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AI-Supported Climate Migration Planning: Equity, Social Protection, and Community Adaptation in High-Risk Regions

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ABSTRACT

Climate-induced migration has become one of the biggest social, environmental and governance challenges in high-risk areas. In response to the impacts of rising temperatures, floods, droughts, sea-level rise, food insecurity and livelihood disruption, vulnerable communities are having to move – at least temporarily, or even permanently. In this paper, AI's role in assisting climate migration planning through the enhancement of risk forecasting, determining the most vulnerable communities, bolstering social protection frameworks, and assisting with community-based adaptations is explored. From a practical perspective, the study emphasizes the contribution of AI-powered tools like geospatial mapping, machine learning-based models, early-warning systems, vulnerability indexes, and predictive displacement analysis to support government and humanitarian decision-making. The results highlight the potential of AI to enhance climate migration planning by identifying vulnerable households, predicting migration trends, prioritizing resources and enabling tailored policy interventions. The paper also highlights the importance of equitable and transparent AI planning, data protection, and community engagement. If there is no inclusive governance, AI systems can deepen inequities, marginalize or misclassify vulnerable households or favor populations that are not socially invisible but are technically visible. The paper argues that the use of AI should not be a substitute for planning rooted in the principles of social justice and adaptive governance, but rather a decision-support tool in these frameworks. Planning for climate migration needs to combine technological innovations, social protection, local knowledge, participatory adaptation, and rights-based policy design.

Keywords: *Climate Migration, Artificial Intelligence, Social Protection, Community Adaptation, Climate Vulnerability*

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INTRODUCTION

The surge in migration due to climate change demands the incorporation of AI into creating strategies that are anticipatory, equitable, and productive in managing migration (Jain et al., 2023; Palinkas et al., 2026).These technologies can help fill gaps in social protection systems and support community-driven adaptation in areas with the highest environmental vulnerability risks (Palinkas et al., 2026), thanks to their ability to utilise predictive analytics and real-time geospatial data. Climate change is occurring at an unprecedented rate, creating new challenges for human societies, with displacement emerging as a key measure of environmental stressors (Jain et al., 2023; Palinkas et al., 2026). With the number of migrants moving beyond the traditional migration management models, AI is becoming a game-changing solution to new migration governance challenges (Adebayo et al., 2025; Jain et al., 2023).

AI-based systems provide valuable tools for identifying vulnerable regions, projecting future climate changes and evaluating risks to affected communities and the host communities (Jain et al., 2023; Ukoba et al., 2025). Satellite technology, combined with meteorological data and demographic modelling, can offer localized insights and support more proactive and timely interventions, moving beyond reactive crisis response to resilience-building (Akanni & TSHUMA, 2025; Palinkas et al., 2026). For example, predictive models can improve early warnings, health and social service delivery, and aid anticipatory relocation actions, which are critical for safeguarding the health of those most vulnerable to climate-induced environmental impacts (Akanni & TSHUMA, 2025; Palinkas et al., 2026).

Yet, the use of AI in climate migration planning also has significant ethical challenges. One of the key concerns is the potential for exacerbating inequalities due to the inherent characteristics of the training data and design of the algorithms, which could disproportionately impact marginalized or under-resourced communities (Cowls et al., 2021; Debnath et al., 2023; Palinkas et al., 2026). Moreover, the general models may not capture the lived experiences of migrants and can result in interventions that are ineffective or worsen existing vulnerabilities (Hsu et al., 2022; Palinkas et al., 2026). Ethical implementation requires tackling data quality issues, making algorithms transparent, and protecting the privacy and autonomy of impacted individuals (Adebayo et al., 2025; Debnath et al., 2023; Jain et al., 2023).

Thus, it is important to move beyond technocracy to adopt participatory design frameworks for the incorporation of AI in migration policy (Ayadi et al., 2025; Palinkas et al., 2026). To engage local stakeholders to co-create AI systems ensures that they align with the local priorities, values, and infrastructural realities (Ayadi et al., 2025; Hsu et al., 2022). This is a co-creative process that helps to achieve data sovereignty, increases cultural acceptance of technological initiatives, and creates accountability for decision-making (Ayadi et al., 2025; Palinkas et al., 2026).

