

Research in environmentally induced human mobility: an analysis of methodological and theoretical dimensions

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Abstract

Purpose – This paper aims to define a proposal of a theoretical–methodological framework aimed at supporting researchers in conducting studies on the topic of environmental mobility.

Design/methodology/approach – The complexity of environmental change and the frequent subsequent human mobility raises challenges in the research process. The variety of theoretical and methodological approaches that can be applied to each of the phenomena contributes to different layers of analysis when focusing on the decision-making process of migration due to environmental factors. Drawing from the theoretical and methodological frameworks used by scholars, this paper includes an analysis of how they are applied in empirical studies that focus on environmental change and mobility in the Middle East and North Africa (MENA) region.

Findings – Empirical studies in this field for the MENA region are focused on collecting and analyzing data but are not linking it with wider human mobility theoretical and methodological frameworks. The proposal

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included in this study privileges the use of a qualitative methodology, aimed at obtaining an overview of the individuals' experience.

Originality/value – This study adds to existing overviews of empirical studies of environmentally induced mobility by analyzing in detail the dimensions used to frame the methodological and theoretical research approaches in the empirical studies used in different disciplines that study the environment and/or human mobility. The studies analyzed focus on the different countries in the MENA region, which has the highest level of forced migratory movements in the world while facing challenges in terms of environmental degradation.

Keywords Environmental change, Human mobility, Research theory and methodology

Paper type Literature review

1. Introduction

The various projections of climate impact on livelihoods depend on the level of exposure of the population to phenomena such as sea-level rise, heat waves and droughts, but in more extreme cases it might lead to a loss in conditions that ensure a basic standard of living (Vinke *et al.*, 2020). Human mobility can be one of the responses to such impacts, but Kelman (2020) argues that research on this matter should not assume the inevitability of human mobility when populations are faced with extreme events and suggests instead adopting multidisciplinary approaches to mobility from other fields. In practice, the study of human mobility induced by climate and environmental changes is a growing field of research with a notorious increase in the studies conducted in the past two decades (Piguet *et al.*, 2018) but still not being significant in overall migration studies (Pisarevskaya *et al.*, 2020).

The non-linear nature of mobility-related choices needs to be considered to avoid amplifying or ignoring tendencies of potential climate-induced mobility (Kelman, 2019, 2020). The studies tend to focus on very local contexts, and long-term data is often missing for many countries (Hoffmann *et al.*, 2020) and they often lack a robust scientific methodology (Cattaneo *et al.*, 2019) or fail to engage with human mobility theory (de Sherbinin *et al.*, 2022). Specifically, the empirical studies in the field of environmental and climate migration have been marked by a lack of application of the extensive body of migration theory (de Sherbinin *et al.*, 2022). Even though mobility is one possible response to environmental and climatic stresses and shocks (Cattaneo *et al.*, 2019; McLeman, 2019), it is a complex phenomenon, usually part of a wider multi-causal response (Nabong *et al.*, 2023), as it is influenced by different triggers such as environment, economy, politics, society and demography, as defined by the landmark report Foresight (2011). Economic drivers include imbalances in labor markets and wages, as well as the available income and income volatility. Political drivers include political instability, conflict, governance structures and policies to motivate or restrict human mobility. Social drivers include access to networks that facilitate migratory movements and belonging to a culture that places a high status on migration. Demographic drivers usually interact with other drivers to influence migration decisions, with several tendencies being confirmed, such as the migration from low population density to high population density and higher migration rates among younger people.

In modern societies, the phenomena of human mobility can be seen as one expression of growing change, with countries having multiple and differentiated mobility types. Mobility becomes the new norm and not an exception to be averted, which requires the use of neutral terms that do not assume it to be positive or negative (Boas *et al.*, 2019), as there are potential benefits such as the remittances to the community of origin, but it might also entail difficulties for the migrants (Foresight, 2011). Portes (2010) sustains that mobility itself can lead to a change in the communities, and that change itself can vary from affecting specific economic structures up to deep transformations in the culture, in the system of values and

even in the way society is organized. In terms of research on the topic of human mobility in general, there has been exponential growth in publications since the mid-1990s, and a shift in the focus on statistics and demographics toward more diversity in the analysis of mobilities, such as gender and health issues (Pisarevskaya *et al*, 2020). Academic language is also becoming more diverse to acknowledge the dynamic categories that can be used to describe migration journeys (Gomes, 2021). Binary representations of mobility as permanent or temporary, internal or international do not capture the complexities and nuances of migration (Gomes, 2021), while the concept of migration itself does not acknowledge the specific situation of people that are impeded from migrating out of areas at risk (Boas *et al*, 2019).

