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Climate Refugee Crisis in the Age of AI: Legal Challenges, Durable Solutions, and the Need for Responsibility Sharing

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Abstract

Among the many severe impacts caused by climate change, displacement and migration are perhaps the most devastating, aside from the direct loss of life. 'Climate Refugees' find themselves caught in a double bind. When seeking asylum under Refugee Law, they are often denied recognition as refugees. Although International Environmental Law has begun to address the interlinkage between climate change and migration, progress remains limited due to a multifaceted geopolitical context. A large number of people are anticipated to seek asylum as 'climate refugees' in a few decades, and policymakers, scholars and international organisations have been univocal on 'responsibility sharing' as the sole redressal. In this context, artificial intelligence could be a tool for gauging the efficacy of climate refugees.

This paper analyses the role of artificial intelligence in determining refugee status and the legal and ethical implications of detecting migration patterns of climate refugees through a doctrinal study of refugee status determination under international refugee law. The initial parts discuss the legal situation of "climate migration" and the minimal recognition compared to the necessity. The second part discusses the integration of AI in mitigating climate risks, recognising and assessing migration patterns and populations affected, as well as the integration of machine learning into refugee status determination, along with the challenges associated with such integration. Climate Refugees are victims of a 'recognition void', which has been emphasised in this paper, which establishes the premise on the basis of which the scale of the crisis is being convoluted. Lack of uniform definition would directly impact the discriminatory practices and severity of the persecution. In light of that, the basic fundamental mitigation tool in the scope of collective responsibility in protecting and assisting climate refugees shall be the use of artificial intelligence.

Keywords*: AI, Refugee Status Determination, Refugee Law, Climate Migration, Climate Change*

I. Introduction

As the world met in November 2024 in Azerbaijan for State parties to discuss Climate Change[1] and deliberate on the contemporary issues that impact or are impacted by such changes, there is still

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1 *UN Climate Change Conference Baku*, United Nations Climate Change, Baku, 11-22 November 2024, available at https://unfccc.int/cop29, accessed on 30 January 2025.

a community of people who deny the phenomenon of 'climate change' and its direct and indirect effects on human lives, as well as unintentional migration and displacement. While some countries still harbour scepticism about climate change, the implications of the same aren't utopian. Even countries with the economic capacity, technological advancements, knowledge, and skills to mitigate this contemporary crisis have fallen short. A 'superpower' country like the United States of America has had a hard time relocating 'climate-induced migrants' under the broad journalist umbrella term 'climate refugee'[2] from Louisiana, the Isle de Jean Charles, to the Land[3]. Similarly, due to the wrath of climate change, several other occupants living in Kivalina, an Indigenous Alaskan village, chose to relocate, as their habitual villages were becoming uninhabitable in nature[4]. The last-mentioned relocation doesn't seek the protection of the international community nor attract legal obligation or assistance, as they shall be displaced internally within the state borders. Yet, with a mere 1,000 people[5] cumulatively, these places found it hard to receive the government's attention and acknowledgement in establishing a causal link between migration and climate change. Ironically, the plight of the internally displaced persons, compelled to move out of their habitats due to the upheaval caused by unprecedented climate change, opens a window to the questionable protection of the 'climate refugees', migrants who are compelled to move beyond the boundaries.

Climate change is intrinsically linked to human behaviour, livelihoods, and survival[6]. The drastic disruption of this long-standing relationship has resulted in an increasingly alienated connection. Mary C. Waters has recently published research[7] discussing the possible future risks of climate migration, including an estimation of future climate migrants based on a typological study. The study not only provides relevant data to discuss the possible impacts of climate change on migrants, but also examines its interplay with the currently hostile political environment in the United States of America towards both climate change and immigrants[8]. National borders are becoming less significant over time, as the land sinks beneath rising waters, and the human population scrambles to find safe shelter. Carbon emissions have reached record levels, bringing with them rising temperatures, altered climate cycles, and extreme weather of both scorching heat and intense cold. Climate change has been a global issue, with its effects felt on every continent, and the effective increase in displacement and migration has continued to grow, garnering increasing attention from scientists, scholars, and legal academicians alike. Thirty years ago, the first report from the Intergovernmental Panel on Climate Change (IPCC) predicted that the most significant impact of climate change would be on human migration. About half of the species evaluated worldwide have moved to higher elevations or the

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2 *United Nations Framework Convention on Climate Change*, 21 March 1994, 1771 U.N.T.S. 107, New York, 4 June 1992.

3 Nine Apperry, 'The First Climate Refugees in the United States: Isle de Jean Charles', *Global Social Challenges, Manchester University*, 2022, available at https://sites.manchester.ac.uk/global-social-challenges/2022/07/12/the-first-climate-refugees-in-the-united-states-isle-de-jean-charles, accessed on 30 January 2025.

4 'Case Study: Relocating Kivalina', *U.S. Climate Resilience Toolkit*, 2015, available at https://toolkit.climate.gov/case-study/relocating-kivalina, accessed on 30 January 2025; See: FS Chapin III and others, 'Alaska' in JM Melillo, Terese (TC) Richmond and GW Yohe (eds), *Climate Change Impacts in the United States: The Third National Climate Assessment* (US Global Change Research Program 2014) 514–36, p. 523, https://doi.org/10.7930/J00Z7150 accessed 15 November 2025.

5 Ibid FS Chapin, p. 521; See: Tom Risen, 'Left Behind', *US News & World Report*, New York, 16 June 2016, available at www.Usnews.Com/News/Articles/2016-06-16/Some-Native-Americans-Lack-Access-To-Safe-Clean-Water.

6 S. Chakraborty, & Sudhakar, 'Beyond Borders: Reassessing the Recognition and Protection of 'Climate Refugees' in International Law', *Asian Journal of Legal Education* p. 231, volume 12:2, p. 231, available at https://doi.org/10.1177/23220058251334747, accessed on 22 November 2025.

7 Mary C. Waters, 'Preparing for Climate Migration and Integration: A Policy and Research Agenda', *Journal of Ethnic and Migration Studies* p. 4, volume 51:4, pp. 1-20, available at https://doi.org/10.1080/1369183X.2024.2438449, accessed on 4 February 2025.

8 Ibid, p. 5.

poles in recent years, and increases in the severity of heat extremes have been linked to hundreds of local species losses, and mass mortality events have been documented on land and in the ocean, according to the Intergovernmental Panel on Climate Change (IPCC), 2023 report[9].

Despite the disproportionate impacts on different countries, many are experiencing climate-related disasters on a regular basis. For instance, in 2021 alone, over 23.7 million people were compelled to leave their livelihoods due to various concerns related to catastrophes[10]. In the Central American region, countries like Guatemala face acute drought followed by torrential floods, which make life unhabitable, and the economy crippled. Similarly, in the regions of Alta Verpaz, by 2070, there may be an exponential reduction in agricultural fertility[11]. Coming to the continent that contributes least to carbon emissions is being hit by climate change at an inverse proportionate rate. The Cyclone Idai, which had hit Mozambique, had affected 2.6 million people, followed by Cyclone Beira, which damaged 90% of the cities. 1.7 million people[12] were affected, of whom 400,000 were forced to leave their homes. Periodic cyclones, droughts, and typhoons make countries like Malawi, South Sudan, Nigeria, Zimbabwe, and Mozambique among the most vulnerable in the world. In Madagascar, the people faced famine due to upheaval caused by climate change[13]. It was recognised as the first climate refugee crisis due to famine caused by Climate Change[14]. Southern Madagascar is experiencing a drought so severe that citizens are being forced to scavenge for most of their meals. Currently, more than 1.14 million people are being pushed to the edges of starvation. The situation in Asia is no better; Jakarta has been referred to as the sinking capital of Indonesia[15]. Due to the unprecedented scale of its sinking in the Java Sea, some parts of the city's outskirts have already been submerged.[16] Similarly, Bangladesh has seen consistent migration out of the country due to the consistent environmental disasters that have impacted lives severely[17]. People go from coastal regions to cities like the nation's capital, Dhaka, or Khulna. People have been compelled to relocate to the country's interior due to harsh weather occurrences, soil salinity, and frequent river erosion. Afghanistan observes the largest number of internal migrants, while countries like China, the Philippines, India, and Vietnam also see periodical climate-induced migrants. The IPCC Fifth Assessment Report[18] states that a significant

9 IPCC, 'Climate Change 2023: Synthesis Report', *Intergovernmental Panel on Climate Change (IPCC),* 2023, p. 5, available at https://www.ipcc.ch/report/ar6/syr, accessed on 30 January 2025.