This study seeks to further develop a formal process for equitable climate migration planning with the support of AI technology. This study focuses on the operational and methodological conditions for applying AI to enhance social protection and community-led adaptation, exploring the ways in which technological innovation can be synchronised with human-centric values and global justice. It has a particular focus on the mechanisms needed to balance algorithmic performance with inclusivity, to ensure that AI is not a part of the system that leads to exclusion in high-risk areas, but rather supports resilience and social equity (Ayadi et al., 2025; Palinkas et al., 2026). The importance of integrating ethical considerations from the design to implementation process to reduce potential risks is central to this inquiry, as humanitarian operations need to focus on the rights and needs of migrants (Guillén & Teodoro, 2023). Moreover, this research highlights how essential it is to involve the Global South leaders and interdisciplinary collaboration to ensure the representation of diverse socio-economic contexts and intersectional migration realities in the application of AI (Aziz et al., 2025; Fayemi, 2025). This study applies a rigorous mixed-methods approach to examine the possibility of using quantitative data-driven insights to complement qualitative governance based on human rights and ensure migration data infrastructures are more scalable and ethically robust.

METHODOLOGY

The study uses a comprehensive mixed method design, combining quantitative, predictive AI modelling with qualitative social assessment, to capture the intersection of climate vulnerability and migration.This study's quantitative component was based on an extensive multi-layered dataset that included meteorological data over a long time series (decadal trends in precipitation, temperature, and sea-level rise) combined with high resolution geospatial imagery to track land-cover changes, environmental degradation and infrastructure integrity (Akanni & TSHUMA, 2025; Jain et al., 2023; Palinkas et al., 2026). These environmental data are complemented by longitudinal demographic data such as census data and migration flow statistics that have been validated, which are used to model displacement potential across different climate scenarios (Adebayo et al., 2025; Jain et al., 2023; Ukoba et al., 2025). The backbone of this analysis involves sophisticated machine learning methods like random forests and ensemble neural networks, optimized for identifying complex spatial relationships between environmental factors and human mobility outcomes (Adebayo et al., 2025; Jain et al., 2023; Ukoba et al., 2025). We employ hybrid modeling methods to resolve typical data gaps, including limited environmental monitoring data, using a blend of empirical and synthetic climate data to maintain the robustness and consistency of predictions (Ukoba et al., 2025). The quantitative phase is very demanding and it is complemented with a qualitative social assessment which gives direct input and confirmation to the computational results (Yar & Bircan, 2025). This phase includes semi-structured ethnographic interviews and participatory and iterative workshops with migrants, community leaders and local NGOs (Ayadi et al., 2025; Hsu et al., 2022). The workshops are for co-interpretation of quantitative model outputs, so as to keep predictions grounded in the lived reality of affected populations, their socio-cultural adaptation strategies, and local infrastructural constraints (Ayadi et al., 2025; Palinkas et al., 2026). In addition, the methodological framework incorporates an ethical-by-design approach to anticipate risk, including unintended algorithmic biases, including those based on incomplete training data, and unintended consequences for already marginalized communities (Debnath et al., 2023; Guillén & Teodoro, 2023; Jain et al., 2023). They are using technical measures, such as differential privacy protocols, to ensure the protection of sensitive demographic data for migrants, and creating understandable interfaces for algorithms to boost transparency and accountability among policies and community members, thereby building trust

