

Artificial Intelligence and Climate Justice: Reflecting on the Impact of Data Centres on the Environment

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**Artificial Intelligence and Climate Justice: Reflecting on the Impact of Data Centres
on the Environment**

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Abstract

This paper critically discusses how AI can be leveraged to foster climate justice. With climate change devastating people and planet, the paper observes that AI has emerged as a powerful technology that can deliver effective climate solutions towards climate justice. The paper discusses the specific application of AI in climate action. Despite its benefits, the paper notes that AI presents several risks and challenges that can undermine effective climate action. In particular, the paper notes that the impact of AI data centres on the environment can worsen climate change raising

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further injustices. Consequently, the paper suggests how the positive attributes of AI can be harnessed while minimising its negative impacts on the environment in order to achieve climate justice for people and planet.

1.0 Introduction

Artificial Intelligence (AI) has emerged as a powerful tool and solution as the world grapples with a climate emergency. The world is facing a climate crisis with adverse climatic and weather events including heatwaves, wildfires, floods, sea-level rise, tropical storms, droughts and hurricanes increasing in scale, frequency and intensity globally with severe impacts on people and planet¹. The impacts of climate change are causing dangerous and widespread disruption, depletion and degradation of nature while also affecting the lives, health, livelihoods and well-being of billions of people all over the world². With the climate crisis intensifying, its effects are becoming irreversible for humanity today, and are poised to worsen in future unless drastic action is taken to reduce greenhouse gas emissions³.

Tackling climate change is therefore a global imperative in the pursuit of Sustainable Development. The United Nations 2030 Agenda for Sustainable Development⁴ acknowledges that climate change is one of the greatest challenges of our time whose adverse effects undermine the ability of all nations to achieve Sustainable Development⁵. Consequently, Sustainable Development Goal (SDG) 13 under the Agenda urges all states to take urgent action to combat climate change and its impacts⁶.

It has been correctly noted that effective climate action involves recognising and addressing the disproportionate impacts of climate change on the people and places least

¹ World Health Organization., 'Climate Change' Available at <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Key%20facts,diarrhoea%20and%20heat%20stress%20alone>. (Accessed on 11/07/2026)

² Intergovernmental Panel on Climate Change., 'Climate change: a threat to human wellbeing and health of the planet. Taking action now can secure our future' Available at https://www.ipcc.ch/report/ar6/wg2/downloads/press/IPCC_AR6_WGII_PressRelease-English.pdf (Accessed on 11/07/2026)

³ The Effects of Climate Change., <https://science.nasa.gov/climate-change/effects/> (Accessed on 11/07/2026)

⁴ United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (Accessed on 11/07/2026)

⁵ Ibid

⁶ Ibid

responsible for the problem for justice, equity and fairness⁷. For example, it has been observed that the poor, marginalized and disadvantaged populations including indigenous peoples, local communities, women and girls and the youth are more vulnerable to the impacts of climate change⁸. Further, due to geographic and economic vulnerability, people and communities in the Global South are extremely vulnerable to climate change and its impacts⁹. In light of its disproportionate impacts, it is necessary to advance fair, equitable, ecologically-just and locally-led climate action in order to achieve justice for people and planet¹⁰. Climate justice is therefore a key concept and approach that seeks to uphold equity, fairness, accountability and human rights in climate action by recognizing and addressing the disproportionate impacts of climate change on vulnerable individuals, communities and regions¹¹.

This paper critically discusses how AI can be leveraged to foster climate justice. With climate change devastating people and planet, the paper observes that AI has emerged as a powerful technology that can deliver effective climate solutions towards climate justice. The paper discusses the specific application of AI in climate action. Despite its benefits, the paper notes that AI presents several risks and challenges that can undermine effective climate action. In particular, the paper notes that the impact of AI data centres on the environment can worsen climate change raising further injustices. Consequently, the paper suggests how the positive attributes of AI can be harnessed while minimising its negative impacts on the environment in order to achieve climate justice for people and planet.

