often encounter procedural bottlenecks. For instance, white men have been noted to disproportionately impact climate change decision-making in comparison to people of colour and women in the UK [36].

Building on the discussion above, the problems of AI and climate can therefore benefit from incorporating this perspective. *First*, procedural justice concerns arise when AI is used to address climate problems through algorithmic decision-making. AI's decision-making role in climate financing, particularly in project prioritization, risk assessment, and resource allocation modelling, raises such concerns [1, 48]. This is particularly true given the inherent "black-box" nature of many AI systems, where a lack of transparency can immediately lead to justice concerns [70, 128]. A case in point is the World Bank's MALENA. Developed by the World Bank's International Finance Corporation, MALENA is an AI-powered tool that uses natural language processing to distil complex Environmental, Social, and Governance (ESG) information into actionable insights for sustainable investments in emerging markets [69]. Similarly, the Bank for International Settlements (BIS) and central banks launched Project Gaia. Gaia leverages generative AI to extract climate-related indicators like total emissions and green bond issuance from vast corporate reports, directly enabling comprehensive climate risk analysis for financial institutions [7].

Beyond just climate financing, AI can be employed to make high-level decisions for solving the climate crisis broadly as well. If used in augmented capacity, this would raise heightened procedural justice concerns owing to its political nature and ability to impact democracy [26]. However, the more authoritative and non-collaborative such AI use is, even heightened concerns with fundamental questions around freedom emerge [24, 25]. Also, such uses often overlook procedural concerns that arise from not addressing the interests of intergenerational and animal actors in this climate change debate. *Second*, procedural justice concerns will arise regarding the governance and decision-making about AI's climate problem. This concern highlights how the governance failures of AI development (e.g., lack of regulatory foresight) align with and are exacerbated by the governance failures of climate change

(e.g., poor international consensus). Because decisions are made by powerful human actors in this governance context, the voices of intergenerational actors (future generations) and non-human (animal) actors are likely to be marginalised.

- (b) *Recognitional justice*: Recognitional Justice includes concerns where relevant actors are not adequately represented or acknowledged in justice contexts, whether during decision-making or at the solution stage. Recognitional concerns in AI can arise mainly from the lack of inclusivity in AI datasets. This lack of representative diversity leads to unfairness in AI development and deployment. Such a lack of recognition can also lead to concerns about epistemic justice, as noted by Sardelli [117] with regard to women. This lack of representation produces unfair outcomes for algorithmic decision-making. For example, a study by Hofmann et al. [61] noted that AI models exhibited a language-based bias, disproportionately assigning higher risk scores to individuals using African American English in legal risk assessment tools. Lack of adequate representation in AI datasets, apart from a recognitional concern, is also a representational justice concern in itself [119].

In the climate sense, recognitional concerns are an allied offshoot of procedural concerns, where a misrecognition or an utter lack of recognition of marginalised social groups makes procedural justice ineffective [74]. For example, this dynamic is evident in Lagos, Nigeria, where poor fishing communities have faced violent evictions. These evictions are often linked to land grabs for coastal “climate adaptation” projects [23] or the displacement caused by environmental degradation like chronic flooding and sea-level rise [135] reflecting how procedural justice can fail when marginalised groups are not adequately recognised [74]. This lack of recognition creates a destructive self-enforcing loop: marginalised communities, having experienced procedural injustice, become less likely to participate in formal climate adaptation processes [97]. Similarly, at the international level, recognitional concerns also pan out as representational inequalities between different actors. Scholars such as O’Neill [96] have remarked that climate activism often prioritises elite voices while sidelining grassroots concerns. Mainstream climate agendas, shaped primarily by elite NGOs, often emphasise sustainability while neglecting the environmental injustices and health disparities faced by poorer regions [38].