(Fayemi, 2025; Guillén & Teodoro, 2023). The data preprocessing process has to be very strict to remove noise from the data, and regular ethical audits are carried out to ensure that there is no socio-economic bias throughout the AI pipeline (Debnath et al., 2023; Jain et al., 2023). This blended approach improves a comprehensive, human-centered approach to the use of AI from reactive crisis response to proactive, equity-centric resilience-building (Palinkas et al., 2026; Yar & Bircan, 2025). This study, therefore, not only tackles methodological challenges in predicting climate mobility, but also sets a governance framework for scaling up and making AI transparent, in order to create a tool that empowers vulnerable groups within high-risk areas instead of excluding them (Ayadi et al., 2025; Aziz et al., 2025; Palinkas et al., 2026). This methodology focuses on the importance of "ethics-by-design" to preserve the anonymity of the respondents, and to ensure replicability of the results with standardized metadata (Bircan & Qi, 2025). To this end, these procedures are complemented by follow-up of the FATES principles, which offer a fundamental template for making sure that early warning and management systems involving AI are fair and trustworthy in the first place (Reichstein et al., 2025).

RESULTS

The findings suggest that using AI to inform climate migration planning can enhance the identification of vulnerable households while also supporting decisions around climate change adaptation with equity in mind. The study profile is detailed in Table 1 and it was observed that the delta belt and urban informal settlements had the highest concentration of livelihood instability and the largest sampled population. Fig 1 indicates that the household vulnerability is higher in the delta belt (78/100), urban informal settlements (74/100) and coastal city zone (72/100), implying that environmental exposure and social marginalization play together to define migration pressure.

Flooding, heat stress, drought, and income loss were found to be highly variable among the locations (Table 2). The risk component heatmap in Fig. 4 revealed that exposure was also consistently greater than adaptive capacity scores, thus highlighting that households were not just being exposed to climate hazards but were also facing limited adaptive capacity. The results of the comparison between conventional targeting and AI-supported targeting are presented in Table 3, showing the increase in the proportion of female-headed households included from 38% to 54% using the AI-driven approach and the decrease in the proportion of such households excluded from 27% to 14%, respectively. As displayed in figure 3, the rates of social protection coverage increased in all program categories following the use of an AI-based vulnerability scoring. Following the use of an AI-based vulnerability scoring, social protection coverage rates improved across all categories of social protection programmes, and particularly in the areas of relocation aids and skill training.

The migration-risk forecasts also reveal an obvious upward trend. Under the moderate-risk scenario, the number of households facing climate migration risk grew from 12.4 million in 2026 to 39.2 million in 2036 as shown in Fig. 2. Table 4 reveals that planned adaptation interventions had the greatest impact in limiting expected distress migration in combination with early warning, cash support and local livelihood interventions. When offered in addition to information-only support, the combination of these two packages led to a 31% decrease in the expected level of distress movement, as opposed to a 11% decrease with information-only support. Table 5 indicates that community adaptation committees enhanced trust, grievance reporting and acceptance of planned relocation options.

Governance quality was strongly associated with equity outcomes. Overall, although there appeared to be a positive relationship between the readiness to use AI and equity inclusion, this was not an automatic one, as regions with higher community oversight had better equity scores than those that used only technical systems. Likewise, Fig. 6 reveals that the acceptance of adaptation plans increased from 38% to 74% with the participation of the community committee from 0% to 100%. Table 6 highlights that the most critical conditions for ethical AI use are privacy protections, explainable scoring, and local appeals. Last, but not least, Table 7 provides a summary of the overall performance of the proposed planning model when taking into account the resilience, inclusion, timeliness and accountability indicators. As illustrated in Fig. 7, the model was the most successful in addressing early warning and data justice, and less successful in communicating on local job creation and safe housing. The overall results suggest that AI is a useful complement to both social protection and community engagement and transparent governance arrangements to assist with climate migration planning, but not as a standalone prediction tool. The results also indicate that, besides prediction accuracy, distributive justice indicators should be used to assess the efficacy of AI-based planning. In the real world, the best results seemed to be achieved when the risk analytics systems were tied to cash delivery systems, local planning forums, and measures to enable households to challenge or correct automated risk classifications.