2.0 Artificial Intelligence and Climate Justice: Opportunities and Challenges

AI has emerged as a powerful tool that is strengthening climate action all over the world. For instance, it has been observed that AI technologies provide solutions towards

⁷ Center for Climate Justice., 'What is Climate Justice?' Available at <https://centerclimatejustice.universityofcalifornia.edu/what-is-climate-justice/> (Accessed on 11/07/2026)

⁸ Climate Justice Global Alliance., Available at <https://sdgs.un.org/partnerships/climate-justice-global-alliance> (Accessed on 11/07/2026)

⁹ Giles. M., 'The Principles of Climate Justice at CoP27.' Available at <https://earth.org/principles-ofclimatejustice/#:~:text=That%20response%20should%20be%20based,the%20consequences%20of%20climate%20change> (Accessed on 11/07/2026)

¹⁰ PanAfrican Climate Justice Alliance., Available at <https://pacja.org/> (Accessed on 11/07/2026)

¹¹ World Economic Forum., 'What is Climate Justice?' Available at https://www.weforum.org/videos/climate-justice/?gad_source=1&gad_campaignid=22228224717&gbraid=0AAAAAoVy5F63G-51xPZCfWH7BGsBXa909&gclid=Cj0KCQjwy_fOBhC6ARIsAHKFB7-f_LGoyvNwbnGjFgLrrT_dmP191-82u3vFJ4ys0nW2O-1_lrLH30AaAiFPEALw_wcB (Accessed on 11/07/2026)

reducing greenhouse gas emissions which are the primary cause of climate change¹². AI technologies can aid in minimising waste, conserving energy, and identifying emission hotspots in industrial processes thus providing a basis for sound climate action¹³. In addition, it has been observed that AI tools and systems can optimize the deployment of renewable energy sources such as solar and wind thus supporting global energy transition which is a crucial agenda towards confronting climate change¹⁴. Fossil fuels such as coal, oil and natural gas are by far the largest contributor to global climate change, accounting for over 75 percent of global greenhouse gas emissions and nearly 90 percent of all carbon dioxide emissions¹⁵. Global transition to renewable energy sources like wind and solar is therefore one of the most important solution to the climate crisis¹⁶. AI can support this transition including through optimising forecasting of solar and wind output, enabling predictive maintenance of renewable energy systems to minimise downtime and enabling smart grid management to efficiently balance supply and demand¹⁷. AI tools can analyse crucial factors such as wind patterns and solar radiation thus ensuring a smooth transition to renewable energy in the pursuit of climate justice¹⁸.

In addition to supporting climate mitigation including through fast-tracking global energy transition, AI also provides solutions that can enable people to adapt to climate change towards achieving climate justice. For instance, it has been observed that in era marked by unprecedented climate and weather-induced disasters, the integration of AI into early warning systems is advancing monitoring and forecasting capabilities, optimizing warning dissemination and communication so that important information reaches people at risk of disasters in time for them to act and avoid the worst impact of disasters such as severe storms, floods and landslides¹⁹. AI tools can analyze huge volumes of climate data thus tailoring and translating warnings to specific contexts and

¹² United Nations Climate Change., 'AI and Climate Action: Opportunities, Risks and Challenges for Developing Countries' Available at <https://unfccc.int/news/ai-and-climate-action-opportunities-risks-and-challenges-for-developing-countries> (Accessed on 11/07/2026)

¹³ Ibid

¹⁴ Ibid

¹⁵ United Nations., 'Renewable Energy - Powering a Safer Future' Available at <https://www.un.org/en/climatechange/raising-ambition/renewable-energy> (Accessed on 11/07/2026)

¹⁶ S & P Global., 'What is Energy Transition?' Available at <https://www.spglobal.com/en/research-insights/articles/what-is-energy-transition> (Accessed on 11/07/2026)

¹⁷ The Renewable Energy Institute., 'How AI Is Making Renewable Energy Smarter' Available at <https://www.renewableinstitute.org/how-ai-is-making-renewable-energy-smarter/> (Accessed on 11/07/2026)

¹⁸ Ibid

¹⁹ Enhancing Early Warning Systems with Artificial Intelligence., Available at <https://www.itu.int/itu-d/sites/digital-impact-unlocked/enhancing-early-warning-systems-with-artificial-intelligence/> (Accessed on 11/07/2026)

enhancing access to climate information on the basis of geography, gender, or vulnerability²⁰. It has been observed that AI can strengthen early warning systems by predicting extreme weather events such as hurricanes, floods and droughts, thus enabling proactive disaster risk management for sound climate action²¹. AI can therefore strengthen early warning systems thus enabling vulnerable individuals, communities and nations to effectively anticipate, respond and recover from adverse climatic events.

Another way through which AI can bolster climate adaptation is through precision agriculture. Precision agriculture refers to a data-driven approach to farm management that can improve productivity and yields, thereby increasing the overall profitability of farming²². In particular, it has been observed that advances in AI are supporting precision agriculture by analyzing local soil and weather patterns to optimize the use of inputs such as water, fertilizer and pesticides, minimize environmental impacts and boost agricultural productivity and food security²³. By supporting precision agriculture, AI can help to mitigate the impacts of climate change on agriculture and food production towards bolstering resilience, livelihoods and food security.

