Exploring temporal and topical dynamics of research on climate/environment–migration nexus: A critical comparative perspective

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Abstract

Research on climate/environmental change and human migration have undergone significant transformations since the early 1990s. Attention by migration-related journals and environment/climate-oriented journals has been uneven. What is absent is a critical comparative approach to this unevenness and the evolving dynamics of the nexus in a continuum. We conducted a critical comparative analysis of six scholarly journals to fill this gap. Based on multi-stage mixed methods, our findings suggest: (1) scholarly research has disproportionately focused on the impacts of X (climate/environmental change effects) on Y (human migration), vulnerabilities, and agency of moving people and broader social and political processes receiving less attention; (2) Compared with migration-related journals, climate/environment-oriented journals have contributed more to research on the climate/environment–migration nexus, with significant differences in their approach and topical selections; (3) 'Migration as an adaptation strategy to climate change' as a theme has shown an unprecedented rise since 2010, with most articles having a skewed emphasis on migration as an individual and unplanned form of adaptation rather than that of planned adaptation; (4) Research on the climate/environment–migration nexus has recently entered the early maturation period, which approximates research into mainstream migration studies. Consequently, we divide the research's last three decades into three stages: prognostic period (early 1990s to early 2000s), transitionary period (early 2000s to 2010), and growth period (2010-present). We suggest that both journal groups embrace more inclusive and diverse foci on different scales.

Keywords: climate change, environmental change, migration, systematic review

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1. Introduction

One of the most profound impacts of climate/environmental change has been on human migration. In 2020, climate-related disasters resulted in 30 million new internal displacements across 149 countries, more than three times the displacement driven by conflict and violence (IDMC 2021: 12). Accordingly, scholarly and policy interest in the intertwined relationship between climate/environmental change and migration has shown an unprecedented increase, particularly in the last decades (Milán-García et al. 2021; Ghosh and Orchiston 2022). Since the early 1990s, vital paradigm shifts have been experienced; some new themes, including migration as an adaptation to climate change, have emerged, and some tensions (e.g. opposite extremes proposed by maximalists and minimalists as discussed in upcoming section) have been largely resolved, while others (legal protection of those crossing borders due to climate) persist. Simply put, despite a certainty level achieved regarding climate change's impacts on mobility in the literature, uncertainty remains concerning the extent, severity, and timing of climate change on the one hand and how people respond to it—to migrate or not to migrate—on the other hand (IPCC 2022).

Unlike the early studies of the 1990s primarily relying on predicting displacement as a massive wave occurring South to North (IPCC 1990; Hugo 1996; Myers 1997), it is now apparent that the effects of climate/environmental change on human mobility are more complex and context-specific. Above all, it is now more certain that rapid-onset events such as floods and storms and the gradual effects of climate change, including drought and sea-level rise, might have differential impacts on the type and duration of migratory movements (Kaczan and Orgill-Meyer 2020; IPCC 2022). As such, climate change tends to lead more to internal movements than cross-border or permanent movements (Gray and Mueller 2012; IPCC 2022). Increasing studies have also accepted that climatic/environmental factors are deeply embedded in other socioeconomic, political, and demographic factors (Koubi 2019; Faist 2020; Thiede, Randell and Gray 2022). Migration might therefore be a good adaptation strategy to climate change for some populations (McLeman and Smith 2006; Tacoli 2009; Black et al. 2011), while its impacts might lead to 'trapped populations' (immobilised) for some others, particularly among the most vulnerable and the poor (Black et al. 2011; Nawrotzki et al. 2017). More recently, it has emerged that people experiencing climate change impacts might voluntarily stay put, due to their attachment to a place and culture (Oakes 2019; McMichael et al. 2021).

One of the most continuous tensions relates to assigning a name to people on the move because of the impacts of climate/environmental change. Divergence ranges from 'climate (change) migrants' (Warren 2016; Francis 2019) to 'environmental migrants' (IOM 2009) to 'environmental refugees' (Myers 1997). As opposed to earlier views in the 1990s of 'climate refugees' as dangerous or passive victims (Sakellari 2021), the relatively recent discourse shifted towards framing migrants as resilient persons who adapt to this change by migrating (Methmann and Oels 2015; Bettini 2017). An equally important tension seems to be the gap in legal protection to safeguard migrants moving across international borders because of climate-related reasons. Despite a notable increase in international mechanisms and policy frameworks, actions taken so far have not had the expected impact (Bilak and Kälin 2022).

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Against the backdrop of such rapidly evolving research on the link between climate/environmental change and migration since 1990, growing bibliometric studies delineate temporal or topical trends regarding the nexus (e.g. Obokata, Veronis and McLeman 2014; Piguet, Kaenzig and Guélat 2018; Ghosh and Orchiston 2022; Anuar et al. 2022; Zander et al. 2022). Many of such studies have analysed how research on the climate–environment–migration nexus have been distributed based on publishing authors, countries, institutions, disciplines, or methods used (e.g. Piguet, Kaenzig and Guélat 2018; Maretti, Tontodimamma and Biermann 2019; Milán-García et al. 2021; Anuar et al. 2022). Studies focusing on key topics of articles have presented what have been examined and/or overlooked (Milán-García et al. 2021; Ghosh and Orchiston 2022; Anuar et al. 2022; Maretti, Tontodimamma and Biermann 2019; Zander et al. 2022).

Nevertheless, which topics and trends have persisted or changed in a continuum remains unexamined, with the partial exception of Piguet, Kaenzig and Guélat (2018), who divide research into four successive periods (from 1985 to 2016). Moreover, different topical selections and approaches adopted by different journal groups have yet to unfold for empirical evidence.[1] Hence, this research maps the evolution of key topics and trends in a continuum in the last 30 years and is based on critical comparative analysis of different journal groups, which is detailed in Section 3. It identifies research gaps peculiar to each journal group and offers a research agenda for future scholarly studies.

Following the Introduction, this article comprises four sections. Based on earlier studies and this research's findings, the second section analyses the main changes and continuities in scholarly research on the climate/environment–migration nexus from 1990 to 2022. The third section discusses data and methods. The fourth one, consisting of eight subsections, presents the results of our research. We first lay out the evolution of articles during a three decade-long period and compare migration-related journals with environment/climate-oriented journals.[2] Analysis of geographical distribution of scholarly studies follows. Revolving around long-lasting tension, we discuss tendencies to frame people moving for climate/environment-related reasons. Turning to an analysis of core topics in Section 4.4 (Sections 4.4–4.8) we elaborate on the main research topics that are central and peripheral to the nexus. The last section, based on our overall findings, broadly divides the last three decades of research into three stages. Recent signs of 'an early maturation period' are traced, bringing the nexus closer to the broader framework of migration studies, and we develop suggestions for the future of this early maturation stage.