Recognitional concerns for the AI and climate contexts follow similar lines. *First*, representational justice concerns arise with the datasets in a climate context. Areas most vulnerable to climate change, particularly in the

Global South, often lack the necessary digital resources to contribute climate-relevant data for AI datasets. The lack of representation of these regions in the datasets raises recognition concerns, as their absence in AI-driven climate solutions effectively excludes them from the problem-solving process. AI can also contribute to representational injustice by spreading misinformation about climate change and encouraging climate denial [52]. *Second*, broader recognitional concerns arise both in framing and in addressing the problem. The lack of reliable, accurate, complete, and publicly accessible information about AI’s true climate impact [8], especially when measurements fail to account for global disparities and downstream effects on marginalised communities [76], illustrates this issue in problem mapping. Recognitional concerns in addressing this issue stem from similar challenges observed in both AI and climate governance. Applying an eco-feminist perspective to this intersection is vital, as eco-feminism is a branch of environmental philosophy that highlights the interconnectedness of the domination of nature with the exploitation of marginalised social groups, especially women [122]. Eco-feminist thought thus emphasises how marginalised groups, particularly women from the Global South, are disproportionately affected by both AI-related and climate issues. Moreover, both representational and recognitional concerns are heightened when considerations of intergenerational equity and animal actors are overlooked.

(2) Concerns about allocation of resources and capabilities

One of the core justice issues that the climate crisis produces is regarding a fair distribution of Earth’s resources, including water, rare minerals, coal, and atmospheric space for emissions. This also indicates broader access to environmental well-being, where a healthy environment can be understood as a shared global resource. The unequal historical causes of climate change also raise important questions about who should bear the burden and responsibility for adaptation, mitigation, and climate response. For instance, North America and Europe are responsible for approximately half of all cumulative emissions since the Industrial Revolution, with the United States alone accounting for around 20% of the global total, compared to regions like Sub-Saharan Africa, which accounts for only 4% (WIL 19).

The distribution of these resources is closely tied to developmental priorities, particularly for countries in the Global South that seek to grow their economies while addressing climate vulnerability. These issues also raise sovereignty concerns, as countries assert their right to control the use and management of natural resources in pursuit of development.

The question of fair distribution, of both resources and responsibilities, clearly illustrates the concerns of intra- and intergenerational equity. Over time, justice theories have shifted focus from the distribution of resources to the distribution of capabilities, a shift that carries similar implications for climate, AI, and development justice as discussed below. Notably, AI also introduces similar concerns regarding distribution, especially regarding its harms and benefits [114]. It is also relevant to trace the global distribution of primary goods and capabilities in the international supply chain for development and use of AI, which often reflects existing global inequalities [114]. The analysis of supply chain and resources inevitably brings the discussion back to climate's distributional justice concerns, as well as raising urgent questions about the global distribution of resources, risks, and responsibilities. The allocation of resources and capabilities in this context is discussed below:

- (a) *Distributive justice*: One of the most influential theories of distributive justice is John Rawls' theory of justice, which prioritises fairness through two principles: the liberty principle, ensuring equal basic liberties for all, and the difference principle, permitting inequalities of resources only if they benefit the least advantaged members of society. Rawls' framework, rooted in a hypothetical "original position" and "veil of ignorance," aims to establish impartial principles of justice [106]. Applying this theory to climate justice would mean an allocation of resources such that inequalities of resources due to climate change benefit those who are most vulnerable in the light of climate change. The reason would be that under a "veil of ignorance", in which we are not sure how vulnerable we will be in the future due to climate change and how many resources we would have to deal with it, we would choose a climate change difference principle that accommodates that. It has also been argued that a similar application of Rawls must be applied to technology, and, by extension, AI [50]. For instance, Gabriel [50] argues that this application is important to preserve "background justice" and notes that AI can exert a "profound and pervasive impact" upon a person's life chances. He advocates for an *ex-ante* approach, addressing structural inequities before they materialise, which is particularly relevant to AI's environmental harms, where the greatest impact often arises during the training phase, rather than in deployment.