Despite its role in bolstering global climate action, AI is also associated with negative environmental impacts that can worsen the climate crisis and fuel climate injustices. In particular, it has been observed that huge energy and water consumption in AI data centres raises sustainability concerns, particularly in regions already facing resource constraints due to climate change²⁴. Supporting the immense computational requirements of both training and deployment of AI models requires massive energy consumption in data centres which usually comes with negative environmental impacts²⁵. Consequently, it has been argued that if left unchecked, AI can worsen the

²⁰ Artificial Intelligence and Early Warning Systems: Promise, Peril, and the Path Forward., Available at <https://www.early-action-reap.org/blog/artificial-intelligence-and-early-warning-systems-promise-peril-and-path-forward> (Accessed on 11/07/2026)

²¹ United Nations Climate Change., 'AI and Climate Action: Opportunities, Risks and Challenges for Developing Countries' Op Cit

²² United Nations Development Programme., 'Precision Agriculture for Smallholder Farmers' Available at <https://www.undp.org/publications/precision-agriculture-smallholder-farmers> (Accessed on 11/07/2026)

²³ Ibid

²⁴ United Nations Climate Change., 'AI and Climate Action: Opportunities, Risks and Challenges for Developing Countries' Op Cit

²⁵ World Economic Forum., 'Powering the future: The energy shift for sustainable AI' Available at <https://www.weforum.org/stories/energy-transition/the-essential-energy-shift-for-sustainable-genai/> (Accessed on 11/07/2026)

global energy crisis²⁶. In addition, it has been observed that AI data centres produce electronic waste which can cause environmental pollution if not well-managed with negative impacts on human and ecosystem health²⁷. AI data centres also rely on critical minerals and rare elements, which are often mined unsustainably causing environmental injustices²⁸. In particular, it has been observed that every AI data centre depends on copper-heavy power systems while microchips that power AI need rare earth elements, a situation that drivers huge demand for these critical minerals which are often mined in environmentally destructive ways²⁹.

From the foregoing, it emerges that despite its role in strengthening climate action, AI data centres have a negative environmental impact that can worsen environmental injustices. Consequently, it is imperative to tackle the environmental impact of AI data centres in order to effectively harness AI as a tool that can bolster the pursuit of climate justice for people and planet.

3.0 Harnessing Artificial Intelligence for Climate Justice

AI is a double-edged sword in the pursuit of climate justice. On one hand, its positive attributes can fast-track energy transition, optimize energy use towards efficiency, track greenhouse gas emissions, strengthen early warning systems including through accurately predicting extreme weather events, enhance access to climate information, and support precision agriculture³⁰. However, the benefits of AI in climate justice are counterbalanced by the environmental impacts of data centres including massive energy and water demands, electronic waste that fuels environmental pollution and huge demand for critical minerals³¹.

In light of the foregoing, it is imperative to ensure that AI is effectively and appropriately harnessed in order to strengthen global climate action for Sustainable Development. In particular, there is need to utilise AI to bolster climate change mitigation and adaptation including through integrating it in energy systems, utilising it to strengthen early

²⁶ Ibid

²⁷ United Nations Environment Programme., 'AI has an environmental problem. Here's what the world can do about that.' Available at <https://www.unep.org/news-and-stories/story/ai-has-environmental-problem-heres-what-world-can-do-about> (Accessed on 11/07/2026)

²⁸ Ibid

²⁹ Ibid

³⁰ United Nations Climate Change., 'AI and Climate Action: Opportunities, Risks and Challenges for Developing Countries' Op Cit

³¹ United Nations Environment Programme., 'AI has an environmental problem. Here's what the world can do about that.' Op Cit

warning systems and disaster preparedness, applying it to track greenhouse gas emissions, and embracing it in precision agriculture³². Through this, it is possible to harness and utilise the transformative power of AI in the pursuit of climate justice.

However, on the other hand, it is necessary to address the impact of data centres on the environment. This can be achieved by using clean energy sources to power AI data centres. In particular, developers have been urged to prioritize using or training AI models run by efficient, net-zero data centres that are powered by renewable and low-carbon energy sources including nuclear³³. In addition, by embracing circularity including through recycling water and reusing components, it is possible to reduce the environmental footprint of AI data centres³⁴. It is also necessary to ensure that critical minerals such as copper and rare earth elements which are used in AI data centres are sustainably extracted including through upholding the rights of indigenous and local communities while also fostering environmental protection³⁵. Countries have also been urged to integrate AI policies into broader environmental laws and regulations in order to ensure the ethical and appropriate use of AI for sustainability³⁶.

