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The Link between Disaster Displacement and Migration Intentions

Evidence from global survey data

Deuster, C.

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Joint Research Centre

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Contact information
Email: christoph.deuster@ec.europa.eu

EU Science Hub
https://joint-research-centre.ec.europa.eu

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Contents

Abstract

This report uses rich global survey data from the Gallup World Poll to analyse the relationship between environmental conditions, displacement and migration. An instrumental variable model is used to link geocoded data on environmental disasters to individual anticipation of displacement and migration aspirations. The report confirms the established finding that the connections between environmental factors and human mobility patterns at various spatial scales are complex and context specific. In particular, the report suggests that in less-developed regions an expectation of higher risks of future environmental disasters leads to a lower individual desire to migrate internationally. By contrast, in least-developed regions the anticipation of higher risks of environmental disasters induces those individuals who wish to migrate internationally to increase their efforts to plan for international migration. These results point to causal relationships between environmental factors and migration behaviour in countries with lower levels of development. They add further nuanced findings to discussions on climate change exposure, vulnerability and 'environmental immobility' and on climate-induced migration and displacement of different types and at various spatial scales.

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Author

Christoph Deuster

1. Introduction

In recent decades, the adverse consequences of climate change have become increasingly visible in all world regions. A large amount of scientific evidence documents that the global climate is changing, as demonstrated by rising surface temperature levels and the growing intensity and frequency of environmental and climate-related disasters (Guha-Sapir et al., 2014; IPCC, 2023). Given these substantial changes in climatic conditions, an increasing number of those in the policy and academic communities have focused on adaptation measures and human responses to these changes in recent years. Among the human response mechanisms, the movement of people as a consequence of climatic factors and environmental disasters has attracted particular attention (Black et al., 2011; McLeman and Smit, 2006).

The importance of the topic has been underlined by a recently published European Commission staff working document that specifically assesses existing EU 'policies, instruments and practices addressing displacement and migration of populations caused by disasters' (European Commission, 2022). The document highlights the urgent need for coordinated action by various key stakeholders, including the European Commission's Directorate-General for European Civil Protection and Humanitarian Aid Operations, its Directorate-General for International Partnerships, a wide range of other Commission services and the European External Action Service. In light of the key role played by the EU in protecting and supporting people affected by disasters, the current report aims to provide additional scientific evidence on the link between disaster displacement and migration intentions.

Despite the increasing prominence of the topic, scholars have not reached consensus on the effects of climatic conditions on human mobility. Instead, relevant analyses and scientific studies emphasise that the relationship between climatic factors and human migration is complex. Whether the adverse consequences of climate change increase or decrease migration flows is context specific (Beine and Jeusette, 2021; Berlemann and Steinhardt, 2017; Hoffmann et al., 2020; Hunter et al., 2015). In addition, since climate effects are linked to certain geographical locations, the analysis of the environment–migration nexus requires a geographical approach examining mobility at different spatial scales (Alessandrini et al., 2023; Burzyński et al., 2022; Conte et al., 2021; Desmet et al., 2018; Rigaud et al., 2018).

In terms of international migration, the literature does not provide a definite answer on whether adverse environmental factors lead to more or less migration across national borders. While some studies find a direct positive relationship between climatic shocks and international migration (Backhaus et al., 2015; Cai et al., 2016; Coniglio and Pesce, 2015), other studies identify indirect channels, such as climate-induced decreasing living standards, that lead to international migration (Beine and Parsons, 2015; Marchiori et al., 2012, 2017). Other analyses argue that the effects of climate change constrain or even reduce international migration and attempt to explain what causes this 'environmental immobility' (Benveniste et al., 2022; Black et al., 2011, 2013; Cattaneo et al., 2019; Grecequet et al., 2017). These contributions highlight the importance of addressing climate change exposure and vulnerability of individuals (McMahon et al., 2021; Tucker et al., 2015).