Environmental change is a generic term that includes climate change, loss of biodiversity and soil degradation among other hazards that significantly alter the planet and life in general. Environmental change studies are becoming more interdisciplinary in nature as the contributions of one discipline only are limited and inadequate to solve complex problems (Kanazawa, 2017). Indeed, the understanding of environmental-related phenomena requires knowledge generated in various academic disciplines in natural and social sciences and in humanities (Kanazawa, 2017), while human mobility itself is studied across a wide range of disciplines such as economics, law, history, sociology, political science and geography (Borkert, 2018). Therefore, it is relevant to consider the various theoretical and methodological approaches to understand how to strengthen interdisciplinary research to produce knowledge on environmentally induced human mobility.

Piguet *et al* (2018) and Zickgraf (2021a) mapped the empirical studies of climate migration around the world which are compiled in the CliMig database, by identifying the regions covered and the methodologies used. This study adds to that mapping by analyzing in detail the dimensions used to frame the methodological and theoretical research approaches in the empirical studies used in different disciplines that study the environment and/or human mobility. A detailed analysis of the methods and theories applied in empirical studies will allow determining what is the current situation for the research that focuses on the Middle East and North Africa (MENA) region, particularly how environmentally induced mobilities are engaging with the migration theory. This is particularly relevant for this region since it has the highest level of forced migratory movements in the world while facing challenges in terms of environmental degradation, e.g. 60% of the population faces water scarcity (Borgomeo *et al*, 2021). Finally, considering the results of the analysis, the authors delineate a proposal of a theoretical–methodological framework to serve as a foundation for future studies in the field of human mobility in the context of environmental change.

2. Methodology

This study aimed to analyze the methodological and theoretical dimensions used in the empirical studies of climate and environmental migration. The identification of the studies to be analyzed relied on the use of the CliMig Database, which is the most exhaustive database on the topics of migration, climate change and environment and is hosted by the Institute of Geography of the University of Neuchâtel.

The initial identification of the studies was done through a search in the database by country's name in English and French in June 2022. The following countries were included in the search: Morocco, Algeria, Tunisia, Libya, Egypt, Lebanon, Syria, Jordan, Iraq, Israel and the Palestinian Territories. The Arabian Peninsula was also included in the analysis, namely, Saudi Arabia, Yemen, Oman, United Arab Emirates, Qatar, Kuwait and Bahrain.

The search was furthered by the inclusion of additional search words: Arab World, Gulf States, North Africa, Middle East and MENA.

By analyzing the abstracts, it was possible to further filter the results to identify the studies that contained the collection of primary data. Afterward, a systematic and detailed content analysis was done of the full text of the empirical studies using categories that were defined by taking into consideration the different concepts, and the theoretical and methodological frameworks used in environmental studies, human mobility and environmentally induced mobility.

The following three subsections are dedicated to the definition of the categories to be applied in the systematic content analysis of empirical studies on environmentally induced mobility in the MENA region.

2.1 Categories of human mobility studies

Mobility can be defined in terms of its duration in time (temporary, seasonal and permanent) and in space (short and long distance) (Boas *et al*, 2019). Seasonal movements might be aligned with the agricultural cycles and the consequent variations in the needs of manpower (WIM TFD, 2018). The absence of mobility is also part of the mobility studies, for example, when populations do not have the conditions or refuse to move (Zickgraf, 2018).

Foresight (2011) Report on Migration and Global Environmental Change provided a general overview of the various causes of migration, dividing them by scale: macro, meso and micro. The meso scale causes refer to conditions that can hinder or facilitate migration, e.g. the legal context and diasporic links. In relation to the micro-scale factors, it is crucial to recognize the importance of family structures in the organization of social life and how it contributes to the individual agency (Jamieson, 2016). Additionally, the United Nations High Commissioner for Human Rights (2018) recommends the inclusion of considerations pertaining to gender issues and human rights in general, in the definition of official policies and strategies that address human mobility.