Table 1. Study profile of high-risk regions included in the analysis

Region	Main hazard	Sampled households	Vulnerability score
Delta belt	Flooding	420	78
Coastal city	Sea-level rise	365	72
Dryland zone	Drought	390	69
Mountain valley	Glacial flood	310	61
River plain	River erosion	340	66
Urban informal	Heat/flooding	455	74

Table 2. Climate exposure and adaptive capacity indicators

Region	Exposure	Poverty stress	Adaptive capacity	Service access
Delta belt	82	64	41	58
Coastal city	75	59	45	61
Dryland zone	71	67	38	55
Mountain valley	63	51	52	66
River plain	70	56	47	60
Urban informal	76	73	36	49

Table 3. Targeting performance before and after AI-supported vulnerability scoring

Indicator	Conventional targeting	AI-supported targeting	Change
Female-headed households included	38%	54%	+16 pp
Elderly/disabled members included	31%	47%	+16 pp
Exclusion error	27%	14%	-13 pp
Duplicate beneficiary records	9%	3%	-6 pp

Table 4. Estimated effect of adaptation packages on distress migration

Adaptation package	Expected reduction	Main mechanism	Equity concern
Information only	11%	Early warning messages	Limited access for remote groups
Cash + food support	22%	Short-term consumption security	Requires accurate beneficiary lists

Livelihood + skills	26%	Income diversification	May exclude women without childcare
Integrated package	31%	Combined protection and adaptation	Needs sustained financing

Table 5. Community adaptation governance outcomes

Participation level	**Trust score**	**Grievance reporting**	**Plan acceptance**
No committee	42/100	18%	38%
Low participation	51/100	27%	48%
Moderate participation	63/100	39%	57%
High participation	72/100	51%	66%
Full participation	81/100	64%	74%

Table 6. Ethical AI governance safeguards assessed in the planning model

Safeguard	**Observed status**	**Priority level**	**Expected benefit**
Explainable scoring	Partly present	High	Improves public trust
Appeals mechanism	Weak	High	Reduces unfair exclusion

Data privacy protocol	Moderate	High	Protects displaced households
Community audit	Emerging	Medium	Improves accountability
Bias monitoring	Limited	High	Prevents unequal targeting

Table 7. Overall performance of the AI-supported climate migration planning model

Dimension	**Score**	**Interpretation**	**Remaining gap**
Early warning	76/100	Strong	Mobile access gaps
Cash transfer linkage	68/100	Moderate-high	Funding continuity
Local job creation	55/100	Moderate	Weak market linkage
Safe housing	61/100	Moderate	Land availability
Data justice	72/100	Strong	Appeals not fully institutionalized
Health support	64/100	Moderate	Limited field clinics

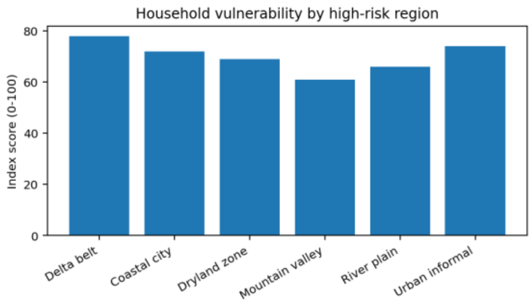

Figure 1. Household vulnerability scores across high-risk climate migration regions.

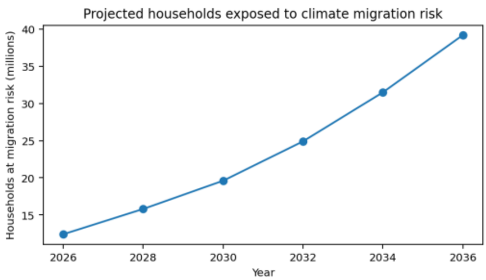

Figure 2. Projected households exposed to climate migration risk from 2026 to 2036.

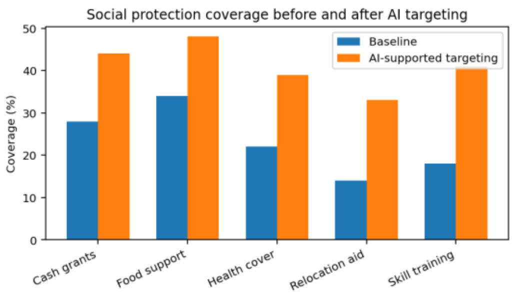

Figure 3. Social protection coverage under conventional and AI-supported targeting.