10 European Commission, *Commission Staff Working Document: Addressing Displacement and Migration Related to Disasters, Climate Change and Environmental Degradation* (Publications Office of the European Union 2022), p.6, Available at https://ec.europa.eu/echo/files/policies/sectoral/swd_2022_displacement_and_migration_related_to_disasters_climate_change_and_environmental_degradation.pdf, accessed on 13 July 2025; See: Elfie Swerts & Eric Denis, *Development Challenges, Risks and Resilience in Asian Mega Cities,* Springer, Tokyo, 2015, available at https://doi.org/10.1007/978-4-431-55043-3_1, accessed on 22 November 2025.

11 Deepmala Ghosh, *Global Climate Change and Environmental Refugees: Nature, Framework and Legality*, Springer, Switzerland, 2023, p.11, available at doi:10.1007/978-3-031-24833-7, accessed on 22 November 2025.

12 Ibid; Nine Apperry (n 3).

13 Moriah Prescia & Amali Tower, 'WFP Declares Southern Madagascar on Brink of Climate Change-Driven Famine', *Climate Refugees*, 29 June 2021, p. 1, available at https://www.climate-refugees.org/spotlight/2021/6/29/madagascar., accessed on 20 November 2025.

14 Ibid.

15 Al Jazeera Staff, 'Why Indonesia is Abandoning Its Capital City to Save It', *Al Jazeera*, 9 November 2022, available at https://www.aljazeera.com/news/2022/11/9/hldwhyindonesia-is-abandoning-its-capital-jakarta-to-save-ithld, accessed on 17 November 2025.

16 Ibid.

17 European Commission (n 10); Ghosh (n 11), p. 12.

18 International Centre for Climate Change and Development and Climate and Development Knowledge Network, 'The IPCC's Fifth Assessment Report: What's in It for South Asia? Executive Summary', *IPCC,* 2014, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, p. 7, available at https://cdkn.org/sites/default/files/files/CDKN-IPCC-Whats-in-it-for-South-Asia-AR5.pdf, accessed on 17 November 2025.

portion of the Asian region will face the impact of climate change in the form of floods, cyclones, and extreme environmental disasters[19].

Even as the international community has made significant strides in addressing humanitarian issues caused by climate change, the connection between displacement and climate change remains underappreciated. In the discussion regarding the recognition of climate refugees, a certain degree of blame can be discerned in the scholarly debate surrounding it. In a historical analysis of this regime, one can observe the range of terms used to refer to the same group of people, reflecting convenience and scholarly novelty. Vogt's mention[20] of ecologically displaced persons in 1948 may be the first time such displacement has been anticipated and has largely been taken forward by Lester Brown[21], who coined the term 'Ecological refugees. Thereon, several modifications have been made to the term by the inclusion of 'economic Refugees' by Kathleen Newland[22] and 'Environmental Refugees' by El-Hinnawi, Disaster Refugees, and motivated migrants by Renaud[23]. These terms were sometimes used synonymously or were left to be understood in the context of the fundamental subsection, which drew a narrower classification of climate refugees from diverse factors, including geography, time, compulsion, and the pace of climate change. etc. Despite some scholars taking the initiative to introduce newer subsets under the broad umbrella of climate or environmental refugees, the narrower each subset has been, the more empirical data have been referred to as unreliable, and, consequently, the lack of attention and protection[24].

The absence of a uniform legal recognition of 'climate refugees' has directly impacted the identification of the scale of the crisis. The methodology for identifying the 'calculation' of the number of climate refugees requires a foundational understanding of who shall be counted and who shall be excluded. A larger and broader definition should encompass a multitude of people, while a narrower definition may be more preventive than a protective regime. Despite acknowledging the standard deviation, the lack of reliable data poses an issue in predicting the migration analysis, pattern, behaviour, scale, and complementary factors, such as rights and protection. The 'ecological fallacy' introduced by Piguet may be a significant argument in this context, as the lack of dependable data at the average level may not hold true at the individual level. In the orthodox understanding of migration typologies, as propounded by Russel King, the foresight of understanding climate refugees is flawed. However, scholars like Partha Sarathi Ghosh have apprehended that demographics and climate may play a

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19 Gurvinder Singh, 'India, the Brutal Effects of Cyclone Amphan in West Bengal Won't Fade Quickly', *Life Gate*, Kolkata, 5 June 2020, available at https://www.lifegate.com/cyclone-amphan-west-bengal, accessed on 6 February 2025.

20 William Vogt, *Road to Survival*, Victor Gollancz Ltd, London, 6th edition, 1951.

21 Lester Brown, Peter McGrath & Bruce Stokes, 'Twenty-Two Dimensions of the Population Problem', *Worldwatch Institute* p. 233, volume 35:1, 1976, available at https://doi.org/10.2307/1531902, accessed on 22 November 2025.

22 Kathleen Newland, *International Migration: The Search for Work. Worldwatch Paper 33*, Worldwatch Institution, Washington D.C., 1979, pp. 1–32, available at https://files.eric.ed.gov/fulltext/ED180894.pdf accessed on 22 November 2025; See, 'The Nansen Conference: Climate Change and Displacement in the 21st Century', *Norwegian Refugee Council*, 2011, Norway, p. 5, available at https://www.unhcr.org/sites/default/files/legacy-pdf/4ea969729.pdf, accessed on 22 November 2025.

23 Fabrice G. Renaud, Janos Bogardi, Olivia Dun & Koko Warner, 'Control, Adapt or Flee: How to Face Environmental Migration?', *UNU Institute for Environment and Human Security,* p. 11, Publication Series of UNU-EHS No.5, 2007, available at https://www.researchgate.net/publication/237460197_Control_Adapt_or_Flee_How_to_Face_Environmental_Migration, accessed on 6 February 2025.

24 Diane C. Bates, 'Environmental Refugees? Classifying Human Migrations Caused by Environmental Change', *Population and Environment*, volume 23:5, 2002, pp. 465-477, available at https://doi.org/10.1023/A:1015186001919, accessed on 22 November 2025.

significant role in ascertaining migration patterns[25]. Therefore, the subjective analysis of the term 'climate refugee' may encompass a diverse range of variables, as Zickgraf's study introduced a new set of people who may be referred to as the 'trapped population'.[26] Apart from the multi-faceted definition of climate refugees, there is significant disagreement due to a complex understanding of the interrelationship between climate change and migration patterns. Two opposing schools of ideology, based on this, may be referred to as maximalist and minimalist. The maximalist theory, backed by natural scientists, has been advocated by the foremost scholars who have introduced the world to ecological refugees, environmental refugees,[27] etc. As per this theory, there is a direct impact[28] of environmental change on the displacement pattern[29]. The minimalist approach supplemented by social scientists[30] acknowledges that the direct impact of climate change on migration is flawed. Prof. Klepp also says in the above-mentioned article that all displaced persons are entitled to fundamental human rights[31]. These rights include the right to life, health, shelter, food, and movement. Regarding the development of more specific rights that guarantee the protection of environmental migrants, individual governments, scientists, international organisations, and NGOs have aimed to create a new legally binding treaty or expand existing treaties in international law, especially at earlier stages of the debate. This linear approach to studying migration and skewed empirical data overlooks migration at a holistic level. There are multicausal links[32], including social, economic, and political factors, that have a lasting impact on migration beyond the effects of climate change in isolation. The usage of 'humanitarian design'[33] has been debated on the grounds of credibility and assessment.