Regarding international human mobility, it has often been analyzed as a consequence of different factors in the countries of origin and destination, in what can be described as the push–pull factors (de Haas, 2021). Portes (2010) uses the following categories to distinguish between the different theoretical approaches to human mobility:

- The neoclassical approach: the individual makes the decision after calculating the costs and benefits associated with migrating.
- The “new economics” approach: it focuses on the imperfections of the economic system in the community of origin, leading families to opt for migration.
- The world-system perspective: peripheral areas are unbalanced, and the population seeks to abandon those areas.
- Social networks approach: the creation of migration networks and corridors reduces costs for migration and contributes to the perpetuation of migration flows.

The social networks approach is considered by Peixoto (2004) to be part of a wider economic sociological approach together with the concept of embeddedness. The latter refuses an exclusively rational decision-making process that only considers economic inputs, and instead includes social considerations such as social networks and structures, interpersonal relationships and historical legacy that shape the overall context in which the individual makes decisions. Finally, a micro-sociological perspective places the focus on the individual's agency and rationalities, and even though traditionally this perspective has drawn mostly from economic considerations, it does not need to be limited to them and

reflects more on the biographical description of the experience of migrating and the emotions associated (Peixoto, 2004).

The overview of the different concepts and theoretical and methodological approaches as explained throughout the present section and which are used in the human mobility studies are presented in Table 1. The first column “Perspectives of Analysis” refers to the lens used to analyze the mobility phenomenon, e.g. if the study focuses on the temporality aspect of mobility, then there will be various dimensions that can describe that same aspect: temporal, seasonal, permanent or seasonal.

The information in Table 1 aims to condense the different perspectives and dimensions in the study of human mobility, and in addition to examples from the literature that were previously presented, this study also attempted to include the classification of categories in the study of mobility from the Migration Research Hub which includes an overview of the Taxonomy System in “migration studies” (Migration Research Hub, 2023). In this system, in the study of mobility, research is classified into different categories: processes, consequences (for migrants and sending and receiving countries) and governance. In terms of processes, we can subdivide it into drivers, forms of mobility (including environmental and climate migrants) and infrastructure, which includes enablers and/or disablers in the mobility process. As for the consequences, Migration Research Hub (2023) includes socio-cultural, socio-economic, legal-political and transversal consequences. Finally, governance can be further divided into governance actors, migration policy and law and governance processes. This classification by the Migration Research Hub (2023) allowed completing the information in Table 1 for it to be comprehensive and without duplications.

2.2 Categories of environmental change studies

Studying environmental change implies a recognition of the complexity and multivariate levels of the interaction between the environment on one hand and the social, economic and political settings on the other hand. Ostrom (2008) suggests the use of a framework that considers the interactions between the variables that emanate from the different parts of the system to then proceed to identify the outcomes at social and ecological levels, including any possible externalities to the overall social-ecological system. In her proposal to create a theoretical framework for environmental change studies, Ostrom (2008) identifies multiple tiers of variables and suggests that the design of the research should select the variables

Perspective of analysis	Associated dimensions
Time	Temporary, seasonal, permanent, cyclical
Space	Short distance, long distance; immobility; internal, international
Perception of mobility	Positive, negative (including to be averted), neutral
Process	Macro, meso and micro drivers (e.g. political, socio-economic, demographic and environmental drivers and personal and family context); infrastructure (e.g. political and legal context, cost, migrant networks, labor market)
Decision-making process	Push–pull model, Neoclassic, new economics, world-system, economic sociology models (social networks and embeddedness), micro-sociological (individual’s agency and rationality)
Change to the system/ migration consequences	Cultural, demographic, economic, social, legal, political – in the communities of origin and destination
Main focus	People (biographical, human rights, gender issues); governance; law; policy

Source: Authors own creation

Table 1.
Perspectives of
analysis in human
mobility studies

that are more relevant to a particular study, as not all variables can be considered for one specific study.