2. Background: climate/environment–migration nexus in motion

Being aware of the impossibility of pinning down when exactly migration appeared in climate change or environmental change discourse, one can date the genealogy of the debate to the mid-1980s and 1990s, when 'environmental refugees' were dominantly viewed as a pathology to be averted (Methmann and Oels 2015). As a cause of concern for states' national security, the term 'environmental refugees' came into prominence with a famous

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report by the United Nations Environment Programme published in 1985 (Morrissey 2012).[3] Norman Myers's famous prediction of '200 million people for the year 2050' (Myers 1997) left its mark in the following decades. Likewise, early studies in the 1990s, relying on scant evidence, centred upon the probability of movement of climate/environment-induced people *en masse*, mainly from the Global South to the Global North, thereby evoking apocalyptic and securitisation implications (IPCC 1990; Hugo 1996; Myers 1997).

The debate between 'minimalists' and 'maximalists' also pervaded in the 1990s. Of a more sceptical approach, the former do not view the environment as a fundamental cause of migration, but the latter, from a more alarmist perspective, view outmigration as a direct result of environmental degradation (Suhrke 1994). Despite a gradual shift towards the acceptance of the multicausality of the relationship between climate/environmental change and migration, the influence of this debate seems to persist, particularly concerning the relationship between environmental/climate change, conflict, and migration (Kelley et al. 2015; Selby et al. 2017).

The prognostic studies of the 1990s continued in the early 2000s, particularly on policy agendas (Myers 2002). Although claims about massive movements that evoke securitisation implications were already challenged in the 90s (Durand-Delacre et al. 2021), more robust and nuanced evidence that refute such allegations have become more crystallised in the last 10 to 15 years. During the early 2000s, the scholarly focus started to shift to increasingly robust empirical studies measuring the adverse impacts of climate change on movement (Hunter 2005; Perch-Nielsen, Bättig and Imboden 2008; Saldaña-Zorrilla and Sandberg 2009). Even early in the 2010s, many studies agreed that inadequate empirical evidence firmly showed the interlinkages between climate/environmental change and human mobility (Lilleør and Van den Broeck 2011; Cohen et al. 2013). Likewise, securitisation connotations of the late 1980s and 1990s, with unabated apocalyptic connotations, evolved into one where climate change threatens human security and requires protection for the vulnerable (Detraz and Betsill 2009). Although a definite periodisation is impossible, this protection/humanitarian framing, which inherently supports aid for the vulnerable, became more explicit in the mid-late 2000s (Hartmann 2010; Methmann and Oels 2015).[4]

As shown in sections below, as of early 2010, policy–academic circles have undergone an unprecedented rise in research. Notably, studies of this phase have more robustly refuted the dominant predictions of the 1990s that climate/environmental change would linearly lead to large-scale, external, and permanent migration. They have delineated that adverse impacts of climate/environmental change might lead to more temporary, internal, or short-distance movement than permanent, international, and long-distance migration (Gray and Mueller 2012; De Longueville, Zhu and Henry 2019). They showed that the different impacts of climatic change and variability (rapid-onset events vs. gradual effects of climate change) could yield various movement forms (Nawrotzki et al. 2017; Chen and Mueller 2019). Similarly, it has become more evident that whether such change would lead to migration is mainly dependent on individuals' or households' capabilities and socioeconomic conditions (Mastrorillo et al. 2016; Kaczan and Orgill-Meyer 2020). Climate shocks or their gradual effects might not necessarily lead to mobility but instead

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would 'trap' people, particularly the most vulnerable, poorer households (Black et al. 2011; Nawrotzki et al. 2017; Quiñones, Liebenehm and Sharma 2021).

Contradicting earlier assumptions, increasing research has also indicated a scant connection between climate change and violent conflict (Buhaug 2010; Soest 2020). They have suggested that climatic conditions breed conflict only in fertile ground, interacting with other socioeconomic, political, and demographic factors (Koubi 2019; Soest 2020). Likewise, much research has also found that climate/environmental change may not be the primary reason for migration decisions but rather profoundly entangled with other factors (Veronis and McLeman 2014; Neumann and Hermans 2017).

The early 2010s signified another change, indicating migration as an adaptation to climate/environmental change. Despite earlier attention to migration as a possible adaptation strategy to such change during the 2000s (McLeman and Smith 2006; IOM 2008; Tacoli 2009), the shift in focus has since become more explicit (IOM 2010; IPCC 2014). Likewise, unlike the former two discourses—securitisation and humanitarian framings—'adaptation via migration' discourse frames migration not as a problem to be solved but as an opportunity, whereby migrants can become resilient and adaptive subjects (Bettini 2017; Baldwin and Fornalé 2017). More recent framing, challenging the discourse of 'migrants as adaptive agents' and evoking climate justice, tends to see migrants as political subjects who are faced with socio-economic, political, and institutional obstacles that could hinder plausibility of 'migration as adaptation strategy' (Ransan-Cooper et al. 2015).

More recently, novel insights have emerged that might refute findings of the earlier periods, concerning the primary and secondary role of climate change in mobility. This contention lies in recent results that climate change only leads to stronger migration intentions among climate literates (Helbling et al. 2021). Likewise, people tend to attribute their migration decisions to something other than climate/environment when they are provided with fixed reasons behind migration, which do not involve the multicausality of the nexus (IOM 2020). Equally important, it is now manifest that many people persist in not moving due to their attachment to place, identity, and culture (Oakes 2019; McMichael et al. 2021), a finding that highlights the agency of so-called immobilised or 'trapped' populations.

Such a shift towards 'migration as a form of adaptation' and the complexity and contextuality of the nexus do not necessarily translate into a complete break from either humanitarian/protection or securitisation frameworks in policy agendas (Ransan-Cooper et al. 2015). Notably, the above-mentioned famous prediction by Myers (200 million people by 2050) finds room in the International Organisation for Migration (IOM)'s report (IOM 2008). Likewise, the Intergovernmental Panel on Climate Change (IPCC) dedicates a sub-section to how climate change could indirectly trigger violent conflict, impacting the national security policies of states (IPCC 2014). More recently, 'mass migration' within the context of climate change has been on the 2022 Munich Security Conference agenda, which associated the climate crisis with the security crisis (DW News 2022). Moreover, the current estimates of the climate displaced for 2050 range from 10 million to 1.2 billion (Durand-Delacre et al. 2021). It, thus, turns the issue into a mere 'numbers game' (Brown 2008).