On the other hand, artificial intelligence technologies are being used in various contexts, such as assessing credit risks, implementing them in courts, the legal departments of large corporations, public authorities, and management.[34] Legal theory is striving to adapt to processes controlled by artificial intelligence without human involvement, taking into consideration the challenges presented by the information society. The existence of this aspect of the digital world and its implications make legal analysis more challenging. AI challenges the bounds of agency and responsibility, highlights the

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25 Partha S Ghosh, *Migrants, Refugees and the Stateless in South Asia*, Sage Publications Pvt. Ltd, New Delhi, 1st edition, 2016.

26 Caroline Zickgraf, 'Theorising (Im)mobility in the Face of Environmental Change', *Regional Environmental Change* p. 126, volume 21:126, 2021, available at https://doi.org/10.1007/s10113-021-01839-2, accessed on 17 November 2025; See: 'Foresight: Migration and Global Environmental Change', *The Government Office for Science*, 2011, London, p. 16, available at https://assets.publishing.service.gov.uk/media/5a74b18840f0b61df4777b6c/11-1116-migration-and-global-environmental-change.pdf, accessed on 6th February 2025.

27 Essam El-Hinnawi, 'Environmental Refugees', *United Nations Environment Programme*, 1985, Nairobi, p. 12, available at https://digitallibrary.un.org/record/121267?ln=en&v=pdf, accessed on 22 November 2025.

28 Norman Myers & Jennifer Kent, *Environmental Exodus: An Emergent Crisis in the Global Arena*, Climate Institute, Washington, D.C., 1995.

29 Jodi L Jacobson, 'Environmental Refugees: A Yardstick of Habitability', *Bulletin of Science, Technology & Society* p. 257, volume 8:3, 1988, pp. 257-258.

30 Silja Klepp, 'Climate Change and Migration', *Oxford Research Encyclopedia of Climate Science*, 2017, p. 18, available at https://doi.org/10.1093/acrefore/9780190228620.013.42, accessed on 22 November 2025.

31 Ibid, p. 30

32 Etienne Piguet, 'Theories of Voluntary and Forced Migration', p. 24, in Robert McLeman & François Gemenne (eds), *Routledge Handbook of Environmental Displacement and Migration*, Routledge, New York, 1st edition, 2019, available at https://doi.org/10.4324/9781315638843-2, accessed on 22 November 2025.

33 Brita Fladvad Nielsen, 'Humanitarian Design', p. 97, in Antonio De Lauri (ed), *Humanitarianism: Keywords*, Brill Academic Publishers, Leiden, 2020.

34 Devika Ramachandran & Rashmi Singh Rana, 'AI-driven jurisprudence: Navigating legal landscapes in the digital age', *International Journal of Law, Justice and Jurisprudence* p.128, volume 4:1, 2024, pp. 128–139, available at https://doi.org/10.22271/2790-0673.2024.v4.i1b.103, accessed on 22 November 2025.

limitations of anthropocentric normativity, and calls for a rethinking of legal subjectivity in the digital age[35]. This paper identifies 'predictive analysis', 'data management' and 'refugee status determination' efficacy as some of the viable solutions to the existing 'protection and recognition void' that has been the fate of climate refugees so far, and how AI can be the pragmatic solution for that, if at all[36]. The paper reaffirms the definition extended by scholar Stellina Jolly and Nafees Ahmed, where 'climate refugee' includes the anthropogenic changes along with the sudden or gradual climatic disturbances or unhabitable conditions[37].

II. Climate Refugees and the 'Protection-Recognition Void'

Two of the most prominent instruments in International Refugee Law that are widely accepted are the 1951 Refugee Convention and the 1967[38] Protocol. Article 1(2)(a) of the Convention[39], in conjunction with the Protocol, defines a "refugee" as someone who faces a "well-founded fear" of "persecution" based on specific grounds: (a) race, (b) religion, (c) nationality, (d) membership of a particular social group, and (e) political opinion. When the Convention was established in the aftermath of World War II, the concept of refugees primarily focused on those fleeing persecution by their own state. However, in 2019, 79.5 million people were forcibly displaced because of violence, conflict, persecution, and human rights violations.[40] The capacity of the 'state and its agents', outlined as agents of persecution, has been diluted over the period of various non-state actors triggering the contemporary tussle, if the breach of social contract theory is a pre-requisite to receive refugee status?

However, the capacity of 'climate change' as a sole agent of persecution has continued to be a debate. Persecution is to be determined by striking a balance between objectivity and subjectivity, based on the actions of state authorities toward displaced individuals[41]. Additionally, apart from individuals who do not have readily accessible legal migration avenues, many have brought attention to the issue of 'trapped populations' or individuals who lack the means to acquire knowledge or

35 Bhushan, Tripti, 'Artificial Intelligence, Cyberspace and International Law', *Indonesian Journal of International Law,* volume 21:2, 2024, p. 291, available at https://scholarhub.ui.ac.id/ijil/vol21/iss2/3/, accessed on 22 November 2025.

36 Matilda Arvidsson & Gregor, 'Decision Making in Asylum Law and Machine Learning: Autoethnographic Lessons Learned on Data Wrangling and Human Discretion', *Nordic Journal of International Law* p. 56, volume 92:1, 2023, p. 65, available at https://doi.org/10.1163/15718107-bja10057, accessed on 22 November 2025; See: Ana Beduschi, 'International Migration Management in the Age of Artificial Intelligence', *Migration Studies* p. 576*,* volume 9:3, 2021, p. 576, available at https://doi.org/10.1093/migration/mnaa003, accessed on 22 November 2025.

37 Stellina Jolly & Nafees Ahmad, *Climate Refugees in South Asia: Protection Under International Legal Standards and State Practices in South Asia,* Springer, Singapore, 2019, p. 55.

38 *Protocol Relating to the Status of Refugees*, 4 October 1967, 606 UNTS 267, New York, General Assembly resolution 2198 (XXI), 16 December 1966, available at https://www.ohchr.org/sites/default/files/protocolrefugees.pdf, accessed on 22 November 2025.

39 *Convention Relating to the Status of Refugees,* 22 April 1954, 189 UNTS 137, Geneva, July 28, 1951.

40 Merdin Mohammed, *A Study of the Challenges Faced by Students Who Identify as Refugees Who Have Experienced Interrupted Education and Trauma,* Doctor of Philosophy, University of San Diego School of Leadership and Education Sciences, May 2022, p. 15, available at https://digital.sandiego.edu/cgi/viewcontent.cgi?article=1928&context=dissertations, , accessed on 22 November 2025.

41 Handbook on Procedures and Criteria for Determining Refugee, *United Nations High Commissioner for Refugees*, 2019, available at https://www.unhcr.org/sites/default/files/legacy-pdf/5ddfcdc47.pdf, , accessed on 22 November 2025.

money to avoid the severe consequences of climate change[42]. These extended various categories of refugees who were previously not covered by the five illustrated grounds of persecution were to receive subjective test analysis and complementary refugee protection. However, in the discussion of climate change, the UNHCR Handbook further clarifies that climate change will not be considered the primary grounds for persecution unless supplemented with one of the other five grounds. This suggests that the maximalist debate on the direct impact of climate change on the refugee movement been denied by the refugee agency. However, if such a climate refugee crisis has resulted in political, religious or other conflicts, as the secondary agent, it remains a chance to be deciphered as a ground of persecution.