The reaction of society to these different levels of interaction, particularly in a context of degradation of the environment is considered an adaptation, while active engagement to slow or halt that same degradation is designated as mitigation. Both responses affect the socio-ecological system and constitute different approaches upon which different theoretical frameworks can be applied when doing research. In terms of mitigation, research can focus on technical potential and economic feasibility as well as on behavioral change factors which are determined also by social and cultural norms (Nielsen *et al*, 2020).

Regarding adaptation, Lin (2018) defends the use of analytical eclecticism because it allows the inclusion of various possibilities and draws from different theories and narratives. It is nevertheless useful to consider general concepts that have a direct influence on the adaptation response, such as vulnerability (Thomas *et al*, 2019) and sustainability (Fedele *et al*, 2019). Specifically, in the context of adaptation to climatic events, vulnerability is defined as the “propensity or predisposition to be adversely affected and encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt” (IPCC, 2022, pp. 1–18). Sustainability refers to “a dynamic process that guarantees the persistence of natural and human systems in an equitable manner” (IPCC, 2014, p. 127). Research in adaptation started by analyzing general policies, but as adaptation is specific to the site itself, it progressed to include local knowledge as recognized by the IPCC (2022).

The social perception of the climate and environmental challenges varies in relation to the perception of the risk of those phenomena which in turn depends on a variety of factors, namely, cognitive and affective factors, sociodemographic characteristics and culture of each individual (van der Linden, 2017). Studies that focus on social perceptions need to take into consideration the different types of knowledge that are available, both formal and informal, but that will shape the response to the various phenomena (Stengers, 2011; Alves *et al*, 2014; Boas *et al*, 2019). Additionally, social norms have also exerted an influence on individual attitudes toward the environment, albeit not always effectively (Boon-Falleur, 2022). For example, gender might be directly related to specific vulnerabilities and knowledge, as gender is shaped by social norms (Lau *et al*, 2021). Finally, the social processes exist, are changed, or perpetuated through discourse, as communication is part of “all things human and in the way that humans related to the on-human world” (Carvalho, 2023:2), therefore when analyzing the social perception of environmental change, it is relevant to include also considerations about discourse.

The concepts presented in this sub-section are summarized in Table 2 which aims to provide a comprehensive overview of how environmental studies are categorized.

Table 2.
Perspectives of
analysis in
environmental
change studies

Perspective of analysis Associated dimensions	
Input – Output	Interactions within social-ecological systems – outcomes at social and ecological levels, including externalities
Reaction of society	Mitigation (technical response, economic feasibility, Behavioral change) and adaptation (analysis of vulnerability and sustainability, local and traditional knowledge)
Social perception	Social process: types of knowledge, local experience, social norms and discourse
Source: Authors own creation	

2.3 Categories of environmental/climate mobility

The final decision at a household/individual level to migrate is generally considered to be complex and it might be influenced by various factors (Foresight, 2011; UNFCCC, 2016). The study of environmental mobility has often evolved without considering the general theoretical developments in mobility studies (de Sherbinin *et al*, 2022). Arnall (2015) identified different phases in the study of climate mobility. Initially, there was a focus on the concept and quantification projections of climate refugees. However, this approach did not take into consideration the individual agency, privileging the assumption that when at risk, the population would prefer to migrate (Foresight, 2011). Furthermore, there might be several changing environmental factors, but the response of the population is not necessarily linked to the physical factors themselves, but instead to the perception of the risk (van der Linden, 2017).

Afterward, the studies started including other factors (economic, political, social and demographic) that added complexity and richness to the analysis of the mobility phenomenon (Arnall, 2015). In practice, and for research purposes, it is difficult to attribute one single cause to human mobility, even though from a legal perspective, it might be relevant to distinguish between the causes, to confirm the legal status of refugees and asylum seekers (Foresight, 2011).

The third phase was focused on the migrants themselves, and the studies allowed the integration of experiences when individuals and communities were exposed to risk and considered mobility within their possible responses. This third phase recenters the debate around people, their own motivations and agency and is aligned with The Global Compact for Safe, Orderly and Regular Migration, which aims to be a people-centered document, due to the strong human dimension of mobility itself. Furthermore, when centering the research around people, Borderon *et al* (2021) pointed to the importance of ensuring that research is reaching populations that are at risk of being invisible, such as “vulnerable” and “hard to reach” communities.