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3. Data and methods

Our research results from *two* main gaps in the ongoing climate/environment–migration nexus debate. *First*, based on an extensive literature review, we observed that the research on this nexus has rapidly increased, and studies examining it have not focalised on the evolution of topical trends in a continuum as highlighted in Introduction. *Second*, the issue has not been among the main foci of migration-related journals (Hugo 1996), while environment/climate-oriented journals have been more interested in the nexus (see Table 1). Such inclinations have urged us to create a comparative set of two journal groups that cover the last three decades of research where one can note changes and continuities and see how different journal groups might show similarities and differences regarding scientific knowledge production about the nexus.

This study utilised multi-stage mixed methods, combining descriptive and bibliometric analysis. The main data source was the Web of Science (WoS) database, which has proved to be a useful source for earlier studies (e.g. Obokata, Veronis and McLeman 2014; Milán-García et al. 2021). The research sample for the journal selection in the bibliometric analysis was determined using a purposive sampling technique, with no intention of being representative but with the idea of catching possible divergencies in the field. Considering our principal observation that environment/climate-migration debate has not been the primary focus of migration-related journals, first we decided on the journals in migration studies, with specific concerns. The latter included the selection of long-established journals with highest number of publications on the climate/environment–migration nexus. This search resulted in the journals *International Migration, Population, Space and Place*, and *International Migration Review*. The selection of *Population, Space and Place*, a comparatively recent one, lies in the search results of WoS, which displayed it as the journal with the second highest number of publications regarding the nexus among migration-related journals (see Table 1). In parallel with selection criteria of such journals, our environment/climate-oriented journals turned out to be as follows: *Population and Environment*, *Global Environmental Change* and *Climatic Change*.

Our search on the WoS was based on combinations of the keywords 'climate change', 'climate crisis', 'environmental change', 'drought', and 'flood' with the following ones: 'migration', 'displacement', and 'human mobility'. We excluded book reviews and commentaries for a consistent comparison of articles. The first search within these 6 journals generated 230 articles that broadly analyse the relationship between climate/environmental change and human migration. We excluded articles that do not consider at least one sudden-onset events or gradual effects of climate/environmental change. It generated the final inventory of 178 articles (see Table 1). For the second step, we developed a questionnaire (see Table 2) to apply to selected articles, results of which are detailed in Section 4. All data for each question was coded and analysed by the authors via Maxqda Plus 2020 version, which was subject to cross-check by the authors. This process lasted until no discrepancy remained.

4. Results

This section consists of descriptive and critical sub-sections based on the corpus of analysed articles and key developments in the existing literature. First, we focus on the global

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Table 1. Comparison of two journal groups based on selection criteria.

Journal group	Name of the journal	First publication date	The number of articles (from 1990 to 2022)	Impact factor
Migration-related journals	*International Migration*	1961	18	1.946
	International Migration Review	1964	5	2.901
	Population, Space and Place	1995[a]	9	3.814
Environment/ climate-oriented journals	*Population and Environment*	1978[a]	68	3.537
	Climatic Change	1978	37	4.743
	Global Environmental Change	1990	41	9.53

The search, in line with our purposive sampling and the selection criteria, was performed on the WoS in February 2022.
[a]These journals were established first under different names, which are *International Journal of Population Geography* and *Journal of Population*, respectively.

outlook of the articles analysed, which consists of their yearly and geographical distribution from 1990 to 2022 per journal group (see Sections 4.1 and 4.2). These findings are followed by an analysis of the tensions about framing people on the move (see Section 4.3), which are accompanied by critical comparative analysis of emerging, declining, and rising themes based on two journal groups: 'migration journals' and 'environment/climate journals' (see Sections 4.4–4.8).

4.1 Uneven attention by two journal groups, and the likely policy interlinkages

One of the most striking findings of our research is that over time 'environment/climate journals' increasingly give a central place to the climate/environment–migration nexus. In contrast, the nexus remains at the peripheries of 'migration journals' (see Figure 1). This finding becomes more striking if one considers that the analysed migration-related journals are among those that published most in the climate/environment-induced migration field. Another significant result is the peaks in years 2011, 2015–16, and 2020 (see Figure 1), which have important overlaps with earlier studies (e.g. Piguet, Kaenzig and Guélat 2018; Anuar et al. 2022; Milán-García et al. 2021). Even though the likely manifold reasons behind such peaks and fluctuations require fine-tuned research, one might interpret such peaks as coinciding with important climate/environmental policy developments, which have become more apparent in the last decade or so (Aleinikoff and Martin

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Table 2. Main questions directed to selected articles.

Questionnaire:		
1.	What is the distribution of articles per journal group?	See Section 4.1
2.	What is the distribution of geographically studied areas?	See Section 4.2
3.	What do articles mostly call people on the move due to environmental/climatic reasons?	See Section 4.3
4.	What is the core topic of the articles?	See Sections 4.4 to 4.8
Secondary analysis for articles whose secondary focus intersects with other most recurring topics, as shown in Figure 5.		For example, articles that primarily measure climate change effects on migration decisions and secondarily discuss 'migration as an adaptation tactic' against disasters (the latter being the second most recurring topic with 43%) have been subject to this secondary analysis as shown below
Specific Questions Directed to Articles which Discuss 'Migration as an Adaptation to Climate Change'		
1.	Do articles bring a critical, semi-critical or acritical approach to 'migration as an adaptation strategy'	See Section 4.6
2.	Do articles take 'migration as adaptation' as a planned or unplanned activity?	See Section 4.6

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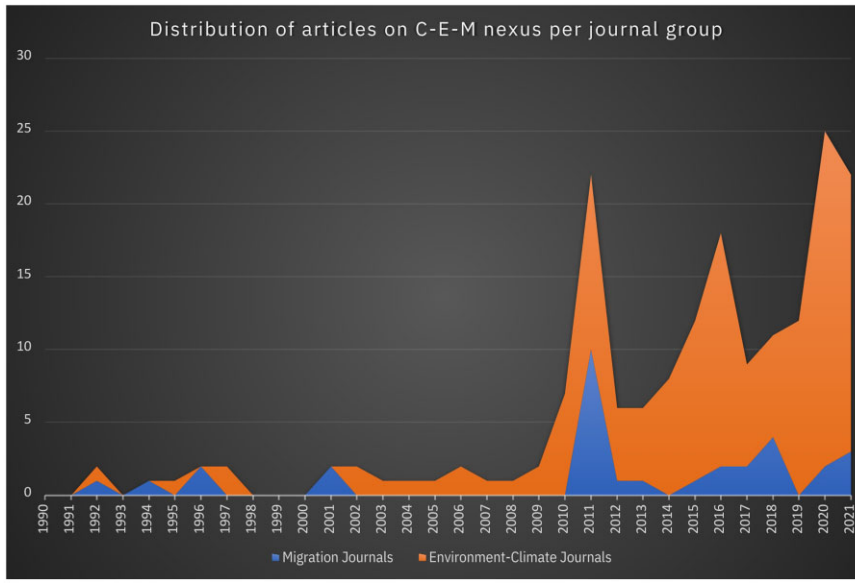


Figure 1. Yearly evolution of articles per journal group.