Previously, the UNHCR initially opposed the designation of "climate refugees", considering it to be a misnomer. Former High Commissioner Sadako Ogata[43], speaking at the 1992 UN Conference on Environment and Development, argued that recognising such refugees would reduce the responsibility of states and the international community to protect those in need. Although the initial stance was maintained for a brief period, the UNHCR has, in furtherance, changed its opinion on the forced migration of people due to the adverse effects of climate change on lives and livelihoods. The international body has now acknowledged that climate change can even be a source of a humanitarian crisis, leading to migration as one of the multi-pronged consequences. On the other hand, the International Organisation for Migration has long accepted environmental variables as a valid reason, although there is no categorical difference between long-term climate degradation and environmental disasters, such as earthquakes.

The Guiding Principles on Internal Displacement, adopted by the United Nations in 1998, start a conversation on the migration pattern triggered by natural disasters. However, such a provision has ceased to acknowledge the migrants within the municipal borders. There is a recognition void for those who are forced to cross borders due to reasons stemming from climate degradation, regardless of the means by which it occurs, and the reason may be deduced from the political and diplomatic context of international community interactions. The striking avoidance of the acknowledgement of cross-border migration due to climate change comes from the existing refugee crisis being enough for the countries to deal with, and not wanting to put up with the responsibility of allowing refugees for an even more subjective and ambiguous criteria, already being overwhelmed with political and religious refugees. The second consideration might also be that acknowledging these refugees and allowing assessment might lead countries not to comply with actual climate pollution mitigation laws, thereby causing environmental damage.

Not to mention, differentiating climate refugees separately from other types of refugees is an immense challenge in itself. As states continuously neglect to recognise climate refugees, there is a chance that existing and agreeing nations will implement national legislative and policy frameworks that would considerably improve international refugee recognition and provide systematic enhancements for the international community in terms of safeguarding the population. The current geopolitical hurdles in nations, however, are significant, as diplomatic turmoil and changes in governments often run counter to the best interests of climate change and migration policies. The recent changes in the

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42 Avidan Kent & Simon Behrman, *Facilitating the Resettlement and Rights of Climate Refugees: An Argument for Developing Existing Principles and Practises*, Routledge, New York, 1st edition, 2018, p. 5, available at https://api.pageplace.de/preview/DT0400.9781351175692_A34371856/preview-9781351175692_A34371856.pdf, , accessed on 22 November 2025.

43 Javier Verdú Baeza, 'Climate Refugees, Human Rights and the Principle of Non-Refoulement', *Peace & Security – Paix et Sécurité Internationales* p. 1, Issue 11, 2023, p. 7; See: Sumudu Atapattu, *UN Human Rights Institutions and the Environment: Synergies, Challenges, Trajectories* , Routledge, 1st Edition, 2023.

government in the United States of America have seen a pivot in climate change policies, which, over the last few years, had progressed towards the inclusion of climate migrants into national asylum and immigration systems. Theoretically, existing international environmental law, refugee law, and international human rights law can all offer longer-term options to safeguard climate refugees. Severe policy-wise amendments and commitment towards change in a subjective manner would be needed from both national and international organisations, governments, and autonomous bodies to have an impact in this field[44].

III. AI and International Jurisprudence

While AI is not a subject of international law and its jurisprudence in the conventional Westphalian sense, the deployment of the technology and the guidelines that follow have prompted a sustained introspection into long-standing avenues of international law, such as humanitarian law, state responsibility, environmental law, refugee law, and others. AI's most subtle yet omnipresent jurisprudential intervention lies in its capacity to complicate the binary structure of legal subjectivity. The conventional division between state and non-state actors, which had been put under strain by the emergence of private conglomerates and multicorporate structures, has been further diluted as the capacity of machines has increased. While international law has traditionally resisted attributing legal personality to non-human entities, the growing functional independence of AI systems and their increasing involvement in various scenarios invite a critical rethinking. Daniel Ferreira[45] has discussed the implications of AI in a more judicial sense, where his paper explores the potential collision or merger between hyperrealism and legal realism, focusing on the analytical aspects of court decisions. Many scholars have worked on predictive algorithms of a similar nature[46.] Other international scholars have discussed the inclusion of AI-based rights and duties, often arguing that AI's rights and obligations differ from those of other legal issues and may only be specified by legislators[47]. However, it is abundantly clear that AI's involvement in norm-generating processes, both internationally and domestically, is only going to continue on an upward trajectory, as international commitments, interactions, and processes evolve. As an example, under the Convention on Certain Conventional Weapons (CCW), the United Nations Group of Governmental Experts (GGE) has been debating the incorporation of AI into autonomous weapons systems (AWS) in great detail while the intersection between algorithmic governance[48] and states' duties to protect civil, political, economic, and cultural rights has started to be addressed by international human rights law doctrine. The implications and use cases of technology are broad, increasing almost daily. Parallelly, the need for guidelines, critical discussions, and jurisprudential reimagining increases too, as indeed, due to

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44 Caitlan M. Sussman, 'A Global Migration Framework Under Water: How Can the International Community Protect Climate Refugees?', *Chicago Journal of International Law Online* p. 41, volume 2:1, 2023, pp. 41–68, available at https://cjil.uchicago.edu/online-archive/global-migration-framework-under-water-how-can-international-community-protect, accessed on 30 January 2025.

45 Daniel Brantes Ferreira & Elizaveta A. Gromova, 'Hyperrealistic Jurisprudence: The Digital Age and the (Un) Certainty of Judge Analytics', *International Journal for the Semiotics of Law - Revue internationale de Sémiotique juridique 36* p. 2261, volume 36:6, 2023, p. 2270, available at https://doi.org/10.1007/s11196-023-10015-0, accessed on 22 November 2025.

46 Masha Medvedeva, Michel Vols & Martijn Wieling, 'Using machine learning to predict decisions of the European Court of Human Rights', *Artificial Intelligence and Law* p.237, volume 28:2, 2020, p. 238, available at https://doi.org/10.1007/s10506-019-09255-y, accessed on 22 November 2025.

47 Paulius Čerka, Jurgita Grigienė & Gintarė Sirbikytė, 'Is it Possible to Grant Legal Personality to Artificial Intelligence Software Systems?', *Computer Law & Security Review* p. 685, volume 33:5, 2017, p. 692, available at https://doi.org/10.1016/j.clsr.2017.03.022, accessed on 22 November 2025.

48 Ibid.

the black-box nature of AI algorithms, mistakes, inaccuracies, and biases may be difficult to detect. Consequently, individuals may not be able to obtain redress in case of violations of their rights.[49]

IV. Artificial Intelligence Adaptation: Climate Risk Mitigation to Migration Assessment

The efficacy of artificial intelligence has led many organisations worldwide to adopt and integrate it into various systems, including administration, judiciary, legislation, education, and socioeconomic operations. Even in 2004, expert systems, as they were then known, were increasingly being used by government agencies to inform or assist in administrative decisions. Expert systems had the potential to make decisions more accurately, consistently and cost-effectively, particularly in areas of high-volume decision-making.[50] Artificial intelligence has proven to be and continues to be of significant importance in mitigation and adaptation, thanks to its enhanced predictive capabilities, which are themselves continually developing at a rapid rate. It has already been observed that, through the leveraging of big data analytics, sophisticated machine learning, and neural networks to their utmost potential, nuanced weather and climate models are being constructed by AI.[51] Cowls and Tsamados, in their article, establish that the potential use of AI for mitigating climate risk comes with a risk of compromising ethics, which is further discussed in the article.[52] In terms of administration specifically, border control for various states has seen the integration of technology and machine learning in various ways, from simple electronification of procedures to more direct dependence on AI. There is a simple and yet profound procedural explanation of AI usage in administrative decisions, including the refugee status determination. According to Cameron and Goldfarb, an AI system would not be able to directly warn an adjudicator regarding the possibility that a claimant is at serious risk. However, if it presumes that the claimant's factual accusations in the case are accurate, it might offer advice on intermediate issues that arise in a claim. An AI might, for instance, forecast how a nation's police would react to a request for assistance or how a government would handle a particular type of activism. Natural language processing and conventional statistics would probably be used in some capacity.[53] This raises the question of whether an extension of technological applications that can be used in refugee status determination, specifically in understanding patterns and recognising climate migration, would be viable. The models mentioned earlier provide detailed weather predictions for mitigating extreme weather emergencies, such as cyclones, droughts, and floods. Moreover, these models can help predict population movement and plan pre-emptive mitigation strategies.[54] The Sendai

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49 Ana Beduschi, 'International Migration Management in the Age of Artificial Intelligence', *Migration Studies* p. 576, volume 9:3, 2021, p. 589, available at https://doi.org/10.1093/migration/mnaa003, accessed on 22 November 2025.