With respect to other types of human mobility, there is something closer to consensus among scholars on the effect of climatic conditions on mobility and displacement within countries (Millock, 2015). The majority of studies find that the adverse effects of climate change induce substantial flows of internal migrants, measured at various geographical scales (Barrios et al., 2006; Castells-Quintana et al., 2021; Deuster, 2021; Henderson et al., 2017; Kubik and Maurel, 2016; Peri and Sasahara, 2019; Piguet, 2021; Piguet et al., 2011). Environmental disasters have been identified as a particularly strong driver of internal mobility and displacement (Beine and Parsons, 2015; IDMC, 2023; Saldaña-Zorrilla and Sandberg, 2009).

Taken together, the findings established by a growing academic community studying environmental and climate mobility still appear to be scattered and even at times diametrically opposed. Establishing if there is a causal relationship between climatic factors and increased international migration is challenging (Hoffmann et al., 2021), since the various drivers of migration are interrelated (Abel et al., 2019; Niva et al., 2021). Many studies observe that a combination of factors shape individual movement decisions (see, for example, Ronco et al., 2023) and demonstrate the difficulty of isolating environmental drivers of migration (see, for example, Schutte et al., 2021).

Against this backdrop, the goal of this report is to analyse and further disentangle latent links between environmental disasters and individual mobility responses of various different types. The report attempts to address the connection between individual anticipation of climatic conditions and international migration intentions and plans. It seeks to identify whether there are potentially causal relationships between expectations about future environmental conditions, disaster displacement and international migration

aspirations. In order to achieve this objective, the analysis builds on rich survey data from the Gallup World Poll. This survey regularly collects data on individual characteristics, perceptions and aspirations in more than 160 countries. Based on these survey data, the report discusses descriptive and empirical results on individual perceptions, reported behaviour and aspirations to move because of environmental and climatic conditions. An instrumental variable model that exploits geocoded data on environmental disasters makes it possible to establish additional nuanced findings contributing to the debate on the connection between environmental disasters and human mobility.

The remainder of the report is structured as follows. Chapter 2 provides a descriptive analysis of some key findings on individual perceptions related to environmental mobility. This chapter presents the data sources and survey questions used in the analysis as well as several descriptive results. Chapter 3 discusses the results of an empirical analysis intended to disentangle some of the relationships between environmental factors and human mobility patterns. Chapter 4 concludes.

2. Descriptive analysis

2.1. Data sources

This report exploits comprehensive global survey data from the Gallup World Poll in order to analyse the connection between individual perceptions of climatic conditions and migration intentions and plans. The Gallup World Poll regularly collects detailed data in more than 160 countries. In each country, usually around 1 000 individuals are interviewed every year, which provides nationally representative samples of the adult population worldwide. In addition, for the period analysed in this report, the Gallup World Poll data includes information on the locations of most respondents at the level of the first administrative division (i.e. department, district, province, state, etc.). The survey data constitute a rich set of information on individual demographic and socioeconomic characteristics and on personal experiences and perceptions of specific topics, such as environmental conditions and climate change.

The key question of central relevance to this report relates to anticipation of displacement and environmental mobility. The Gallup World Poll includes a targeted question that directly assesses individual perceived need to move as a result of severe environmental problems. To the best of the author's knowledge, this survey question constitutes one of the few examples of a global inquiry that explicitly addresses environmental mobility. The report takes advantage of the exceptional opportunity to analyse the responses to this targeted question on displacement and environmental mobility. More specifically, the remainder of the report analyses the individual responses provided to the following key question asked of survey respondents in 2010.

1. Migration necessity: 'In the next five years, do you think you will need to move because of severe environmental problems?' ([1])

With regard to the analysis that follows, it is of crucial importance to note that this question does not refer to international migration only. Consequently, the question invites answers relating to different types of expected environmental mobility. It may cover individual expectations about the need to move within a country or to migrate across national borders.

In addition, this report focuses on individual-level data on international migration aspirations ([2]). The Gallup World Poll questionnaire offers the unique possibility of linking the question on migration necessity due to severe environmental problems to questions on individual international migration intentions and plans. This report studies the replies of individuals who responded to both these elements of the survey: the question on migration necessity and the questions on individual migration aspirations. It analyses individual responses to two specific Gallup questions related to intentions and plans to migrate internationally.