Through the foregoing, it is possible to harness the positive attributes of AI while minimising its negative environmental impacts towards climate justice.

4.0 Conclusion

AI provides solutions that can deliver climate justice for people and planet. However, in light of its negative impact on the environment, it is imperative to green data centres in order to ensure that AI is harnessed appropriately, ethically and sustainably towards sound climate action and climate justice.

³² United Nations Climate Change., 'AI and Climate Action: Opportunities, Risks and Challenges for Developing Countries' Op Cit

³³ World Economic Forum., 'Powering the future: The energy shift for sustainable AI' Op Cit

³⁴ United Nations Environment Programme., 'AI has an environmental problem. Here's what the world can do about that.' Op Cit

³⁵ World Economic Forum., 'Critical minerals: Why innovation begins beneath the Earth's surface' Available at <https://www.weforum.org/stories/energy-transition/critical-minerals-innovation-earth-surface/> (Accessed on 11/07/2026)

³⁶ United Nations Environment Programme., 'AI has an environmental problem. Here's what the world can do about that.' Op Cit

References

Artificial Intelligence and Early Warning Systems: Promise, Peril, and the Path Forward., Available at <https://www.early-action-reap.org/blog/artificial-intelligence-and-early-warning-systems-promise-peril-and-path-forward>

Center for Climate Justice., 'What is Climate Justice?' Available at <https://centerclimatejustice.universityofcalifornia.edu/what-is-climate-justice/>

Climate Justice Global Alliance., Available at <https://sdgs.un.org/partnerships/climate-justice-global-alliance>

Enhancing Early Warning Systems with Artificial Intelligence., Available at <https://www.itu.int/itu-d/sites/digital-impact-unlocked/enhancing-early-warning-systems-with-artificial-intelligence/>

Giles. M., 'The Principles of Climate Justice at CoP27.' Available at <https://earth.org/principles-ofclimatejustice/#:~:text=That%20response%20should%20be%20based,the%20consequences%20of%20climate%20change>

Intergovernmental Panel on Climate Change., 'Climate change: a threat to human wellbeing and health of the planet. Taking action now can secure our future' Available at https://www.ipcc.ch/report/ar6/wg2/downloads/press/IPCC_AR6_WGII_PressRelease-English.pdf

PanAfrican Climate Justice Alliance., Available at <https://pacja.org/>

S & P Global., 'What is Energy Transition?' Available at <https://www.spglobal.com/en/research-insights/articles/what-is-energy-transition>

The Effects of Climate Change., <https://science.nasa.gov/climate-change/effects/>

The Renewable Energy Institute., 'How AI Is Making Renewable Energy Smarter' Available at <https://www.renewableinstitute.org/how-ai-is-making-renewable-energy-smarter/>

United Nations Climate Change., 'AI and Climate Action: Opportunities, Risks and Challenges for Developing Countries' Available at <https://unfccc.int/news/ai-and-climate-action-opportunities-risks-and-challenges-for-developing-countries>

United Nations Development Programme., 'Precision Agriculture for Smallholder Farmers' Available at <https://www.undp.org/publications/precision-agriculture-smallholder-farmers>

United Nations Environment Programme., 'AI has an environmental problem. Here's what the world can do about that.' Available at <https://www.unep.org/news-and-stories/story/ai-has-environmental-problem-heres-what-world-can-do-about>

United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

United Nations., 'Renewable Energy - Powering a Safer Future' Available at <https://www.un.org/en/climatechange/raising-ambition/renewable-energy>

World Economic Forum., 'Critical minerals: Why innovation begins beneath the Earth's surface' Available at <https://www.weforum.org/stories/energy-transition/critical-minerals-innovation-earth-surface/>

World Economic Forum., 'Powering the future: The energy shift for sustainable AI' Available at <https://www.weforum.org/stories/energy-transition/the-essential-energy-shift-for-sustainable-genai/>

World Economic Forum., 'What is Climate Justice?' Available at https://www.weforum.org/videos/climate-justice/?gad_source=1&gad_campaignid=22228224717&gbraid=0AAAAAoVy5F63G-51xPZCfWH7BGSBXa909&gclid=Cj0KCQjwy_fOBhC6ARIsAHKFB7-f_LGoyvNwbnGjFgLrrT_dmP191-82u3vFJ4ys0nW2O-1_lrLH30AaAiFPEALw_wcB

World Health Organization., 'Climate Change' Available at <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Key%20facts,diarrhoea%20and%20heat%20stress%20alone>