2022). It would thus not be wrong to suggest that research is likely to anticipate policy attention and vice versa.

For instance, 'migration and displacement as a form of adaptation' first appeared under United Nations Framework Convention on Climate Change (UNFCCC) in 2010 (Warner 2011). The United Nations High Commissioner for Refugees (UNHCR) decided to include 'climate change and displacement' among the major themes of a series of expert roundtables in 2011 held for the 60th anniversary of the 1951 Convention relating to the Status of Refugees (Skillington 2015). Likewise, 2015–16 saw the adoption of the Paris Agreement 2015, which entered into force in 2016,[5] along with the Sendai Framework for Disaster Risk Reduction 2015–30,[6] and the endorsement of the Nansen Initiative Protection Agenda.[7] We also see in 2018 the Global Compact for Migration (Global Compact for Orderly and Regular Migration) which recognised climate change as a unique migration driver, along with the landmark decision taken in the case of *Teitiota v New Zealand* in 2020.[8]

4.2 The Global South as data pool

Nearly 85 per cent of the articles analysed have a specific geographical focus (see Figure 2). Almost 15 per cent of the articles concentrate on developed countries, while this proportion rises to nearly 60 per cent for developing and the least developed countries (see Figures 2 and 3). Out of these, all the articles (excluding three since they focus on destination countries) predicated their analyses on countries of origin that have either undergone human mobility or are likely to do so because of climate change.[9] This finding

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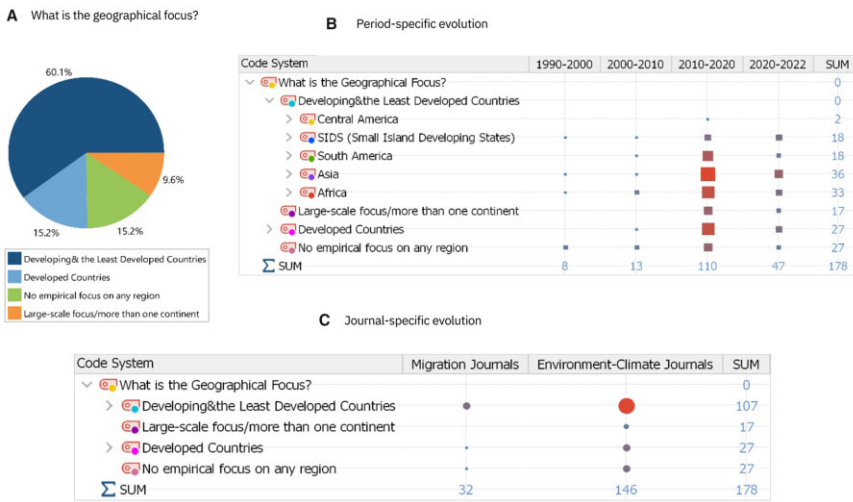


Figure 2. Geographical distribution of research I.

reinforces the inclination that research on environmental migration is mainly done in countries of the Global South (Piguet, Kaenzig and Guélat 2018; Ghosh and Orchiston 2022), while publishing authors or institutions are from the countries of the Global North (e.g. Piguet, Kaenzig and Guélat 2018; Milán-García et al. 2021).

To be more precise, out of the least developed and developing countries, it is West Africa, South Asia, and small island states in the Pacific Islands that stand out, respectively (see Figure 3). Among developed countries, more than half the articles analysed focus on the USA, particularly the impact of hurricanes on displacement (see Figure 3). These findings show that the geographical distribution of scholarly works mostly coincides with current and future highlights of the policy agendas about the regions most exposed to climate change. As the Groundswell report suggests, nearly 216 million people could be internal climate migrants across the six regions, Sub-Saharan Africa, East Asia, the Pacific, and South Asia being the most vulnerable regions (Clement et al. 2021). This uneven geographical distribution could serve the implicit reproduction of the securitised image of 'environmental refugees' fleeing en masse from Global South to North (Piguet, Kaenzig and Guélat 2018).

Since 2010 some notable changes have occurred. These include the emergence of the first crucial scholarly interest in developed countries and large-scale geographical data (see Figure 2). The latter might be attributed to the accumulation of new methods, tools, and projects (including EACH-FOR, MECLEP, and Terra Populus) that could promote nuanced and large-scale modelling and estimations of the impacts of climate change on human mobility. Regarding journal groups—'migration journals' vs. 'environment/climate journals'—it is notable that the former almost solely focus on least developed and developing states. In contrast, the latter's attention goes to developed and least developed and developing countries (see Figure 2).