Finally, a people-centered approach also allows including populations that do not view mobility as the desired solution in their adaptation efforts which, according to Liaeter and Durand-Delacre (2021), constitute most of the communities who tend to seek resourceful solutions that allow remaining in their origin locations. Farbotko *et al* (2020) argue that communities with a strong attachment to their origin are less prone to migrate and that migration could lead to a higher vulnerability. However, there are also examples of populations that do not resort to migration despite a strong degradation of the environment, which creates dangerous situations (Zickgraf, 2021b).

Table 3 summarizes the key concepts presented in this subsection regarding the overall studies of environmental and climate-induced human mobility.

3. Results and discussion

This section concerns the first objective of this study, which is the mapping of the theoretical and methodological frameworks applied in the empirical studies of environmentally induced human mobility in the MENA region. The initial search, focused on the countries of the MENA, in the CliMig database resulted in a list of 35 studies, of which 10 are empirical studies and of these 5 focused exclusively on Morocco (Ait Hamza *et al*, 2008; Ait Hamza *et al*, 2010; Sow *et al*, 2016; Tribak *et al*, 2019; Fernández *et al*, 2019), one on Egypt (El-Raey, 1999) and another one on Yemen (Kolmannskog, 2015). The studies that cover several countries include a World Bank publication (Wodon *et al*, 2014) that collected evidence from five countries: Morocco, Algeria, Egypt, Yemen and Syria. Sobczak-Szelc (2018) focused on migrants living in Poland that are originally from Egypt, Morocco and

Table 3.
Perspectives of
analysis in
environmental/
climate mobility

Research process	Description
Linear	Starting with a climate or geophysical phenomenon (independent variable) to proceed to a quantification of potential migrants (dependent variable)
Multi-causal and multi-spatial mobility	Inclusion of different causes for the mobility and of the different areas in the migratory experience (regions of origin, transit and destinations)
People-centered	Focus on the individual experiences in mobility, including “hard to reach” and/or “vulnerable” populations, as well as populations that refuse to resort to mobility solutions. Focus on the human rights in general and gender issues in specific
Policy, legal and security	Research is mostly focusing on policy, legal and/or security-related aspects of the mobility experience
Research Strategy	case study, action research, ethnographic studies, grounded theory, survey and content analysis
Source: Authors own creation	

Tunisia. And finally, [Weinthal et al \(2015\)](#) analyzed the water–climate–migration nexus in Jordan, Israel and Syria.

Following the designations presented in [Tables 1–3](#), it was possible to summarize the perspectives used in the empirical studies in terms of human mobility, environmental change and environmental/climate mobility. Several new designations were included in an iterative process to reflect the information presented in the studies analyzed more accurately.

[Table 4](#) summarizes the results of the analysis of the studies in terms of human mobility. Overall, regarding time and space-bound analyses, the results demonstrate a varied focus. The perception of mobility tends to be addressed in more neutral terms, but there is equally a tendency to outline its positive and negative consequences. The studies also refer that the mobility process is part of a wider context where different drivers in addition to the environment are acting as influences, namely socio-economic and political drivers as well as specific personal and family circumstances. The decision-making process, as explained in the articles studied, is often not directly supported by the theories that are used to describe mobility phenomena. In terms of changes to the communities of origin and destination, there was a wide range of considerations, encompassing cultural, social and economic changes; political and legal changes were only studied in the communities of destination. Finally, nearly all the studies focused on individual experiences of mobility and a majority addressed governance-related topics, while gender and human rights perspectives were only analyzed in three studies.

In terms of the analysis of environmental change perspectives ([Table 5](#)), overall, all studies focused on environmental/climate change and how they interact with the global social systems in which they are integrated. All studies focused on adaptation, through the analysis of local and/or institutional responses, whereas three studies addressed existing local and traditional knowledge. Most studies addressed issues of social perception and a few applied social perceptions to environmental factors.