50 John McMillan, 'Automated Assistance in Administrative Decision Making: Better Practice Guide ', *Commonwealth Ombudsman,* 2007, pp. 2-3, available at https://www.ombudsman.gov.au/__data/assets/pdf_file/0025/317437/Automated-Decision-Making-Better-Practice-Guide-March-2025.pdf, accessed on 25th January 2025.

51 Josh Cowls, Andreas Tsamados, Mariarosaria Taddeo & Luciano Floridi, 'The AI Gambit: Leveraging Artificial Intelligence to Combat Climate Change-Opportunities, Challenges, and Recommendations', *Ai & Society* p. 283, volume 38, 2023, p. 286, available at https://Doi.Org/10.1007/S00146-021-01294-X, accessed on 25 January 2025.

52 Ibid.

53 Hilary Evans Cameron, Avi Goldfarb & Leah Morris, 'Artificial Intelligence for a Reduction of False Denials in Refugee Claims', *Journal of Refugee Studies* p. 493, volume 35:1, 2022, p. 504, available at https://doi.org/10.1093/jrs/feab054, accessed on 22 November 2025.

54 Chris Huntingford, Elizabeth S Jeffers, Michael B Bonsall, Hannah M Christensen, Thomas Lees and Hui Yang, 'Machine Learning and Artificial Intelligence to Aid Climate Change Research and Preparedness', *Environmental Research Letters*, volume 14:12, 2019, p. 9, available at https://Doi.Org/10.1088/1748-9326/Ab4e55, accessed on 25 January 2025.

Framework for Disaster Risk Reduction (2015-2030) recognises the importance of technological capabilities and their integration for risk reduction in specific disaster mitigation scenarios. Point 14 of the framework reads, "investing in the economic, social, health, cultural and educational resilience of persons, communities and countries and the environment, as well as through technology and research; and enhancing multi-hazard early warning systems"[55]. AI, in itself, can fulfil the mandates by providing actionable information to the authorities of different nations; for instance, authorities can identify places most at risk of displacement by using AI-powered satellite imagery, such as that utilised by the Copernicus Climate Change Service, which tracks environmental changes. From a legal perspective, the application of AI technology would also align with the objectives of the Rio Declaration, which includes precautions against climate risks. On the contrary, if the data-driven predictions prove to be incorrect and the interventions are flawed, legal accountability may be called into question.[56]

Many scholars have adjudged AI's potential in mitigating displacement to be transformative. At the very base of things, AI-powered tools and analytics can help prioritise aid delivery and resource management. Academic minds have argued that existing modes of refugee status assessment always depend on uncertainty, and credibility assessment in migration and other administrative procedures is also careless in its own ways. It is often not possible to validate an account using other forms of proof, such as documents or witness statements. Additionally, certain justifications for acknowledgement, like membership in a specific social group, are especially challenging to prove outside of the context based on a candidate's self-identification or testimony.[57] There is a significant gap that the use of AI and algorithms could help fill. If proven correct, the same process can better distinguish the credibility of climate migrants in a similar determination algorithm. In regions that may be disproportionately affected by climate change, this presents an opportunity to utilise technological advancements for responsibility sharing.

The Canadian Government has successfully applied certain automated systems to streamline the refugee application process and procedures carried out by immigration officials. The program titled "Artificial Intelligence Solution", which is supposed to be part of the litigation process and integration of machine learning into the judiciary, is sought to be applied to the migration appraisal procedures by the government.[58]

The Paris Agreement that addresses climate change and establishes international legal guidelines and frameworks for these interactions frequently discuss adaptive capacity and intervention as a focal point of this discussion. AI and machine learning can be part of this technological assistance mission between states, which would ensure that states do not have any concerns about interference in their sovereign functions from an 'intervening state', all the while helping with crisis mitigation, as well as in cases of a migrating population. For this vision to exist beyond theoretical bounds, however, there

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55 UN Office for Disaster Risk Reduction, Sendai Framework for Disaster Risk Reduction 2015–2030, *United Nations,* 2015, Geneva Switzerland, p. 11, available at https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030 , accessed on 17 November 2025.

56 Niamh Kinchin, 'Technology, Displaced? The Risks and Potential of Artificial Intelligence for Fair, Effective, and Efficient Refugee Status Determination', *Law in Context*, volume 37:3, 2021, p. 14, available at https://doi.org/10.26826/law-in-context.v37i3.157, accessed on 22 November 2025.

57 Trish Luker, 'Decision Making Conditioned by Radical Uncertainty: Credibility Assessment at the Australian Refugee Review Tribunal', *International Journal of Refugee Law* p. 502, volume 25:3, 2013, available at https://doi.org/10.1093/ijrl/eet043, accessed on 22 November 2025.

58 Artificial Intelligence Solution*, Public Works and Government Services Canada*, Tender Notice *B8607-180311*/A, 2018, https://buyandsell.gc.ca/procurement-data/tender-notice/PW-EE-017-33462, accessed on 25 January 2025.

would need to be a convergence of International Refugee Law and Environmental Law components to ensure that the global implementation of AI systems has a few unavoidable characteristics. Keeping in mind the international geopolitical context, the procedural implementation in any administrative scenario must ensure international equal distribution of technology and uniform standards for application, along with proper transparency of the machine supervision procedure. Inversely, these developing technologies can become a bridge of cooperation between various states when fully implemented, as they will mitigate migration and displacement due to climate change and may often be able to predict such migration patterns, taking necessary precautionary measures. This would also ensure that a common understanding of causal data in the context of migration and displacement is placed before these cooperating states, enabling them to prevent climate degradation and reduce pollution through various means, ultimately contributing to the achievement of international environmental law objectives. Even according to the Global Compact for Safe, Orderly, and Regular Migration (2018)[59], AI-based platforms can be better utilised and expanded upon for global safety and development.

Both the Global Compacts have made rigorous recourse to the embedded collective protection framework rooted in the 'group' analogy. While the 'Responsibility Sharing' is underlined through the central focus of executing the Global Compacts[60], there is no certain measure incorporated to protect the climate refugees. Catering to the ambiguity, the Global Compact on Refugees has strangely avoided the redistributive commitments and potentially missed an opportunity to bridge the discussion on environmental justice and refugee protection. Due to various flaws engraved in these instruments, Prof. Chimni has referred to them as one step forward and two steps back.[61]

AI integration into migration status determination and processing of applications, allowing immigrants and often border personnel to have the facilities of accurate and efficient processing, can be beneficial even for refugees in a broader spectrum. AI-enabled burden-sharing and climate displacement mitigation are exemplified by the World Bank's Famine Action Mechanism (FAM) and the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). The potential for creating technology that enhances climate resilience is hindered by the continued fragmentation of international integration and collaboration, despite some progress.

The adaptation intervention principle and its objective are based on the concept of international collaboration to address climate change and its consequences, including climate migration. Many scholars argue that developed states' current application of adaptation intervention principles often misunderstands how to define and counter vulnerability, as well as the true meaning of success behind adaptation assistance. Even though adaptation interventions are meant to address the needs of underprivileged socioeconomic groups and those who are most susceptible to climate shocks and stresses, they are susceptible to elite capture, a persistent issue in development whereby powerful individuals appropriate funds, leading to interventions that perpetuate current power dynamics.[62]

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59 *Global Compact for Safe, Orderly, and Regular Migration*, 10 December 2018, UNGA Res 73/195, available at https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_73_195.pdf, accessed on 22 November 2025.