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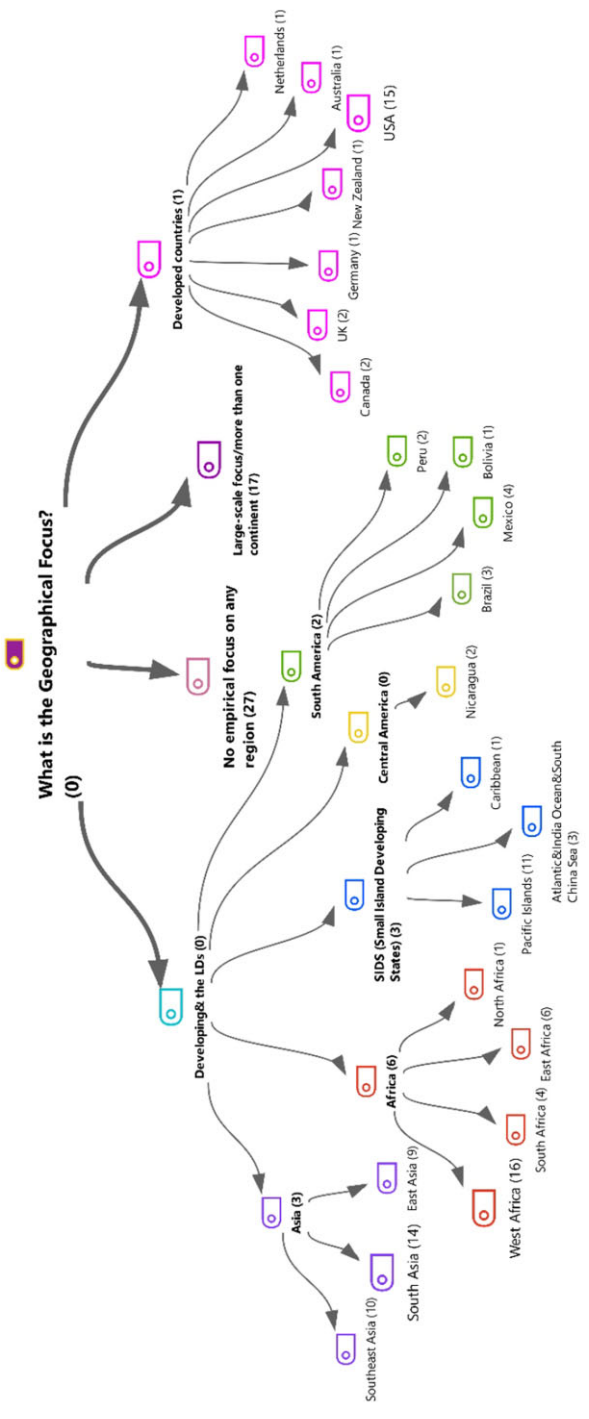


Figure 3. Geographical distribution of research II.

We now focus on emerging, declining, persisting, and rising themes within the nexus from 1990 to the present, first by seeking an answer to the question 'What to call people on the move for climatic/environmental reasons?', which has been a leading tension of the nexus.

4.3 Unfolding the long-lasting tension: what to call those on the move?

Categorising people on the move because of climate/environmental change has been one of the most persistent tensions (Venturini et al. 2012). Divergence ranges from 'climate migrants' and 'climate refugees' to 'environmental refugees', 'environmentally induced migrants', 'environmental migrants', 'ecological migrants', and so on. One of the primary reasons for this divergence is a lacuna in international law to address cross-border movements in the context of disasters and the adverse impacts of climate change (Warren 2016; Francis 2019). On the one hand, climate and environmental issues do not fall within the refugee definition as per the 1951 Geneva Convention on Refugees (Skillington 2015; Warren 2016; Francis 2019). On the other hand, such legal impracticality does not disclaim the tendency that many are likely to fall into the status of refugee as per the Geneva Convention,[10] since climate change is increasingly putting people' lives in danger and is likely to force people to cross borders (Ioane Teitiota v. New Zealand 2020). This impracticality becomes most apparent as to what will happen to islanders in sinking Small Island Developing States (SIDS) who are on the brink of becoming stateless (Yamamoto and Esteban 2017).

We aimed to reveal how this divergence is manifested among scholarly studies based on such variegated framings and the legal lacuna.[11] Above all, it is evident that scholars adopt a cautious approach while assigning a name to people, with almost 70 per cent avoiding direct terms; nearly 14 per cent of them adopting the most inclusive term, 'environmental migrants', as proposed by IOM(see Figure 4).[12] Additionally, when 'migration journals' are compared with 'environment/climate journals', no significant difference arises. Such indirect terms range from 'people moving in the context of environmental change' to 'climate mobilities' (Martin et al. 2014; Cundill et al. 2021). Scholarly interest in the phrase 'climate migrant' has drastically increased since 2010, particularly in 2020 (see Figure 4). Such research findings draw a different picture compared with media sources, since the latter primarily feed on the image of 'climate/environmental refugees' as securitised, victimised, aggregated, and depoliticised subjects, stripped of agency, decision-making, history, and socio-ecological conditions (Bettini 2013; Sakellari 2021).Overall, such a cautious approach by scholars could be an attempt to avoid the 'categorical void', which is defined by Venturini et al. (2012) and refers to the polymorphous reality underlying climate/environmental migration and wide-ranging categorisation of those on the move.

4.4 A Fading theme: prognostic studies

The share of articles analysed that focus on predicting the number and geographies of the climate/environment-induced migrants is not totally negligible, at over 7 per cent (see Figure 5). As discussed earlier, interest in this topic increased in the 1990s (e.g. Hugo

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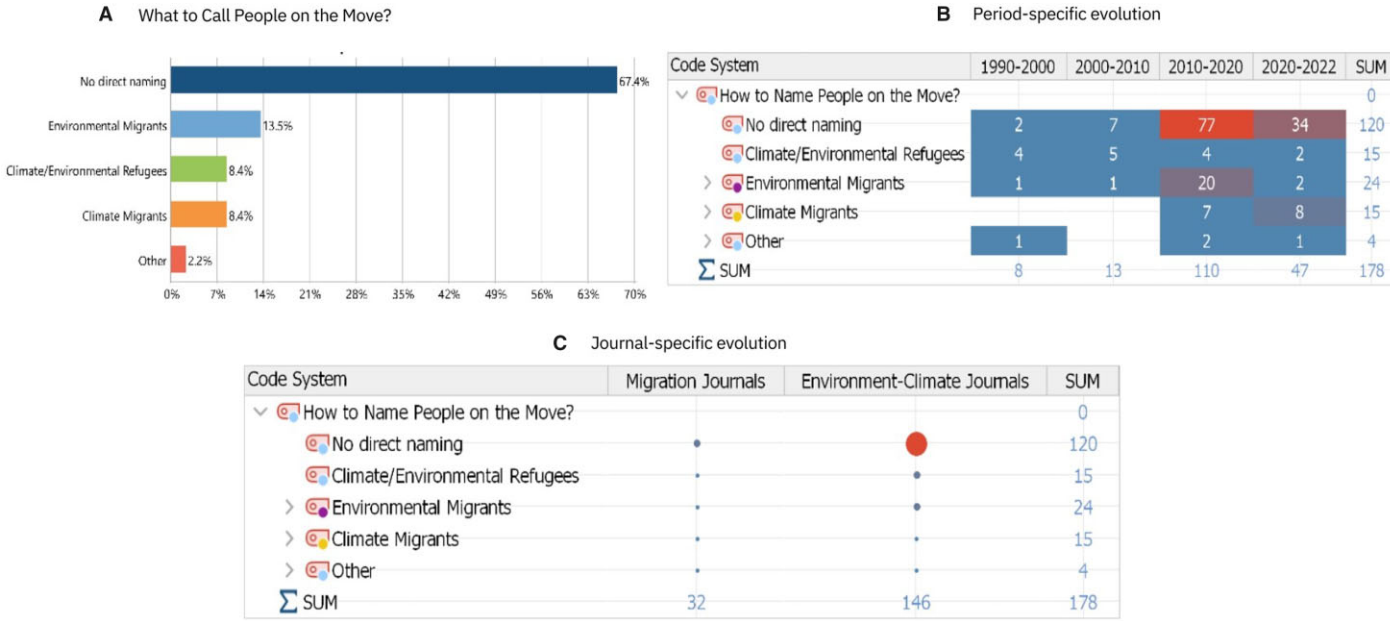


Figure 4. Evolution of naming people on the move.