2. Migration wish: 'Ideally, if you had the opportunity, would you like to move permanently to another country, or would you prefer to continue living in this country?'
3. Migration plan: 'Are you planning to move permanently to another country in the next 12 months, or not?' (Asked only of those who would like to move to another country.)

It is important to note that the design of the questionnaire entails a unique structure of conditionality that characterises the questions related to migration aspirations ([3]). In a first step, individuals were asked about their willingness to move internationally. In a second step, only those who expressed a desire to migrate were

([1]) Such severe environmental problems are specified in a question preceding that on migration necessity in the Gallup World Poll questionnaire. Accordingly, severe environmental problems would include 'pollution, floods, droughts, and extended heat and cold waves' (Esipova et al., 2011). The question text captures most categories of hazardous events that are usually linked to disaster displacement. For instance, the Internal Displacement Monitoring Centre includes earthquakes, dry and wet mass movements, floods, droughts, wildfires, extreme temperatures, storms and volcanic eruptions as hazard types in its database on internal displacement caused by disasters (IDMC, 2023). See Table A1 in the Annex for additional details on the relevant Gallup World Poll questions.

([2]) For a comprehensive discussion and global overview of migration intentions and plans based on data from the Gallup World Poll, see Migali and Scipioni (2018).

([3]) In the remainder of the report, the terms 'desire', 'intention', 'willingness' and 'wish' are used with regard to migration interchangeably to denote individual inclination to move to another country. The term 'migration aspirations' is used to refer to individual migration desires and plans. It should be noted that the data on migration aspirations are based on people's individual perceptions, which may be substantially biased. Individual bias may be particularly relevant in the context of perceived environmental conditions. A comprehensive discussion of the limitations arising from such potential bias is beyond the scope of this report. However, several studies have shown that migration aspirations are correlated with actual migration flows (Bertoli and Ruyssen, 2018; Docquier et al., 2014, 2020).

asked about explicit plans for international migration. Consequently, the second sample of individuals having plans for international migration is not randomly selected. As explained in more detail below, the empirical analysis exploits this conditional aspect of the survey design.

Table 1. Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Severe environmental problems	47 968	0.358	0.480	0	1
Migration necessity	48 521	0.118	0.323	0	1
Migration wish	48 521	0.191	0.393	0	1
Migration plan	8 685	0.103	0.304	0	1
Number of disasters	48 521	3.700	3.850	1	30
Age	48 521	39.83	17.53	15	99
Having children	48 521	0.556	0.497	0	1
Gender (female)	48 521	0.512	0.500	0	1
Married	48 521	0.550	0.498	0	1
Other marital status	48 521	0.160	0.366	0	1
Network abroad	48 521	0.272	0.445	0	1
Foreign born	48 521	0.032	0.175	0	1
Secondary education	48 521	0.442	0.497	0	1
Tertiary education	48 521	0.106	0.308	0	1
Unemployed	48 521	0.060	0.238	0	1
Out of workforce	48 521	0.411	0.492	0	1
Annual income (international dollars)	48 521	7 675	85 963	0	15 925 680
Number of countries: 65			Number of first-level administrative divisions: 739		

NB: This table reports some descriptive statistics for the variables derived from the Gallup World Poll and from the geocoded data on disasters that are used in the empirical analysis. The key variables include expectation of needing to move because of severe environmental problems (migration necessity); intending to move internationally (migration wish); for those with such a migration intention, planning to move internationally (migration plan); and the number of geocoded environmental disasters between 2005 and 2010 aggregated at the first administrative level for those divisions that experienced disasters (number of disasters). For the relevant questions used in the Gallup World Poll, see Table A1 in the Annex.

Sources: Author, based on Gallup World Poll and Rosvold and Buhaug (2021).