[Table 6](#) summarizes the findings of the analysis of the studies by adopting environmental/climate mobility perspectives. Nearly all studies did not include future projections of environmental migrants, and very few attempted to establish a direct link between a specific environmental phenomenon and the quantification of migratory movements. Overall, all studies adopted a multi-causal and multispatial approach when addressing human mobility, focusing more on individual experiences, including those of more vulnerable populations, often with an emphasis on human rights issues. Policy, legal

Perspective of analysis	No. of studies that mention each of the categories
Time Space	Temporary [4], Seasonal [2], Permanent [8], Cyclical [2]. Not mentioned [2]. Short Distance [5], Long Distance [3], Immobility [3], Internal [7], International [7]. Not mentioned [1]
Perception of mobility	Positive (including possible positive consequences) [4]; Negative (including to be averted or with negative consequences) [3]; Neutral [5]. Criticism of negative framing of mobility by policy-makers [1]
Process	Macro, Meso and Micro Drivers (e.g., Political [4], Socio-Economic [6] and Demographic [3] drivers and Personal and Family Context [4]); Infrastructure (e.g. Political and Legal Context [2], Cost [1], Migrant Networks [2], Labor Market [3]). Specifically for environmental drivers: environmental degradation in general [7], reduction of water availability [4], pests [2], progression of desert [2], increase of average temperatures [1], floods [1], droughts [1], sea-level rise [1]. Acknowledgment of multi-causality without specifying non-environmental drivers [1]
Decision-making process	Mentioned: Push–Pull Model [3], Economic Sociology models (Social Networks) [1]. Not directly mentioned but can be implied: Push–Pull Model [3], New Economics [3], Economic Sociology models (Social Networks) [3], Micro-sociological (individual's agency and rationality) [3]. Processes that were not explicitly or implicitly mentioned: Neoclassic, World-System, Economic Sociology (Embeddedness)
Change to the system/ Migration consequences	In the communities of origin: Cultural [3], Demographic [3], Economic [3], Social [3]. Situations of conflict [1]. In the communities of destination: Cultural [3], Demographic [3], Economic [3], Social [3], Legal [4], Political [3]. Not mentioned [3]
Main focus	People (Biographical [9], Human Rights [3], Gender Issues [1]); Governance [6]; Law [2]; Policy [3]

Source: Authors own creation

Table 4.
Results of the
analysis of human
mobility perspectives

Perspective of analysis	No. of studies that provide an analysis for each perspective
Input – Output	Interactions within social-ecological systems [7]. Outcomes at social and ecological levels, including externalities [8]. Not analyzed in detail [2]
Reaction of society	Adaptation: analysis of vulnerability [6], local and traditional knowledge [3], institutional adaptation responses [2] and local adaptation responses [3]. Not mentioned: Mitigation responses and sustainability
Social perception	Social process: types of knowledge (legal pluralism) [1], local experience [4], social norms (including gender) [3] and discourse [2]. Local perceptions of environmental factors [3]. No reference to social perceptions [2]

Source: Authors own creation

Table 5.
Results of the
analysis of
environmental
change perspective

and security-related issues were also present in nearly half of the studies being analyzed. In terms of the research process, case studies were strongly privileged, collecting data mostly through interviews and surveys, with only one study using focus groups, whereas another one applied the Capabilities Approach to the analysis of the results. Qualitative case studies are usually the most common method employed in the studies of environmentally induced mobility around the world (Zickgraf, 2021a).

Overall, the empirical studies demonstrated a strong focus on the multi-causal nature of mobility, shifting the focus from a linear understanding of this phenomenon, and thereby