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1996; Myers 1997). Following an explicit decline, more recently (2020–2), one cannot find articles whose core focus is forecasting migratory flows based on limited or ample evidence. Such a tendency might indicate that scholarly focus increasingly keeps aloof from prognostic studies. It might be viewed as scholars' implicit recognition of infertility in forecasting the numbers in the ever-changing and uncertain landscape of the nexus.

4.5 The most resilient theme: 'Impacts of climate/environmental change on migration'

Almost 51 per cent of the articles analysed primarily focus on the impact of X (adverse effects of climate/environmental change) on Y (human migration) (see Figure 5). Studies within this scope could be roughly divided into two groups. One group could be identified with those measuring merely one effect of climate/environmental change (e.g. drought, extreme heatwaves, and flooding) on different groups of people and various forms of human migration (e.g. internal, external, rural–urban, rural–rural, short-distance, long-distance, temporary, and permanent) (e.g. Jülich 2011; Quiñones, Liebenehm and Sharma 2021). The other group concentrates on more than one impact of climate/environmental change on different populations and forms of mobility (e.g. Koubi et al. 2016; Nawrotzki et al. 2017).

They generally agree upon the contextual differences peculiar to each case, either temporally or spatially. They also mostly agree on the embeddedness of climate/environmental change in other socioeconomic, demographic, and political factors (e.g. Nawrotzki et al. 2017; Thiede, Randell and Gray 2022). That this theme is the most persistent for each journal group since 1990 could derive from the differential impacts of climate/environmental change on different regions and populations over time. Another reason could lie in the uncertainty inherent to such change, be it the severity, timing, and duration of the impacts or the unpredictability of how people react or proact- migrate or remain (IPCC 2022). Based on such uncertainty and contextuality, inherent to the nexus, this topic will likely maintain the core focus for the upcoming studies.

4.6 Adaptation through migration: a theme on drastic rise

With an approximate proportion of 13 per cent, migration as an adaptation to climate change is the second most predominant core topic of the articles analysed. When we consider papers secondarily paying attention to adaptation, this share increases to 43 per cent. This rising trend since 2010, which becomes most evident as of 2020, might highlight an essential turn in approaching the climate/environment–migration nexus. For 'migration as an adaptation to climate change' inherently highlights the agency of migrants in the face of climate change as opposed to the former securitisation and humanitarian frameworks, which view migrants primarily as dangerous and/or passive victims. One might attribute this drastic rise to an increasing recognition that climate change is irreversible, and climate action should pay attention to adaptation as much as it does to mitigation (IPCC 2014, 2022).

Two critical developments in climate policy, among others, have played a key role in initiating this climbing trend. First, in 2010, the Cancun Adaptation Framework under

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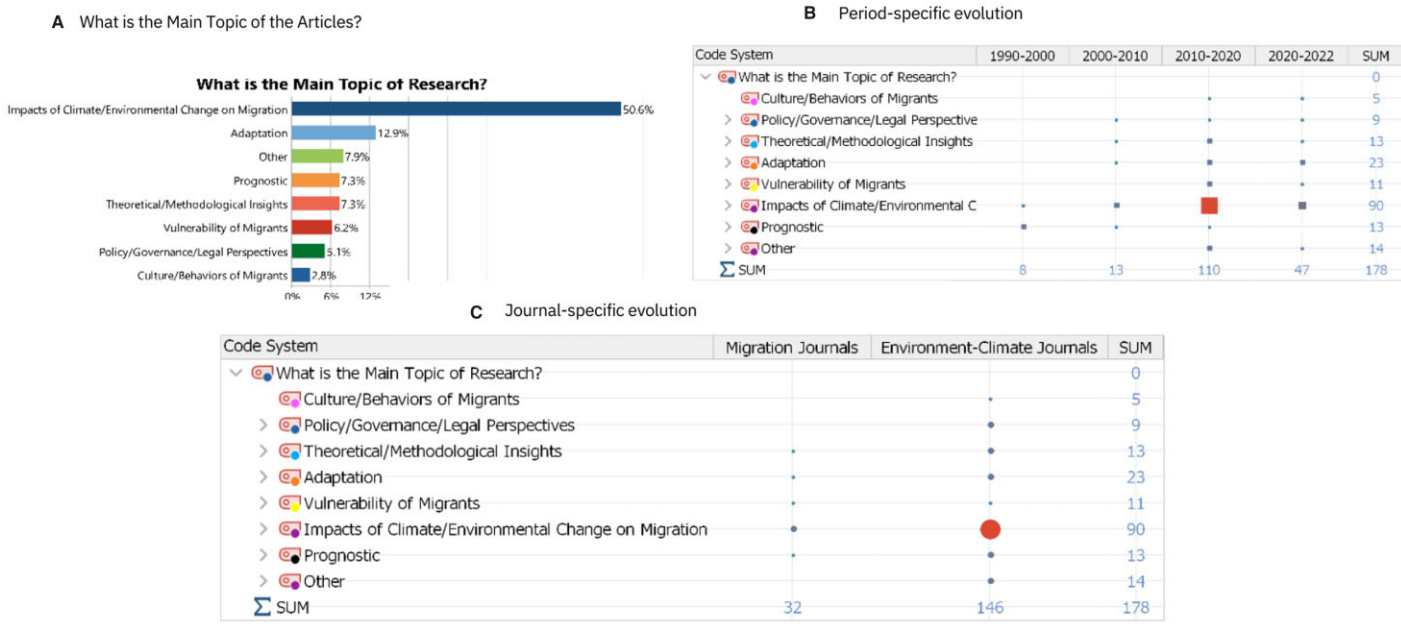


Figure 5. Evolution of the core research topics.