60 IDM No. 33, International Organisation for Migration, https://publications.iom.int/system/files/pdf/IDM-33.pdf

61 Chimni, B. S. "Global Compact on Refugees: One Step Forward, Two Steps Back." *International Journal of Refugee Law* p. 591, volume 30:4, 2018, available at https://doi.org/10.1093/ijrl/eey062, accessed on 22 November 2025.

62 Siri Eriksen et al., 'Adaptation Interventions and Their Effect on Vulnerability in Developing Countries: Help, Hindrance or Irrelevance?', *World Development*, volume 141:4, 2021, p. 3, available at https://doi.org/10.1016/j.worlddev.2020.105383, accessed on 6 February 2025.

Technological assistance towards other countries can be a step toward correction that, through providing technological assistance, is much more hands-off and doesn't disturb state sovereignty and independent growth. Integrating AI into administrative functionalities can be a precautionary phase of adaptation intervention that provides much more success without considerable doubts about consequences.

V. Refugee Status Determination and AI

Even though the possibility of incorporating Al into Refugee Status Determination (hereinafter referred to as RSD) has only been briefly discussed thus far, the substantial and ongoing expansion of Al in government programs, such as border control and migration, as well as its growing systems, can gradually expand from mitigating climate damage to responding to climate refugees to determining refugee status, which has always been a controversial process for any situation that is frequently complicated by geopolitical relations. Decision-making wait periods for refugee status approval vary on a spectrum, but UNHCR and most state systems face considerable delays in this procedure. The process by which States and the United Nations High Commissioner for Refugees (UNHCR) decide whether a person satisfies the requirements to be recognised as a refugee in accordance with the definition in the Convention relating to the Status of Refugees (Refugee Convention) is known as Refugee Status Determination or RSD. RSD is an intricate procedure that is often impeded by delays and ambiguities due to its subjective nature. Kinchin and Mougouei[63] argue in their article that implementation of the current system will always be beneficial, even if it comes with the usual challenges of integrating the subjective rationale needed to determine the status of human beings, effectively constructing the future of their humanitarian rights. Migrants, although they have a broader definition by nature, can fit into the category of procedural entities that could benefit from AI and technological integration, especially when it comes to climate migrants. Particularly with regard to "climate migrants", international institutions are still hesitant to offer particular protections. By advancing disaster relief aid and boosting public awareness of the issue, the UN, other international organisations, and countries have, however, stepped up their efforts to address humanitarian disasters and displacement caused by climate change. It is crucial to explore how we can develop a more effective and efficient approach to managing climate migration as the numbers continue to rise, despite significant progress in expanding protections for climate migrants. While AI applications may be used to address the refugee status problem, the issues and identification of climate migrants require a governance and administrative overhaul before such advancements can be made. Mehryar and Tong[64] argue in their article that governance can benefit from the advent of AI integration for climate risk mitigation, indirectly assisting populations suffering from it. Currently, there are AI processes in different countries (especially Europe) that have phased integration into the refugee process through different means of border control and data analytics. There are substantial human rights-related obstacles to implementing AI systems in this industry. At the same time, there is already strain on the current legal safeguards against bias, illegal choices, and refoulement. In the area of border and immigration enforcement, the executive and other government departments maintain broad discretionary, unreviewable powers that are not subject to the substantive and procedural restrictions typically afforded to individuals. When AI systems provide seemingly straightforward

[63] Niamh Kinchin &Davoud Mougouei, 'What Can Artificial Intelligence Do for Refugee Status Determination? A Proposal for Removing Subjective Fear', *International Journal of Refugee Law* p. 373, volume 34:3-4, 2022, p. 389, available at https://Doi.Org/10.1093/Ijrl/Eeac040, accessed on 25 January 2025.

[64] Sara Mehryar, Vahid Yazdanpanah & Jeffrey Tong, 'AI And Climate Resilience Governance', *iScience*, volume 27:6, 2024, p. 3, available at https://Doi.Org/10.1016/J.Isci.2024.109812, accessed on 25 January 2025).

answers to difficult issues, these difficulties may worsen on a large scale.[65]

If AI can overcome the shortcomings of human credibility evaluations, it could be a priceless tool for decision-making in RSD. Machine learning is essential to the operation and design of many Al systems. Machine learning can be produced using either supervised or unsupervised learning techniques. Machine learning uses algorithms that learn from historical data to find correlations. Automated credibility assessments are one type of expert system that could be applied to RSD. Artificial intelligence systems can significantly improve the current systems of technology-enhanced credibility evaluations that are typically linked to polygraph screening or lie detection tests, which have always been doubted for their inaccuracy and tendency to create a false positive.[66] As Kinchin and Mouguei[67] have pointed out, an AI expert system with both supervised and unsupervised learning technologies can be used to deal with refugee status determination, and rudimentary automated processes can make it significantly swifter. This article posits that a predictive data analysis system coupled with data mining and categorisation capabilities of Artificial Intelligence, specifically tuned to deal with the refugees and their assessment, can be tested to see its efficiency. This could provide access to otherwise unrecognisable relevant information, and the status of refugees could be clearly identified. The objective part of this assessment can be fruitfully conducted through AI, and such possibilities necessitate further experimentation with proper supervision. Application of these systems comes with very transparent opportunities to remove biases from the decision-making authorities and often clears up concerns on their behalf. The variability of human decisions might be minimised with human involvement being applied when absolutely necessary, and a sense of uniformity of different decisions can be established.[68] In the case of climate migration specifically, this could be hugely influential, as climate migration as a concept is hard to understand and appraise compared to the 'risk of prosecution' aspect mentioned in the typical international instruments and related protocols, which do not directly exist in climate forced migration cases. In this case, the most prominent example of such legislation that can directly control the use of AI-based technology in border management and migration assessment is the EU AI Act[69] which is a horizontal legislative instrument released by the European Commission in April 2021. The European Commission proposed the Regulation with the goal of regulating a broad range of automated or artificial intelligence-enabled technologies. People crossing borders, seeking refugee status, or immigrating face considerable human rights concerns while using migration technology, especially when they are partially or totally automated. The discussion hereon makes it clear that accountability for the usage of technology in this scenario is the first step, which can be only thought of through a parallelly running governance structure that is robust, adaptive and well-articulated. The final draft of the AI Act, that has been published in July 2024, has a few leanings that might fit the process of migration control, although it has been constantly criticised for the risks it poses since its inception.[70] The Act itself accepts a risk-

65 Madeleine Forster, 'Refugee Protection in The Artificial Intelligence Era: A Test Case for Rights', *International Law Programme* p. 1, volume 27:6, 2022, p. 3, available at https://Doi.Org/10.55317/9781784135324, accessed on 27 January 2025.

66 Ryan Gallagher & Ludovica Jona, 'We Tested Europe's New Lie Detector for Travelers and Immediately Triggered a False Positive', *The Intercept*, New York, 26 July 2019, available at https://theintercept.com/2019/07/26/europe-border-control-ai-lie-detector/, accessed on 28 January 2025.

67 Kinchin and Mougouei (n 30), p. 385.

68 Niamh Kinchin & Davoud Mougouei (n 56).

69 Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act), 2024, OJ L 1689/1, 12 July 2024.