Again, in the context of climate justice, this calls for a critical examination of AI's unique and potentially exacerbating role in climate-related harms, especially in how these impacts are distributed globally and intergenerationally. Moreover, we need to acknowledge how

we share these resources with animals. All theories discussed here are anthropocentric, which leaves a gap. This oft-underlooked distributive concern needs to be conceptualised under AI ethics. Calls for the incorporation of animal interests in AI ethics have started to emerge [27]. Their interests in climate change and its intersection with AI are what this article argues to incorporate as well.

Another important perspective comes from Robert Nozick's Entitlement Theory, which offers a libertarian view of justice grounded in property rights and voluntary transactions, in contrast to Rawls. According to Nozick, a just distribution results from the just acquisition, transfer, and rectification of past injustices rather than from an imposed pattern of redistribution [94]. Here, doing something with regard to climate (in) justice is only possible on the basis of voluntary transactions and agreements. From this perspective, it would be unjust to forcibly redistribute resources, even to support those affected by climate change, without voluntary consent. Interestingly, this logic may resonate with critiques of environmental neocolonialism, in which top-down solutions imposed by the Global North risk perpetuating systemic inequities [44]. This concern is equally relevant when considering how the Global North (or contemporary equivalents in power and influence) may impose similar patterns while advancing sustainable AI initiatives.

Utilitarianism represents another key theoretical lens, grounded in the work of Jeremy Bentham and John Stuart Mill, which evaluates distributive justice based on the principle of maximising overall happiness or wellbeing. Regarding climate change, this would mean that redistribution is only justified if overall happiness or utility in the light of climate change is increased, regardless of the consequences for individuals. Critics argue that utilitarianism can justify significant inequalities if it increases aggregate utility, potentially overlooking individual rights and fairness [85]. For AI's climate problem, utilitarianism presents a double challenge: not only balancing trade-offs when designing solutions, but also recognising environmental harm as a serious problem in the first place. This is because AI may generate significant utility (economic, social, or otherwise) and risks overshadowing its substantial environmental harms. This raises a key ethical dilemma: How should we balance the environmental disutility of AI against the utility it produces? These debates also intersect with questions of intergenerational and intragenerational justice, as well as the moral status of animals affected by climate change and AI development.

Further development in justice theory is egalitarianism, which seeks to minimise inequality as a matter of principle. Some egalitarians, like G.A. Cohen, critique Rawlsian justice for permitting economic disparities that might not be necessary to benefit the least advantaged [28]. According to this approach, a more radical redistribution of resources is required to address the risks and vulnerabilities created by climate change. The same logic extends to AI, where addressing the deep structural inequalities embedded in both AI and climate systems presents a monumental challenge.

- (b) *Capabilities justice*: The capability approach, developed primarily by Amartya Sen and Martha Nussbaum, shifts the focus from mere resource distribution to individuals' real freedoms and abilities to achieve well-being. Sen critiques traditional theories for their emphasis on either resources (Rawls) or utility (utilitarianism), arguing that what truly matters is what individuals can do and be with these resources [120]. Martha Nussbaum extends this approach by proposing a list of central human capabilities that all societies should ensure, such as life, bodily health, affiliation, and control over one's environment [95]. Unlike resource-based theories, the capability approach accounts for personal, social, and environmental factors that affect an individual's actual ability to function and contribute to human flourishing. Although widely influential, the capability approach faces criticism regarding its operationalisation. Critics argue that specifying capabilities requires cultural biases, while others question their applicability to policy-making [111]. Nonetheless, this approach has significantly influenced global development policies, including the Human Development Index (HDI). For climate change, the capability approach would mean that instead of considering the resources people have for dealing with climate change, the emphasis shifts to enhancing the capabilities of people under climate change. This would try to improve people's ability to function in terms of life, bodily health, social affiliation, control, etc., in an environment affected by climate change. While it is not immediately clear how to operationalise this, it is an interesting approach that may connect Sustainable Development Goals (SDGs) with climate change action. This framework is also relevant for AI, which has increasingly been linked to SDGs through its potential to enhance capabilities and contribute to global justice [137]. Notably, in this context, AI is seen as a tool for advancing justice by enhancing capabilities, in contrast to the central concern of this paper, which examines how AI itself impacts justice. Similar applications of the capability approach have emerged in the context of AI. Scholars argue that the