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the UNFCCC directly invited stakeholders to address 'climate-induced displacement, migration and planned relocation' (UNFCCC 2010). Second, the 2010 Foresight Report on Migration and Global Environmental Change viewed migration as a 'transformational adaptation' to environmental change and an effective option to enhance long-term resilience (Government Office for Science 2011). It is no coincidence that in 2010, IOM, for the first time, left significant room for 'migration as an adaptation strategy', apart from its earlier implicit mention in 2008 (IOM 2008). Implications become most evident with the latest IPCC report, where adaptation is mainstreamed into climate change (IPCC 2022), along with IOM's recent reports (2020–22), extensively debating migration as an adaptation to climate/environmental change.

Increasing interest in 'adaptation through migration' brings to light a contested issue. On the one hand, migration might be a good adaptation strategy to climate/environmental change (McLeman and Smit 2006; Tacoli 2009; Gemenne 2010). On the other hand, it might result in a depoliticised reading of climate change which conceals power asymmetries, climate injustices, or other structural inequalities embedded in historical accumulation (Methmann and Oels 2015; Baldwin and Fornalé 2017; Bettini 2017). Our findings point to a preponderance of 'migration as a neutral form of adaptation to climate change', since most articles analysed (75 per cent) highlight neither the underlying inequalities and unequal capabilities of households or populations to migrate, nor the differential responsibilities behind climate change. Nearly 25 per cent of the articles analysed whose primary or secondary focus is on 'adaptation via migration' bring a critical or semi-critical approach. They mostly suggest that migration might not be an effective adaptation strategy, instead worsening the socio-economic conditions of migrants (Vinke et al. 2022); adaptation planning might under- or mis-represent historically marginalised or vulnerable groups (Marino 2012); it might have unexpected psychological consequences for migrants in case of failure of social institutions and political neglect (Wolsko and Marino 2016). Likewise, most articles analysed (nearly 92 per cent) concentrate on unplanned migration as an individual or household adaptation. In contrast, the remaining (8 per cent) explore migration as planned by states. Speaking the language of progress, such foci might translate into a more depoliticised reading of climate change, since it could remove ordinary social, economic, and political processes from the debate (Baldwin and Fornalé 2017; Bettini 2017).

4.7 The emergence of sociological perspectives

The proportion of the articles analysed that focus primarily on the vulnerabilities of the climate/environment-induced migrants is relatively low at around 6 per cent. Studies in this direction could be divided into three broad categories: the most predominant one going to health, psychological disorders, or other challenges migrants face (e.g. Rahaman et al. 2018; Hunter et al. 2021). Others include the differential socioeconomic vulnerabilities of migrants and non-migrants when faced with the adverse impacts of climate change (e.g. Guo, Sim and Ho 2020; Liu and Balk 2020), along with an analysis of the social and structural inequalities underlying ability and inability to migrate as an adaptation to climate change (e.g. Cundill et al. 2021). This finding also comes to the same conclusion as

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those provided by Ghosh and Orchiston (2022), who find that the livelihoods of climate migrants have not been a critical focus in most studies they analysed.

Similarly, the belatedness of this theme is apparent when one considers that the first interest as such arose in 2010 (see Figure 5). Likewise, it sits at the heart of 16 per cent of all articles published in 'migration journals' and 4 per cent of all 'environment/climate journals articles'. One could infer from this inclination that, however, inadequate, 'migration journals' tend to pay more attention to underlying inequalities and vulnerabilities regarding the climate/environment–migration nexus. Overall, such tendencies signify a lack of critical and climate justice attention that indeed question 'common but differentiated responsibilities' and delineate climate change impacts as highly complex socio-political processes that create both winners and losers (Morchain 2018).

The share of the articles analysed that concentrate on the agency of people, or cultural, social norms, and behavioural factors that underlie migration decisions is very low at around 3 per cent. They mostly reveal underlying reasons for non-mobility, including attachment to place, culture, and identity (e.g. Oakes 2019; McMichael et al. 2021). Focus on this theme also starts as of 2010, showing relative increase. Such belatedness also affirms the arguments of Ransan-Cooper et al. (2015), who highlight the belatedness of framing environmental migrants as political subjects compared with earlier framings, for example, migrants as securitised, victimised, and adaptive agents. Articles whose core is on climate policy and legal perspectives also receive low interest, with a proportion of just over 5 per cent. These primarily range from protection gaps or governance challenges in human mobility (e.g. McNamara 2007; Warner 2010) to policy perceptions and preferences for mobility among various groups (e.g. Thornton et al. 2019; Stanley et al. 2021). The rest address human mobility within the context of climate change based on the potential contributions of international agreements (Warner 2018), possibilities arising from development cooperation (Stojanov et al. 2021), and social protection (Johnson and Krishnamurthy 2010). The articles feeding on the latter two themes—briefly policy and governance frameworks and cultural and social norms—belong to 'environment/climate journals'. This finding indicates a shortage of focus in 'migration journals'. All combined could show that the proportion of the core scholarly interest in more profound, structural issues and the agency of people has been considerably lower and somewhat belated. It runs counter to the fact that climate migration is a social question deeply embedded in processes of social inequalities to the extent that it is an ecological issue (Faist 2020).

4.8 What are other emergent topics that are peripheral to the nexus?

Emergent topics at the peripheries of the climate/environment–migration scholarship—what we termed 'Other' (see Figure 5)—consist of the following ones: return/recovery migration following hurricanes; media representations of climate/environment-induced migrants; attitudes towards these people; impacts of climate literacy on migration decisions; and social networks.[13] All such topics appear as of 2010, becoming more manifest since 2020. They all belong to the remit of 'environment/climate journals'. One can argue that such emergent themes and the 'sociological perspectives' discussed above might bring the nexus closer to the broader scope of migration studies. They have a high potential to highlight how climate and environmental change is deeply embedded in macro, micro,

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and meso level factors (Black et al. 2011). Another significant finding is that studies primarily analysing the securitisation implications of the nexus disappear as of 2020, which indicates a similar trend to the fading prognostic studies discussed earlier. Unlike predominant tendencies in media outlets (e.g. Bettini 2013; Sakellari 2021), scholarly interest in the securitisation implications of the nexus is thus increasingly declining. It might be due to increasing evidence displaying scant links between climate change and violent conflict (Buhaug 2010; Soest 2020), since climate change, instead of being a direct conflict-driver, acts mostly as threat multiplier in particular geographies including the African continent.