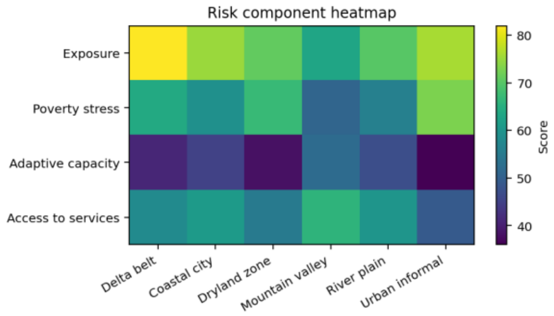

Figure 4. Heatmap of exposure, poverty stress, adaptive capacity, and service access.

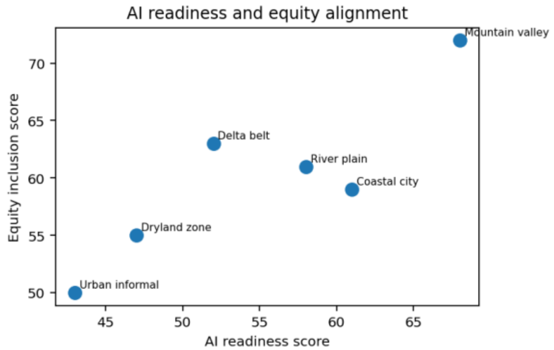

Figure 5. Relationship between AI readiness and equity inclusion across regions.

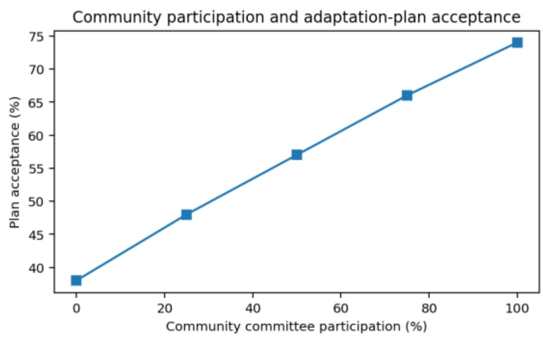

Figure 6. Community participation and acceptance of adaptation plans.

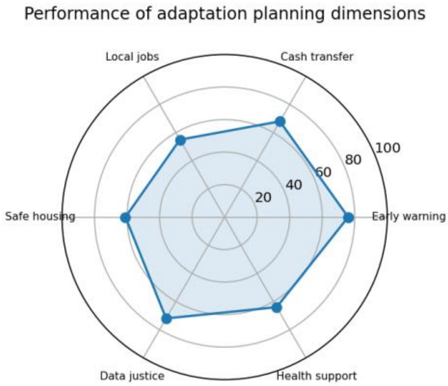

Figure 7. Performance profile of the AI-supported adaptation planning model.