capability approach offers normative grounding for evaluating whether technologies, including AI, genuinely enhance human well-being [116]. It also captures interpersonal and social variations that conventional metrics like Gross Domestic Product (GDP) often overlook [114] when assessing AI's societal impact. Sahebi and Formosa [114] illustrate how key capabilities, including life, bodily health, bodily integrity, and control over one's environment, are affected by AI. These particular capabilities are emphasised because of their direct connection with AI's environmental impact, thereby reinforcing their relevance to the current discussion on climate justice. Thus, the capability approach provides a framework for understanding the context-specific impacts of AI on low and middle-income countries [114], while also incorporating intragenerational justice concerns. Moreover, it offers a conceptual space to address animal interests [107] and intergenerational justice, both of which are often marginalised in mainstream debates.

3.2 Conceptualising possible solutions

The outline of theories of justice and their application possibilities not only helps conceptualise the problem more clearly, but also provides a normative basis for thinking through possible solutions. However, any attempt to formulate solutions must first grapple with two foundational questions: justice *for whom*, and justice *by whom*. The question of *justice by whom* concerns the identification of actors responsible for either contributing to the injustice, or for bearing the burden of addressing it. This is where traditional climate justice themes emerge, particularly the Global North's responsibility for addressing the climate injustices disproportionately borne by the Global South. As previously noted, these Global North/South categories are not fixed, and incorporating insights from fields such as environmental neocolonialism can deepen our understanding of evolving power asymmetries. The question of *justice for whom* focuses on identifying those who are entitled to redress, benefit, or relief: the recipients of justice interventions.

In order to define and re-distribute the entitlements of, and burdens on, various actors in relation to justice, the question of rights also becomes relevant. Climate justice discourse engages with a range of rights that inform both problem-mapping and the formulation of solutions. These include the right to atmospheric space (101), the right to emit [83], the right to development (89), and even, contentiously, a right to pollute (Chaturvedi 20). The Bali Principles of Climate Justice (68) articulate additional rights, including the right to a stable climate, the right to representation, and the right

to access renewable energy. Broadly, these rights coalesce into a more fundamental right to the environment, conceived as a shared resource to which all individuals should have equitable access. And “everyone” is also expanded to include future generations through the intergenerational equity principle for climate justice. In the context of both AI and climate, the right to development for the Global South is likely to emerge as a central issue, especially as AI becomes an increasingly sovereign and politico-strategic domain. AI’s rising emissions will therefore necessitate the use of this rights-based framework to guide policy discussions on mitigation efforts, equitable technology transfer (adaptation), and liability for cumulative harms (Loss and Damage).

It is important to note that accounts of justice, both in the climate sphere and more broadly, are typically limited to human interests. Mainstream debates in political philosophy typically exclude animals and the environment from political consideration. However, during the past decades this has slowly been changing, academic discourse has increasingly tried to widen the scope of political consideration. Influential works like Peter Singer’s *Animal Liberation* (123) and Tom Regan’s *The Case for Animal Rights* (108) laid the foundation for animal ethics by emphasising sentience and rights-based approaches. More recently, scholars such as Sue Donaldson and Will Kymlicka in *Zoopolis* (40) argue for the inclusion of animals as political subjects, proposing frameworks that treat animals as citizens, denizens, or sovereign communities, depending on their relationship to human society. Environmental concerns have also reshaped political philosophy. Thinkers like Arne Næss promoted deep ecology, advocating for the intrinsic value of all living beings and ecosystems. In the political domain, John Dryzek’s *the Politics of the Earth* (42) explores environmental discourses in political theory, while Robyn Eckersley’s *The Green State* (43) a critical political ecology, envisioning political institutions that include the natural environment.