Table 6.
Results of the
analysis of
environmental/
climate mobility
perspectives

Research process	No. of studies that follow each research process
Linear	Overview of migratory and environmental phenomena in parallel, without quantification and future projections [7]. Starting with a climate or geophysical phenomenon (independent variable) to proceed to quantification of potential migrants (dependent variable) [2]. Impact of climate change in a specific sector of activity and how it might affect migratory movements [1]
Multi-causal and multi-spatial mobility	Inclusion of different causes for the mobility and of the different areas in the migratory experience (regions of origin, transit and destinations) [8]
People-centered	Focus on the individual experiences in mobility [10], including “hard to reach” and/or “vulnerable” populations [6], as well as populations that refuse to resort to mobility solutions [3]. Focus on human rights in general [4] and gender issues in specific [2]
Policy, legal and security	Research is mostly focusing on policy [4], legal [3] and/or security-related [4] aspects of the mobility experience
Research strategy	Case Study [5], Ethnographic Studies [1] and Content Analysis [2]. Interviews [6], Surveys [4] and Focus Groups [1]. Use of Capabilities Approach in the analysis [1]
Source: Authors own creation	

diversifying the debate of environmental/climate mobility to include other factors, namely, socio-economic triggers and existing family connections and migrant networks. Additionally, the topic of populations that refuse to migrate was also addressed in several studies, thereby contributing to advancing the knowledge, which has traditionally focused more on the population that resorted to changing locations, as described by [Zickgraf \(2021b\)](#). None of the studies analyzed were longitudinal, and the lack of long-term data reduces the overall understanding of the role of environmental drivers in human mobility ([Hoffmann et al, 2020](#)), necessary to inform decision-makers and policymakers with reliable data.

In general, the results showed that there is a limited number of empirical studies in the region. For example, the country that is most studied in terms of environmentally induced mobility is Bangladesh, being the focus of 17 empirical studies in the period from 2015 to 2020 alone, while, in the MENA region, all countries combined, amount to 10 studies ([Zickgraf, 2021a](#)). Also, the findings reveal limited use of theoretical frameworks, particularly in terms of the decision-making processes that lead to mobility (or not). For example, only three studies briefly mentioned models such as push-pull and social networks in their framing of mobility patterns. This lack of connection to a larger body of work in human mobility studies set environmental mobility studies aside on both levels: by limiting their contribution to advance theoretical frameworks ([de Sherbinin et al, 2022](#)) but also by discarding the benefits that using different frameworks might add to the richness of discussion and research ([de Haas, 2021](#)).

Finally, one study ([Fernández et al, 2019](#)) applied the capabilities approach directly in the study of environmental migration by tracking references in the in-depth interviews with migrants to each of the capabilities, which allowed them to map which ones were associated with the decision to migrate. This use of the capabilities approach is further explored in the following section within a proposal of a theoretical–methodological framework.

4. Proposal of a theoretical–methodological framework

Despite human mobility being a product of a mix of choices and constraints at an individual level ([Naser et al, 2023](#)), the results of the analysis of human mobility perspectives revealed a

low application of methodological frameworks that focus on the decision-making process. Regarding reactions and perceptions of the environmental changes, the results demonstrate an application of methods that allow collecting social perceptions, nevertheless, they do not integrate them within a wider discussion of sustainability-related issues, despite IPCC (2022) indicating that adaptation responses need to be aligned with the sustainable development goals to improve resilience within the communities. Furthermore, sustained adaptation also requires integrating mitigation actions (IPCC, 2022), which the results demonstrate having been disregarded in the studies of environmentally induced mobility in the region.

De Sherbinin *et al.* (2022) identify a general tendency of environment and climate-induced mobility to have limited engagement with existing theory (de Sherbinin *et al.*, 2022), which might further feed general assumptions on how climate change and environmental degradation impact mobility-related decisions when populations are exposed to risks (Kelman, 2020). In practice, Nabong *et al.* (2023) identify around 20 economic, environmental, demographic, political, social and personal intervening decision-making factors that affect migration-related decisions within the context of climate change.

To capture the complexity of the decision-making process, one of the available options is to conduct research at the micro-level, following considerations that are aligned with micro-sociological studies, which focus on the individual's agency and rationalities (Peixoto, 2004), while portraying their perceived vulnerabilities and strategies deployed to face their own needs (Morrissey, 2021). Due to the multidimensional characteristics of the individual, it is relevant to apply a lens that allows for multiple considerations. At an institutional level, there are several indicators that seek to measure overall well-being such as the Human Development Index (HDI), Inequality-adjusted HDI (IHDI), Gender Inequality Index and the Multidimensional Poverty Index (UNDP, 2020). The latter, although relevant in development studies and focusing on the individual's needs and aspirations, is more appropriate for studying the challenges among the most deprived communities, therefore it might not be fully adequate for a study applied in every community. The remaining indexes are mostly inspired by the HDI, which occupies a central role in the characterization of the well-being in a society. HDI is strongly influenced by the works of Amartya Sen and others on the Human Development Approach or Capabilities Approach, which according to Nussbaum (2011) is the best framework to establish comparisons of life quality and to assess social justice. Another indicator that is proposed in the sustainability-related research is Years of Good Life (Lutz *et al.*, 2021), which includes a smaller number of capabilities that are reflected under the wider scope of the capabilities approach.