70 Petra Molnar, 'The EU's AI Act and its Human Rights Impacts on People Crossing Borders: In Brief', *Migration Strategy Group on International Cooperation and Development: Dialogue on Tech*, DoT.Mig, 2022.

based classification of the AI systems and proposes that a few safeguards should be established in the case of AI technology that can be deemed 'high risk', including the technology implemented in border management and migration control. Similarly, the use of such technology to understand climate migration can be specified. Transparency, traceability, human oversight, data quality, and risk reduction are among the requirements that are mentioned in the provisions of this Act. Point 33[71] establishes the area of usage acceptance, reading as: "the use of those systems for the purpose of law enforcement should therefore be prohibited, except in exhaustively listed and narrowly defined situations, where the use is strictly necessary to achieve a substantial public interest, the importance of which outweighs the risks." Based on this act, national AI regulatory authorities that specifically deal with border management can be established, which can have specific provisional mandates to supervise climate-induced displacement and migration control. Such management authorities must ensure that there is legal compliance when it comes to the ethical propriety of systems that are considered for predicting climate migration, processing refugee flow and border control. The scope of such institutions might be extended to operationalising these AI systems with specific licensing processes, adjudication and supervision of algorithmic decisions regarding RSD that may give rise to complaints.[72] These regulatory bodies may also work in sync with the climate governance institutions that exist globally or nationally, which may result in collaborative and proactive actions that result in risk mitigation of climate degradation and human loss management, rather than post-facto migration flow. These cross-institutional working can create a system that can fulfil the objective of climate risk mitigation and climate migration equally in a balanced manner. Furthermore, the United Nations Guiding Principles on Business and Human Rights (UNGPs)[73] have been critically analysed and commented on by scholars to provide a soft law direction for AI development and non-state entities, especially regarding due diligence and impact assessment. In a world where automated verification of refugees and status determination might come to exist in a holistic manner, the guidelines might also be important while discussing due process and arbitrary detention under ICCPR, or the principle of non-refoulement under the Refugee Convention.

VI. Challenges and Ethical Concerns of AI Integration

In Europe specifically, the use of AI-based technology in migration processes has been in high numbers, from dialect recognition in Germany to emotion categorisation in Greece, Latvia, and other countries.[74] A nascent but quickly evolving phenomenon, the use of AI systems in border and migration management creates serious issues for the rule of law and the defence of fundamental rights. There is an increasing amount of literature alerting people to the possibility of those systems being abused.[75] On the other hand, when it comes to climate change and the risks associated with it, like the legal interpretation of its consequences, the principle of equity is what drives existing

71 Ibid.

72 Ludivine Sarah Stewart, 'The regulation of AI-based migration technologies under the EU AI Act: (Still) operating in the shadows?', *European Law Journal* p. 122, volume 30:(1–2), 2024, pp. 122–135, available at https://doi.org/10.1111/eulj.12516, accessed on 22 November 2025.

73 'Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework', Office of the High Commissioner for Human Rights, New York and Geneva, 2011, available at https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinesshr_en.pdf, accessed on 22 November 2025.

74 'Intelligent Portable Border Control System', *European Commission,* CORDIS Fact Sheet, Grant Agreement No 700626, H2020, 1 Sept 2016–31, Aug 2019, available at https://cordis.europa.eu/project/id/700626.

75 Forster (n 58).

principles to mitigate these circumstances.[76] Climate Change in itself provides a huge push forward for growth in economic inequalities and forced migrations, in particular, and a detailed simulated study considering fast-onset factors and slow-onset factors can be found in the relevant empirical and experimental studies like that of Conte and Klaus[77] or Burzyński and Deuster.[78] Climate Change is expected to increase the number of migrants to almost 97 million on an estimated scale over the rest of the 21st century. In legal fields, equality thus demands a large portion of policy considerations and legislative and administrative decisions. The demand for proportionality when it comes to a developed state's response to migration and displacement related to climate change is basically derived from the natural principle of equality. AI technology being developed and controlled by mostly developed nations, along with private corporations, can be a concern for this specific usage, especially due to the potential technological inequality exacerbating the already established struggles of less developed and economically weaker states. The use of AI systems in any kind of migration governance can always be entangled with the broader geopolitical architecture of the region in which it is used. The concept of technological hegemony and data colonialism[79] is real and has been discussed by scholars under many scenarios. The predominance of the Global North in these use cases of AI also risks the usage of data from the Global South that has not been consented to by the communities who act as a data source. The development of a sovereign data framework might be a constructive way to deal with such inherent inequality that might plague AI deployment in migration control, even in climate migration. Data sovereignty as a concept is complex in nature and might vary depending on the context in which it is used. Hummel in 2021[80] provides a data-based discussion on the nature of data sovereignty in academic settings, while being based on survey data itself. It claims that data sovereignty should be mainly focused on having control over the dissemination of personal information, or so it is described in a general academic context. Accepting that definition, the usage of AI in migration information has to be in alignment with data sovereignty, as that can also be seen in the previously discussed EU AI Act. In search of this objective, sovereign AI frameworks and sovereign AI models allow for the operationalisation of culturally and legally appropriate standards in the governance of refugee status and climate displacement, ensuring that algorithmic determinations are technologically sound and socially inclusive. Such frameworks or models have been pursued by various states in the global south and Brazil, Kenya, etc, where national control over AI-related systems has found primary importance in policy-based actions. The localisation of the processed data that is 'fed to the algorithm' as well as the contextualisation of ethical standards have rightfully been the centre of focus.

In any usage of AI technology, the doubt on its degree of accountability and positioning is omnipresent. The absence of a concurrent liability regime for harm that might come from AI systems is also a barrier to accountable governance of climate-related migration and displacement. The autonomous nature of AI substantially enhances the complexity of this situation, raising the spectre

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76 Michał Burzyński, Christoph Deuster, Frédéric Docquier & Jaime de Melo, 'Climate Change, Inequality, and Human Migration', *Journal of the European Economic Association* p. 1145, volume 20:3, 2022, pp. 1145-1197, available at https://doi.org/10.1093/jeea/jvab054, accessed on 22 November 2025.

77 Bruno Conte, Klaus Desmet, Dávid Krisztián Nagy & Esteban Rossi-Hansberg, 'Local Sectoral Specialisation in a Warming World', *Journal of Economic Geography* p. 493, volume 21:4, 2021, pp. 493-530, available at https://doi.org/10.1093/jeg/lbab008, accessed on 22 November 2025.

78 Burzyanski & Deuster (n 36).

79 Michael Kwet, 'Digital Colonialism: US Empire and the New Imperialism in the Global South', Race *&* *Class* p. 1, volume 60;4, 2019, pp. 1-20, available at https://doi.org/10.1177/0306396818823172, accessed on 22 November 2025.

80 Patrik Hummel, Matthias Braun, Peter Dabrock & Max Tretter, 'Data sovereignty: A Review', *Big Data & Society*, volume 8:1, 2021, available at https://doi.org/10.1177/2053951720982012, accessed on 22 November 2025.