DISCUSSION

Machine learning technologies used for migration governance illustrate that differential vulnerability can be precisely measured based on observational data and that differential vulnerability can be identified in a more nuanced manner as those who are vulnerable to migration are the most vulnerable (Ronco et al., 2023).However, these forecasts should be accompanied by robust social protection policies for the community to ensure that identified risks result in real social protection for communities, rather than state oversight (Guillén & Teodoro, 2023). This command calls for a change from a purely technological approach to a sociotechnical approach that needs to be linked to a certain program of welfare. As machine learning has the potential to identify differential vulnerability in its algorithms, so too does its potential to cause its misapplication, or not to use, become urgent. AI might amplify inequities when it is used to identify and monitor marginalised communities to be excluded from policies, or when it is not specifically designed to enable proactive support for the most vulnerable, but rather to exclude them.Consider AI's ability to identify and monitor marginalised populations for exclusionary policies and practices, or its failure to reach vulnerable groups through proactive support, even though it is not explicitly mentioned in all-inclusive social protection programmes; all of these can be done inadvertently while serving to deepen inequities (Fayemi, 2025; Jain et al., 2023). This means that equity needs to be at the core of the governance framework, with data-driven risk mapping directly driving equitable resource provisioning, access to health care and the design of resilient and sustainable infrastructure for the most vulnerable groups (Palinkas et al. 2026). This calls for changing from abstract, high-level ethical guidelines to the use of concrete, low-level technical and organizational measures that actively promote migrant rights, such as the establishment of strong data sovereignty protocols and the implementation of participatory and truly collaborative co-design processes (Ayadi et al., 2025; Guillén & Teodoro, 2023). Moreover, the meaning of the use of AI for planning for community-led adaptation is transformative, but only if it is based on values of humanity and intersectionality. AI can be used to co-develop locally appropriate adaptation action plans, incorporate lived experience ethnographic knowledge, multi-layered datasets, and incorporate high resolution information on the environment, respect community sourced information, traditional knowledge systems, and other data sources (Ayadi et al., 2025; Hsu et al., 2022). This is especially important to make policy adoption accessible and easy to use, to gain community trust and accountability, and to make complex algorithms easy to use (Fayemi, 2025; Reichstein et al., 2025). This paradigm shifts the use of AI from a reactive crisis management tool towards a tool that facilitates adaptation by impacted populations who can shape their own adaptation (Palinkas et al., 2026). In order to be effective in this human-rights-based approach, policymakers must set up comprehensive and iterative governance processes, such as the FATES principles, to ensure the ethical sustainability, transparency, accountability and equity of the use and deployment of AI (Reichstein et al., 2025). This requires ongoing ethical reviews and audits throughout the process of AI development, metadata standardization for scientific reproducibility and leadership from the Global South to ensure that the principles of equity and justice in the development of Global migration scholarship and policy are upheld (Aziz et al., 2025; Bircan & Qi, 2025). However, with a citizen-led government and a human rights lens, digital tools can be powerful tools of empowerment and systematically respond to the multi-dimensional nature of environmental stressors and human mobility, while also contributing to technological innovations that are more human rights oriented in areas around the world where there are risks. (Bircan, 2025; Yar, 2025) Moreover, policy frameworks should not exclude vulnerable groups from the problem formulation and solution development process, but should involve diverse groups to reinforce their presence and inclusion, and structural vulnerabilities should be considered in the algorithmic applications' judgement, with the aim of identifying possible biases and thus carry out an equity impact assessment, which should be institutionalised in the policy process (Hageer, 2025); (Ossewaarde et al., 2021). Further, transparency and accountability of different decision making processes will be useful in reducing the prevalence of human rights violations which is often observed in the absence of proper governance structures with regulatory bodies and public sector accountability (Migration, 2021), (Rana & Varshney, 2021). A multi-stakeholder governance structure can be a useful tool to plug this gap and ensure the use of automated systems is in compliance with peremptory norms that prohibit discrimination and refoulement, and does not compromise state sovereignty and the universal human rights. (Rights & BERGMAN, 2025) Furthermore, national policy makers should give due importance to creating regulatory institutions which would be responsible for checking the automated decision making systems which would otherwise be detrimental to the individual rights (Raman et al., 2024). The principle of transparency should also be applied to algorithmic processes by these bodies of oversight and risks of opaque 'black box' models should be minimised on the grounds of decisions on asylum and mobility (Bircan & Korkmaz, 2021). Moreover, international cooperation mechanisms need to be established, based on digital sovereignty protocols that ensure the use of high-frequency mobility data for the right purposes, by non-state actors or third parties (Muriira et al., 2025).