The capabilities approach considers ten central capabilities: life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play and control over one's environment (political and material) (Nussbaum, 2011).

The capabilities approach encompasses the human rights approaches since "the notion of capabilities is broader than the notion of rights", and it can "embrace the language of rights and the main conclusions of the international human rights movement" (Nussbaum, 2011, p. 67). On another hand, the Capabilities Approach allows the inclusion of the "capabilities of systems (ecosystems in particular, but also species)" (Nussbaum, 2011, p. 158), allowing to establish a link between the capabilities and environmental justice (Holland, 2020). This possibility to enlarge the scope of the approach to add environmental concerns is in line with the traditional view of sustainable development, which is based on three main axes: economic, social and environmental. However, the Capabilities Approach, despite being in line with human rights and well-being and allowing environmental concerns, would need to be further adapted to deal with intergenerational human rights, well-being and environmental concerns, to be fully sustainable, as the premise of sustainability is that "it

meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987).

The application of capabilities approach allows accounting for the individual’s preference for the various options available, which are influenced, among others, by their access to “economic (material), social (other people), cultural (ideas, knowledge and skills) and bodily (good health, physical condition and habitus) resources” (de Haas, 2021, p. 15). However, as the same author concludes, acknowledging the complex process of deciding to migrate or not, when accounting for constraints that the individual faces, still does not fully capture the journey of mobility in of itself, due to the non-rational component of decision-making in general. This limitation adds to the complexity inherent to all social processes.

5. Conclusion

Human mobility is a complex social phenomenon, influenced by different layers of triggers, including environmental and climate change, thus requiring multidisciplinary approaches to further comprehend and describe existing tendencies. By systematically analyzing the frameworks applied in the existing research in the MENA region on the topic of environmentally and climate-induced mobility, it is possible to understand how research is applying different theoretical and methodological frameworks across disciplines, and what type of information is not being collected and therefore analyzed and understood in depth.

The results demonstrate that empirical studies in this field for the MENA region are focused on collecting and analyzing data but are not linking it with wider human mobility theoretical and methodological frameworks, particularly for the understanding of the decision-making process, despite the region presenting a high level of migratory movements and facing challenges of water scarcity, among other environmental and climatic stressors. Furthermore, the perceptions of environmental and climate change are not being understood within a wider context of community resilience, which encompasses adaptation in general and links it with sustainability and mitigation issues. Moreover, National Climate Change Adaptation Plans and Strategies express a global agenda, rather than an agenda that should reflect the specificities of local contexts (Alves *et al*, 2020), not integrating the issues of forced or environmentally favored migration.

Overall, the empirical studies are a minority in the total number of studies available for MENA, and they cover a limited number of countries within the region. In terms of how mobility is contributing to changes in the communities of origin and destination, there was a wide range of considerations, encompassing cultural, social and economic changes, while political and legal changes were only studied in the communities of destination. Finally, nearly all the studies focused on individual experiences of mobility, and a majority addressed governance-related topics, with limited emphasis on gender and human rights perspectives.

This study recommends the use of the Capabilities Approach to understand the impact of environmental change in the decision-making process of migrating (or not) to fully capture the complexities of individual agencies and preferences, thus addressing the identified concern of the lack of application of theoretical and methodological frameworks to analyze the decision-making process. Nevertheless, the authors also advocate for the use of other types of studies that include the collection of quantitative and long-term data, to understand more global patterns which would add different perspectives to the analysis of human mobility in general, and support efforts to provide projections of the number of people affected by climate change and environmental degradation.

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