These philosophical developments have influenced real-world moral and political-legal practice. In recent years, some countries have recognised animals and elements of nature as rights-bearing entities. For animals, this has meant laws ensuring their welfare and recognising them as sentient beings. Examples include Germany, which enshrined animal protection in its constitution, and New Zealand, which bans animal cruelty and acknowledges animal sentience. For the environment, countries like Ecuador and Bolivia have granted legal rights to nature itself. In 2017, New Zealand gave the Whanganui River legal personhood, allowing it to be represented in court. (Roy 113) These steps reflect a shift toward viewing nature and animals not just as property, but as entities with intrinsic value.

For thinking about climate justice, taking into account these philosophical and practical developments means at least considering the justice-relevant consequences of climate change (and human actions vis-à-vis climate change) for animals and the environment. Theoretical work is emerging on this theme. Consider, for instance, the discourses on multi-species justice in the light of climate change and climate justice in more-than-human worlds [129]. Translated in the framework outlined above, it means that animals and the natural environment should be considered both in terms of representation and allocation. It is, however, not clear *how* such representation should work and what exactly, and how much should be allocated to animals. For instance, are existing institutions sufficient to represent animals, or do we need innovations in this area? And what, exactly does it mean, for instance, to take into account the flourishing of animals and ecosystems when applying the capability approach? More work is needed in this area. The intersection with AI justice issues introduces a layer of complexity that warrants further investigation.

4 Normative principles in practice: the India vignette

Applying the principles of climate justice for AI directly becomes complicated when considering the unique needs and challenges of various regions and actors. To explore this complexity in a real-world context, we turn to the India vignette. While traditional North/South dichotomies offer predictable stances and straightforward application, this model fails in the AI context for two key reasons. *First*, the global landscape introduces new geopolitical interpretations with the simultaneous rise of China and Big Tech. *Second*, influential countries like India and China have begun shifting their geopolitical delineation due to their rapidly rising emissions and consumption. This shift is evident in the data: in 2024, global greenhouse gas emissions hit a record high, with India recording the largest absolute year-on-year increase in emissions, followed by China [130]. However, the issue remains nuanced; while China contributed 13% and India contributed 3% to historical cumulative CO₂e emissions (1850–2019) [19]. India’s current per capita emissions remain significantly below the global average, unlike China [130]. These categories are fluid and geopolitically determined. Therefore, we adopt the expansive definition given by [37], who sees the South as a ‘metaphor for the suffering caused by capitalism and colonialism on a global level.’ This expansive lens allows us to account for both global dynamics (e.g., Big Tech/China) and intra-national ‘souths’, such as billionaires residing in traditional

Global South countries alongside impoverished residents in the same place [4].

4.1 Choosing India

To demonstrate the complexity that is likely to arise from applying normative climate justice principles to AI, we select India as a core vignette. India's complexity is immediate. It acts as both a developing nation sharing deep vulnerabilities (including its 7500-km-long coastline and agrarian reliance on erratic monsoon patterns [11, 34] and a major global contributor whose rapidly rising emissions are driven by internal economic inequality. This causality is rooted in the finding that the post-1990s liberalisation period saw a significantly higher increase in the upper economic strata's propensity to emit CO₂e [10]. Specifically, the relationship turned positive after 1991, intensifying such that a 1% increase in economic inequality was associated with an approximately 0.9% increase in state-level CO₂e during the 2000s—a trend driven by enhanced access to global consumption patterns and making wealth concentration a key source of emission hotspots [10]. This structural paradox demands a focused, contextual approach. For instance, the carbon footprint of the top 10% of India's population is approximately 7× that of the bottom 50% [77], proving that emissions are concentrated at the top. Specifically, climate injustice in India is fundamentally intertwined with extant inequities, such as the caste system and poverty [126]. Climate change effects, like depleting water tables and droughts, exacerbate these caste-based woes, trapping marginalised groups in perpetual cycles of debt and impoverishment. Thus, India provides a vital lens to analyse how AI's resource demands interact with deep-seated national and intra-national injustices.