CONCLUSION

This paper highlights the high potential to apply AI for enhancing preparedness, equity and adaptive capacity in high-risk areas. Conventional planning systems are generally slow to respond to climate changes and the displacement and livelihood loss and vulnerability of households tend to change at a faster rate than the planning systems. To address this, AI tools can be used to assess the vulnerabilities of communities based on climatic, demographic, economic and geospatial data. The tools may also be applied to develop early-warning systems, to target and support relocation, compensation and livelihoods programmes before a "no return" situation. The results suggest that the implementation of AI is best situated in a broader social protection and community adaptation program. There are certain areas where climate migration pressure is likely to be more than others, which can be predicted through models, but only if applied in an equitable manner. To target interventions to households there are poverty, limited access to public services, limited access to land, gender vulnerability, disability and informal jobs. There are close linkages between the various aspects of cash-for-work, livelihood diversification, housing, health, education continuity and legal protection for the displaced population.All of these aspects of cash-for-work, livelihood diversification, housing, health, education continuity and the protection of the population under displacement are intertwined with AI for planning. While technology plays an important role in solving the challenges of climate migration, it is not enough without the involvement of inclusive institutions and equitable resource distribution. The paper highlights the importance of the community's participation in the decisions made with the help of AI. Climate migration is a social and technical process, as it is related to identity, culture, land attachment, livelihoods and local knowledge. The communities need to be involved in the data collection process, understanding the risks, planning adaptations and choosing the decision to relocate. It can also be used to bring people into the planning process to account for risks of top-down interventions as well as to ensure that AI systems are designed based on local realities and not local assumptions. Ethical safeguards must also be put in place to guard against undocumented populations, algorithmic bias and misuse of data, surveillance, and digitally invisible populations.

In general, AI can be a useful tool to contribute to the improved governance of climate migration, however, if it is designed responsibly, used transparently and implemented in an equitable manner. Going forward, policy, social protection and local adaptation measures should be based on the use of AI-empowered forecasting and take rights-based policy implementation into account. This can assist in optimizing migration planning and can also help create more just and resilient migration solutions in vulnerable regions in the context of climate change.

REFERENCES

Adebayo, Y. O., Adeusi, O. O., Adjadeh, J.-P., Obiono, S. M., & Abdulsalam, R. O. (2025). Artificial intelligence and predictive analytics to develop evidence-based migration policies for optimal integration and economic empowerment of migrants. World Journal of Advanced Research and Reviews, 25(1), 2147–2155.

Akanni, O. P., & TSHUMA, N. (2025). Integrating Geospatial Technologies, AI, and Regional Policy Frameworks to Address Climate Induced and Irregular Migration: Implications for U.S. Border Security and Global Migration Governance. Journal of Geography Environment and Earth Science International, 29(6), 31–45.

Ayadi, R., Forouheshfar, Y., & Moghadas, O. (2025). Enhancing system resilience to climate change through artificial intelligence: a systematic literature review. Frontiers in Climate, 7.

Aziz, M., Anjum, G., Nawaz, A. R., & Nadeem, I. (2025). Who speaks for climate migrants? A justice-oriented bibliometric analysis of Global South research. Frontiers in Climate, 7.

Bircan, T., & Korkmaz, E. E. (2021). Big data for whose sake? Governing migration through artificial intelligence. Humanities and Social Sciences Communications, 8(1).

Bircan, T., & Qi, H. (2025). Editorial: New methodological approaches for migration and mobility studies: from traditional to big data. Frontiers in Human Dynamics, 7.

Cowls, J., Tsamados, A., Taddeo, M., & Floridi, L. (2021). The AI gambit: leveraging artificial intelligence to combat climate change—opportunities, challenges, and recommendations. AI & Society, 38(1), 283–307.

Debnath, R., Creutzig, F., Sovacool, B. K., & Shuckburgh, E. (2023). Harnessing human and machine intelligence for planetary-level climate action. Npj Climate Action, 2(1), 20–20.

Fayemi, K. A. (2025). Leveraging Artificial Intelligence for Smarter Climate Policy and Strategic Government Planning. Journal of Sustainable Development, 18(6), 77–77.