5. Discussion and conclusion

As empirically shown above, the last three decades of research on the climate/environment–migration nexus have undergone significant changes and continuities. One of the most noteworthy findings is that 'environment/climate journals' dwell upon the nexus while the issue has been of secondary focus for 'migration journals'. Equally important is the inference that 'migration journals' and 'environment/climate journals' display notable differences and similarities in approaching the nexus. For instance, 'X's impacts over Y' is the most continuous theme in each journal group, and the latter shows almost synchronous peak years of publications. However, compared with 'environment/climate journals', 'migration journals' tend to pay more attention to climate justice issues, including underlying inequalities and vulnerabilities of migrants. In contrast, most emergent novel themes fall into the exclusive remit of the 'environment/climate journals'. Such findings highlight an apparent necessity of emphasis on the nexus by 'migration journals' and a more complementary, diverse, and inclusive approach by each journal group for future studies.

It is mainly as of 2010 that policy–academic agendas have experienced the most significant shifts. These include a sharp increase in publications and relatively novel topics, such as 'migration as a form of adaptation'. Likewise, most novel themes, sociological and climate justice perspectives emerging as of 2010 (see Figure 5) become more manifest over time, particularly since 2020. We contend that such climbing trend, with key topics becoming more diverse in recent years, points to the 'early maturation phase' that brings the nexus closer to the broader scope of migration studies. Nevertheless, that such diverse foci are markedly lower affirms the marginal role of social sciences and sociology in the production of climate knowledge (Brulle and Dunlap 2015).

Our inquiry also finds that scholarly interest in the nexus has shown an increasing trend in parallel with crucial developments in climate policy, particularly since the first peak in 2011 when climate negotiations and migration issues started to take a different turn, as debated earlier. Despite increasing international mechanisms and institutions focalised on the protection needs of climate-induced migrants, actions as such have not made the expected impact (Bilak and Kälin 2022; Aleinikoff and Martin 2022). One important drawback results from the general lack of strong science–policy relationship that enhances effective integration of climate knowledge into local, national, and global policy processes (Lacey et al. 2018).

Interest in the theme 'impacts of climate change/environmental change on mobility' has been vital for both journal groups—'migration journals' and 'environment/climate

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journals'. The resiliency of this topic is likely to display a similar surge, if not more so, in the future, in tandem with the exacerbating impacts of climate change. A similar increase could be expected for the second most recurring topic, 'adaptation via migration', since mitigation *per se* is far from reaching the desired climate action, and climate change appears to be irreversible. As opposed to the general finding that views adaptation as primarily a neutral and individual phenomenon, there is a significant need for further studies exploring how adaptation might not be a linear, homogenous, or equal process for all. Another apparent need is for studies that can confront binaries of suffering people and places on the one hand and positive transformations on the other (Elliot 2018).

Based on the overall findings of our research and avoiding any clear-cut periodisation, we can broadly divide the scholarly focus on the climate/environment–migration nexus into three periods. We identify the 1990s to the early 2000s as 'the prognostic stage', which is exemplified by studies forecasting the number and geographies of the likely migrants *en masse*, based on scarce empirical evidence, as discussed earlier. We characterise the early 2000s to 2010 as 'the transitionary phase', which shows a somewhat steady increase in empirical studies refuting the allegations of the former period. We call the period beginning in 2010 'the growth period' based on a sharp increase in policy frameworks and the climbing research that robustly and convincingly unfolded the complex and contextual landscape of the nexus. It is also within this period that we note signs of 'early maturation phase'. Thus, we expand the only periodisation suggested by Piguet, Kaenzig and Guélat (2018) who divide it into four successive periods and show major similarities with ours. Our research—covering the period of 1990s to 2022—sheds light on 'remaining gaps and questions' (for 2011–16 and onwards), where Piguet, Kaenzig and Guélat (2018) explored some emergent topics and approaches. Based on significant peaks, key topics, and trends as of 2010, we have delved into what has been central and peripheral to the climate/environment–migration nexus in a continuum. We conclude that even though 'migration journals' and 'environment/climate journals' growingly reflect more diverse, sociological, and critical perspectives, unevenness in their topical selection and approach is an evident one. Hence, we suggest that there remain topics underexamined by each journal group that showcase broader social and political processes, underlying inequalities, and vulnerabilities on the one hand and the voices of both potential and actual climate/environment-induced migrants on the other. Thus, the need for future studies that confront such binaries, surpass the dominant 'X's impacts over Y' approach, and embrace more inclusive and diverse foci is a clear one.

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Notes

1. See our comparative categories 'Period-specific evolution' and 'Journal-specific evolution' in Figures 2, 4, and 5. All sections under *Results* are based on this comparison.
2. We call the former 'migration journals' and the latter 'environment/climate journals'.
3. Its initial use may date back to the 1970s; yet, it has become more associated with the paper of El-Hinnawi (1985). See Morrissey (2012).
4. The issue of climate change became an item on the agenda of the UN Security Council for the first time in 2007. Authorities, including the then UN Secretary General Ban Ki-Moon, attributed the violence in Darfur to various reasons, including resource scarcity, climate change, and demographic factors. See Hartmann (2010) and Detraz and Betsill (2009).
5. Its importance in this context lies in establishing the Task Force on Displacement in 2015 as part of the Warsaw International Mechanism on Loss and Damage to avert, minimize and address displacement related to the adverse impacts of climate change.
6. Seeing displacement as a significant result and trigger of disaster risk, it addresses the need for States to embrace 'policies and programs addressing disaster-induced human mobility to strengthen the resilience of affected people and that of host communities' (UNDRR 2015).
7. Based upon a pledge made by the governments of Switzerland and Norway, the Initiative commits to addressing emerging 'normative gaps' in protecting the needs of 'populations externally displaced'.
8. It is landmark because UN Human Right Committee, ruling that climate change impacts would harm the right to life with dignity, affirmed the application of the non-refoulment principle. The *non-refoulment* principle prohibits the return of a refugee to any country where they might experience torture, persecution, or other serious human rights violations (*Ioane Teitiota v. New Zealand*).
9. See Helbling et al. (2021) as an example. Besides, as Figure 3 demonstrates, the remaining cases (e.g. Africa: 6, SIDs: 3) refer to studies focusing on the whole continent/category or countries from different regions of the same continent/category.
10. 'A refugee is someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion'. (UNHCR 2011).
11. We combined all derivatives of 'environment' and 'climate' such as 'climate-induced migrants' or 'environmentally induced migrants' under two categories: 'environmental migrants' and 'climate migrants'. 'Other' refers to 'drought migrants', 'eco-migrants', and 'disaster migrants'.

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12. 'Environmental migrants are persons or groups of persons who, for compelling reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad'. (IOM 2009).
13. For the latter, when articles secondarily involving social networks in mobility are considered, one can see a drastic rise since 2010.

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