of regulatory lacunae. AI-based migration management can easily lead to non-designated, erroneous determinations of status and denial of migration, as well as misidentification of populations at risk from environmental degradation and disasters. The current legal frameworks, notably the Draft Articles on States' Responsibility for Internationally Wrongful Acts (ARSIWA), are inadequate to address the shared and frequently diffused duties that AI technology imposes. Coincidentally, burden-sharing as a principle also rests on the basis of reasonable accountability, which involves equating historical actions, progress, and current development of stakeholders to determine proportionate responses to climate risk. Accountability would also be even more significant in burden-sharing frameworks, especially when the proficiency of algorithmic AI systems in predictive analysis is questioned, and they do not deliver a so-called equitable solution. A framework for assigning state liability is provided by the Draft Articles on the Responsibility of States for Internationally Wrongful Acts, but due to the involvement of non-state actors, its applicability to AI systems is limited. There is a lack of clarity due to the neoteric nature of the subject matter itself, and such ambiguity will prevent AI integration into burden-sharing principles for climate change, as well as responsibilities related to displacement and migration that emerge due to climate emergencies. When evaluating refugee credibility, Al might reproduce the human thought process to a rudimentary phase, but it would be less able to reach a conclusive answer. The ability to critically reflect on oneself as a human decision-maker helps to mitigate the challenges of determining the plausibility of a refugee claimant. The act of challenging one's own beliefs, assumptions, and perspectives is known as critical self-reflection. Artificial intelligence, which is often touted for its sensitivity and objective analytical prowess in handling raw data, may fall short when it comes to discussing the necessity of forced migration due to climate change and the factors associated with it. Thirdly, climate displacement and migration to be analysed or predicted would mean the collection of both environmental and personal data in large quantities to build any sort of algorithm based on that. The right to privacy is a recognised concept in both modern international and municipal law, with it gaining the status of one of the most significant rights in the era of the Internet of Things. In the case of migration and displacement, though, the transboundary nature that is often involved (especially in the case of migration) complicates the integration of AI technology and data collection. In the case of data collection of migrants between states, which nations' laws would be applicable for data protection would be an area of concern in this instance. International agreements on privacy and data sharing, similar to the Council of Europe's Convention 108 on data protection, can be a pathfinder for these kinds of issues if they arise. The risk associated with gathered and generated data is the inaccuracy of historical data and the subjectivity of policy and administrative decisions in the past, which would become ingrained in the process of data assimilation into any AI. When it comes to reaching a conclusion based on evidentiary data from historical sources, they are seldom exactly accurate in their assessment, and previously existing flawed data means the algorithmic objectivity is compromised. In the case of the RSD, a highly subjective matter to begin with, it would be impossible to separate actual facts and understanding of diplomatic or geopolitical scenarios. It can be argued that such is not the case when it comes to judging climate migration as the factors and data of climate change itself could be more reliable than something like 'fear of prosecution', but it remains to be seen how this unpredictability would work out in a practical scenario where human lives would depend on decisions of Artificial Intelligence. The ethical dilemma in these cases can extend well beyond 'data protection', as cases of migration and displacement might often need a subjective outlook to understand the humanitarian aspects of migration and displacement.

In the context of AI-based analysis under the burden-sharing principle, it would be intriguing to see what an AI framework would consider in cases of migration and displacement, and what factors it would deem significant. The algorithms that are used to make these decisions can also be easily driven

by an 'institutional narrative' and have very specific state interests associated with it[81], due to geo-political and diplomatic factors. Suppose an AI-based system for burden-sharing is balanced around economic considerations. In that case, it might exclude certain vulnerable communities from resource allocation and migration acceptance, which in turn might shift the nature of burden-sharing analysis, the decision on a refugee's status and so on. Prioritising the needs of the more vulnerable population would be of utmost importance when it comes to climate displacement and migration, and accurately integrating AI to understand those subjective variances might be the most challenging aspect of it all. Article 2(2) of the International Covenant on Economic, Social, and Cultural Rights (ICESCR), which prohibits discrimination in the exercise of socioeconomic rights, may be specifically violated in this instance. Algorithmic bias can be challenging to detect, and it would contravene the fundamental principle of equality before the law, as enshrined in the Universal Declaration of Human Rights and most other international and national instruments.

VII. Conclusion

Climate migration, in itself, is one of the most pressing instances of human crisis in the modern world, and the legal factors behind it can be attributed to the rigidity of international refugee law and the limited existence of international environmental law, especially when compared to the necessity for robust frameworks in both subject matters. The convergence of both has led to the exposed precarity of the forced migrant population due to climate change, without any recourse to substantial international protection and constant national authoritative denial. There have been efforts to recognise these refugees within the broader framework of socially persecuted groups at international and non-governmental levels, but substantial progress is still lacking. These efforts have mainly resulted in recommendations rather than binding actions. While the Paris Agreement and related instruments acknowledge the existence of these harrowing issues, the non-binding nature and limited enforceability have hindered a nuanced understanding of the various factors and accurate responses. A systematic and rights-based approach to climate displacement and migration may be the ultimate objective, which would require considerable calibration and rearrangement from an international law standpoint. The previously discussed intersection of environmental law and refugee law in an international context is pivotal to achieving universal recognition, along with ongoing monitoring of key secondary factors, such as geopolitical context.

The 1951 Convention and the 1967 Protocol both remain considerably ill-equipped to deal with climate migration, as, unlike other forms of displacement or forced movement, the nexus between state actions and the objective action of migration cannot be established directly. Though internally displaced persons may also seek protection under this principle, refugees enjoy a more widely recognised form of protection. Climate refugees, however, remain a controversial and legally ambiguous category, as explained earlier. A pragmatic solution is the movement towards uniform recognition of climate refugees, which is necessary to avoid arbitrary asylum policies and discrimination. One such action could be the expansion of the Cartagena Declaration and the Kampala Convention, both of which acknowledge environmental disasters and pervasive violence as reasons for protection, thereby establishing a broader structural base for future-proofing legislative issues related to environmental migration. Another viable solution that has been deliberated amongst scholars is the establishment of a separate instrument modelled after the Guiding Principles on Internal Displacement (1998). To

[81] Laura Smith Khan, 'Why Refugee Visa Credibility Assessments Lack Credibility: A Critical Discourse Analysis', *Griffith Law Review* p. 406, 2019, available at doi:10.1080/10383441.2019.1748804, accessed on 22 November 2025.

address existing gaps, a multi-layered approach is necessary for integrating AI systems into climate migration management globally. Strict liability regimes can be enforced when state and private actors bear responsibility for AI system miscalculations. Alternatively, developer-deployer responsibility can also be used to distribute liability among data curators, institutional entities, operational deployers, and practical management authorities.

There is a compelling argument for the adaptation of the Framework Convention on Climate Displacement and Digital Governance, where cross-sectoral participation can be ensured under the UN, hopefully. This convention, in tandem with other international organisations, may establish a clear legal status for people displaced due to climate-related reasons, along with clearly enunciated principles for the usage of AI systems for migration management, which include ethical standards and principles of equity, proportionality and mandates of transboundary data sharing that might be modelled after Convention 108+ of the Council of Europe. Establishing a global observatory for AI usage in migration management, tasked with providing recommendations, conducting impact assessments, and producing compliance reports, may also be part of the policy affirmations of this convention. An annexation to the Paris Agreement is also possible in this situation, where this additional protocol might reinforce common but differentiated responsibilities by mandating developed states to provide developmental assistance for AI programmes in the global south, all while enforcing a duty of due diligence on states that use AI in displacement governance, including requirements to complete Human Rights Impact Assessments (HRIAs). The integration of AI into refugee determination obviously creates a dilemma due to the vast potential of AI in predictive analysis of climate risk and migration patterns, which could be used to recognise climate migrants and provide them with equitable rights. Predictive analysis can help identify migration patterns, and this population can be theoretically relocated to different areas to avert a migration and displacement crisis.

The Canadian government's exploration of the possibility of implementing AI in immigration programmes, along with the involvement of other Western countries in similar initiatives, has already paved the way for the future to a certain extent. However, the approach with cautionary remarks is transparent in this scenario, where the usual concerns in AI integration include violations of data protection laws, algorithmic and institutional biases, and potential exclusionary assessments based on flawed sampling and data collection that can decide the fate of numerous human lives. This means that establishing legal and ethical safeguards and limitations is extremely necessary, including compliance with basic human rights principles enshrined in various international instruments, such as the Universal Declaration of Human Rights and the ICCPR, among others. Finally, the prospects of Common but Differentiated Responsibilities and Respective Capabilities must be rejuvenated within the context of climate migration. AI-integrated burden-sharing can be based on the Paris Agreement's Articles 9 and 10, which require financial and technological aid to underdeveloped countries. A consideration of the geopolitical context is imperative for AI integration, should it ever happen in administrative procedures like Refugee Status Determination, which would also combat the monopolisation and weaponisation of such evolutionary technology. Ultimately, the phenomenon of climate refugees is not confined to any specific region and requires a shared global responsibility rather than being limited to regional efforts.

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