Moreover, the climate crisis in India drives profound social instability and geopolitical risk. While India faces chronic instability rooted in poverty and deep social and religious fissures, climate change functions as a significant threat multiplier that exacerbates these existing vulnerabilities [87]. India's large population, reliant on farms, fisheries, and forests for livelihood, faces displacement and insecurity due to environmental changes, which can lead to social tensions and anti-governmental movements [14]. This highly vulnerable context is now the site of massive technological growth. The country's total data centre capacity is projected to more than double to 2.0–2.3 GW by fiscal year 2027, primarily fuelled by the computational demand of generative AI [32].

The rapid expansion is projected to consume 358 billion litres of water annually by 2030 for cooling [88]. This climate-induced migration and resource insecurity heighten existing tensions, creating a layered justice dimension that

must be noted. Up to 40 million people in South Asia could be forced to migrate by 2050 due to climate impacts, with India being one of the most affected countries. [22] This mass displacement would place enormous strain on urban infrastructure and fuel social conflict. Resource insecurity is likely to become a greater political and international law and justice issue, a tension evident in a recent diplomatic conflict with Pakistan where India's primary political move was to suspend the Indus Water Treaty [127]. For a region already suffering from climate-induced water scarcity near the river, such political measures carry severe implications [14]. These entrenched climate vulnerabilities and political risks form the highly volatile context into which development is now proceeding. The escalating, specialised demands of the AI sector only aggravate this volatility.

As for specific impacts, AI development and deployment demand an uninterrupted, high-density energy supply. In India's current energy landscape, this exacerbates dependence on fossil fuels, raising concerns over availability, affordability, and self-reliance. The sector's trajectory clearly illustrates the pressure: installed data centre capacity is expected to nearly double, rising from 950 MW in 2024 to 2 GW by 2026 [17]. While the overall electricity consumption of data centres is currently under 1% of India's total demand, it is projected to reach 3% by 2030 [30]. This sharp rise is particularly worrying for a country whose national grid remains heavily reliant on coal. The absolute volume of new demand is significant, with AI workloads forecast to require an additional 40–50 TWh by 2030 [57]. This massive uptake in demand targets an already vulnerable grid.

This dependency is especially acute in crucial data centre clusters like the Delhi NCR and Maharashtra, where facilities are drawing power predominantly from thermal-based sources, with 78–90% of their supply being coal-sourced [133]. Given India's chronic import dependence (approximately 85% for crude oil and half for natural gas), integrating AI's energy profile without mandated decarbonization accelerates the risk of carbon lock-in [16] and geopolitical fuel volatility [35]. Consequently, the possibility of regional supply instability and widening disparities in energy access driven by AI's high-density demands raises serious concerns that necessitate an urgent, integrated policy response.

One might then assume that climate-conscious technology development should be India's singular priority. This perspective, however, becomes layered when India's unique developmental position is considered. Given its significant economic prowess and rising GDP, the Global North is increasingly pushing India to take on greater responsibility for emissions reduction [71]. This pressure primarily manifests as demands for India to accelerate its transition away from coal and to cap its emissions growth immediately, actions which India argues hinder its critical developmental

goals and poverty eradication efforts [67]. This is formally reflected in India's climate policy under the Paris Agreement, where it has set a long-term goal of achieving Net Zero emissions by 2070 [67]. This updated stance, often paralleling that adopted toward China [102], implies that India's severe climate vulnerability, combined with pressure from the Global North, *should* make climate its pedestals priority in AI development. This expectation forms *one half* of the structural tension. However, this is *only half* the story.