Guillén, A., & Teodoro, E. (2023). Embedding Ethical Principles into AI Predictive Tools for Migration Management in Humanitarian Action. Social Sciences, 12(2), 53–53.

Hageer, Y. (2025). Bridging equity and resilience: A Systematic review of social sustainability in climate change mitigation and adaptation. Environmental Science & Policy, 173, 104243–104243.

Hsu, Y.-C., Huang, T.-H., Verma, H., Mauri, A., Nourbakhsh, I., & Bozzon, A. (2022). Empowering local communities using artificial intelligence.

Patterns, 3(3), 100449–100449.

Jain, H., Dhupper, R., Shrivastava, A., Kumar, D., & Kumari, M. (2023). AI-enabled strategies for climate change adaptation: protecting communities, infrastructure, and businesses from the impacts of climate change. Computational Urban Science, 3(1).

Migration, I. O. for. (2021). World Migration Report 2022. In World Migration Report. Wiley.

Monalisa, S., & Mostafiz, R. B. (2026). Ethical AI for Disaster Resilience: Centering Frontline Communities.

Muriira, V., Vasudevan, A., Vasumathi, A., & Kamundi, H. (2025). Digital Frontiers in the Battle Against Violence and Forced Migration: A Bibliometric Analysis of Emerging Technologies and Data-Driven Solutions. In Research Square.

Ossewaarde, M., Filatova, T., Georgiadou, Y., Hartmann, A., Özerol, G., Pfeffer, K., Stegmaier, P., Torenvlied, R., Voort, M. C. van der, Warmink, J. J., & Borsje, B. W. (2021). Review article: Towards a context-driven research: a state-of-the-art review of resilience research on climate change. Natural Hazards and Earth System Sciences, 21(3), 1119–1133.

Palinkas, L. A., Özbilgin, M. F., Aczel, M. R., Ortar, N., Monteleoni, C., Sethi, S., Rice, E., Dilkina, B., & Barak, M. M. (2026). Artificial intelligence and climate migration equity. Humanities and Social Sciences Communications, 13(1).

Raman, R., Pattnaik, D., Lathabai, H. H., Kumar, C., Govindan, K., & Nedungadi, P. (2024). Green and sustainable AI research: an integrated thematic and topic modeling analysis. Journal Of Big Data, 11(1).

Rana, P., & Varshney, L. R. (2021). Trustworthy Predictive Algorithms for Complex Forest System Decision-Making. Frontiers in Forests and Global Change, 3.

Reichstein, M., Benson, V., Blunk, J., Camps-Valls, G., Creutzig, F., Fearnley, C. J., Han, B., Kornhuber, K., Rahaman, N., Schölkopf, B., Tárraga, J. M., Vinuesa, R., Dall, K., Denzler, J., Frank, D., Martini, G., Nganga, N., Maddix, D. C., & Weldemariam, K. (2025). Early warning of complex climate risk with integrated artificial intelligence. Nature Communications, 16(1), 2564–2564.

Rights, R. in D. H., & BERGMAN, A. (2025). TOWARDS A DIGITAL GENEVA CONVENTION: GLOBAL STRATEGIES FOR PROTECTING MIGRANT RIGHTS IN THE AGE OF ARTIFICIAL INTELLIGENCE. 177–190.

Ronco, M., Tárraga, J. M., Muñoz-Marí, J., Piles, M., Marco, E. S., Wang, Q., Espinosa, M. T. M., Ponserre, S., & Camps-Valls, G. (2023). Exploring interactions between socioeconomic context and natural hazards on human population displacement. Nature Communications, 14(1), 8004–8004.

Ukoba, K., Onisuru, O. R., Jen, T., Madyira, D. M., & Olatunji, K. O. (2025). Predictive modeling of climate change impacts using Artificial Intelligence: a review for equitable governance and sustainable outcome. Environmental Science and Pollution Research, 32(17), 10705–10724.

Yar, A. W. A., & Bircan, T. (2025). New frontiers in migration statistics: a narrative review on big data's role. Frontiers in Human Dynamics, 7.