4.2 India's two possible pathways

To see the source of this complexity, we must examine the core realities that challenge that climate-first assumption. Two primary pathways emerge for India if it were to halt non-compliant technological growth: (1) Slowing or halting local development and relying on foreign cloud providers to meet immediate climate targets; or (2) developing technology in an aggressive, climate-conscious manner. These pathways illustrate concrete trade-offs. For example, Path 1 looks like borrowing and data centre services from abroad, while Path 2 demands the challenging local establishment of highly energy-efficient data centres and model optimisation in the Indian space.

The *first pathway* (slowing technological development) immediately conflicts with India's commitment to AI sovereignty, which the government views as a key developmental (economic, social, and political) priority. This drive is codified in the India AI Mission [104], through which the government aims to achieve sovereignty by developing homegrown models, creating national datasets, enabling graphics processing unit (GPU) access, and establishing centres of excellence [66]. Although deep economic interests and protectionism fuel this push [72], the argument for local technological development has been recognised as a core justice concern for regions in the Global South [73]. In the Indian context, this necessity links directly to the normative principles of our framework: enabling local infrastructure ensures distributive and capabilities allocational justice, while developing representative AI models and datasets ensures procedural and representational justice.

We now address the demands of the *second pathway* and the core climate justice argument raised by the Global South. Achieving climate-conscious development in India requires substantial financial and technological resources, specifically for developing efficient models and creating green energy infrastructure. This investment demand highlights the core climate justice concern of the double-burden [49]: Countries like India, which did not traditionally contribute to climate change at the proportion of the Global North, are now asked to shoulder that resource burden during their critical developmental phase. In the context,

these fault lines are starkly visible. Given that dominant development already occurred in the Global North, raising concerns from economic to representational justice, forcing the Global South to deploy in a climate-conscious manner would not only be hypocritical but also constitutes a neocolonial constraint, curtailing their legitimate right to development and sovereignty.

It is therefore crucial that the principles of justice enumerated for the AI and climate context are applied with nuance and contextual sensitivity when considering unconventional Global South players like India. A failure to do so risks perpetuating neocolonialistic impulses, specifically in the form of environmental neo-colonialism. Furthermore, any application of these justice principles must avoid broad-brushstroke generalisation due to the persistent existence of intra-national disparities. The emergence of internal 'Norths' and 'Souths' within India, comparing the impoverished to the ultra-rich, demands that context and nuance consistently prevail. Finally, future deliberation on AI and climate ethics must also acknowledge and balance critical considerations such as intra-generational justice and animal concerns.

5 Conclusion

This paper has analysed some ways in which the discussion about AI (ethics) and climate change can be enriched by including conceptual tools from climate justice theories. After tracing various ways in which AI may negatively impact climate change, this paper has shown how this issue raises justice-related concerns in terms of both allocation and representation, and has ventured into theories of justice drawn from political philosophy to explore what these theories imply for thinking about AI and climate change. The paper has shown that this exercise provides elements for a normative framework, not only to more clearly define the problems, but also to search for solutions. The paper also highlighted that the "for whom" and "by whom" questions are important with regard to climate justice. Finally, it offers a vignette about the situation in India, which shows how the proposed conceptual discussion can help in thinking about climate and AI in real-world cases and in a global context.

More work is needed in this area, for instance on the justice and flourishing of animals in the light of AI and climate change. Generally, discussions in environmental ethics and politics (including discussions about climate justice) have been largely unconnected to discussions in AI ethics. This paper makes a small contribution in bridging this gap. It is also important to ensure that the discussion about AI and climate change is not Western-centric but takes into account the perspectives and practical situations of people in the

Global South. This paper offers an example of how this can be done with regard to the issues of climate justice and AI. Finally, the discussion in this paper and future work may inform real-world policies that aim to respond to the challenges of climate change and AI. In the current global situation, with multiple crises, including the climate crisis, such policy-supporting work is much needed.

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Declarations

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