Finally, the report also uses geocoded data on disasters (Rosvold and Buhaug, 2021) that are derived from information on environmental disasters as recorded in EM-DAT, the international disaster database hosted by

the Centre for Research on the Epidemiology of Disasters (Guha-Sapir et al., 2014) ([4]). The geocoded data on disasters were used to assign a specific geolocation to all disasters in selected categories contained in EM-DAT. For the purpose of this report, the numbers of a selected group of disasters that occurred from 2006 until 2009 and that were assumed to be directly linked to climatic conditions were aggregated at the level of the first administrative division. More specifically, in line with the types of disasters most likely covered by the question on migration necessity, the selected disasters included droughts, extreme temperature events, floods and storms. As will be explained in more detail below, the report uses the information on these specific climate-induced disasters as a variable that is instrumental in studying the environment–migration nexus in the empirical analysis in order to increase the precision of the estimation procedure and establish causal results.

Table 1 contains key summary statistics on all variables derived from the Gallup World Poll, including the key questions on migration aspirations and questions on demographic and socioeconomic characteristics ([5]), and from the geocoded region-specific disaster data that are used in the subsequent analysis. The report focuses on the period between 2005 and 2011 and relies on survey data on a total of 48 521 respondents in the 65 countries for which data could be matched at the level of the first administrative division.

2.2. Descriptive results

The human response to environmental shocks is markedly shaped by context-specific conditions. In particular, local conditions that have a crucial effect on individual socioeconomic factors have a large impact on personal attitudes, perceptions and migration aspirations. Consequently, any analysis attempting to study the link between climatic conditions and human mobility responses has to include a socioeconomic or geographical dimension (Beine and Jeusette, 2021; Berlemann and Steinhardt, 2017; Hoffmann et al., 2020). This report follows the example of many existing studies (see, for instance, Cattaneo and Peri, 2016) and disaggregates the results of the analysis by development group as defined by the United Nations and by geographical area ([6]). This section discusses some key descriptive results derived from the Gallup World Poll data described above.

In general, the data show that a substantial number of respondents to the Gallup World Poll reported in 2010 that they had experienced severe environmental problems in their city or area in the past 12 months. A weighted share of around 35 % of the respondents said that there had been severe environmental problems such as pollution, floods, droughts or long periods of extreme heat or cold. This individually reported experience of severe environmental problems in the recent past is strongly associated with the expected need to move because of such problems in the future. Table 2 indicates that the occurrence of severe environmental issues significantly increases the probability of individuals thinking that they will need to move because of such issues. The table reports the marginal effects of a probit regression analysis in which the binary dependent variable consists of expected migration necessity and the crucial independent variable describes individual experience of severe environmental problems ([7]). The results shown in Table 2 are highly significant for the entire sample and for three subsamples capturing different development groups. The size of the average effect decreases across development groups, with an effect that is around four times larger for the sample of least-developed countries than for the sample of more-developed countries. This potentially reflects different resilience and adaptation capacities at different stages of the development process. The results suggest that exposure to environmental disasters has a strong effect on individual anticipated future need to move due to environmental conditions.

([4]) In EM-DAT, a disaster is defined as a 'situation or event which overwhelms local capacity, necessitating a request to the national or international level for external assistance [and, for it to be entered into the database,] at least one or a combination of the following criteria must be fulfilled:
- 10 or more people reported killed
- 100 people or more reported affected
- A declaration of a state of emergency
- A call for international assistance' (Guha-Sapir et al., 2004).

([5]) For relevant Gallup World Poll questions on demographic and socioeconomic characteristics, see Table A1 in the Annex.

([6]) For the classification of countries by development group and geographical area, see Table A2 in the Annex.

([7]) The estimation can be expressed using the following equation: $P_{EM_i} = \Phi(\beta_1 EP_i + c_i + e_i)$, where EM_i describes the individual expected necessity to move, EP_i stands for the experience of severe environmental problems in the past 12 months, c_i is a country fixed effect and e_i is the error term. The subscript i denotes the individual respondent.

Table 2. Descriptive results – correlation between severe environmental problems and migration necessity

	(1)	(2)	(3)	(4)
	Full sample	Least developed	Less developed	More developed
Variables	Migration necessity			
Severe environmental problems	0.122***	0.199***	0.145***	0.046***
	(0.009)	(0.026)	(0.014)	(0.003)
Country fixed effects	Yes	Yes	Yes	Yes
Observations	47 968	5 447	28 308	14 213

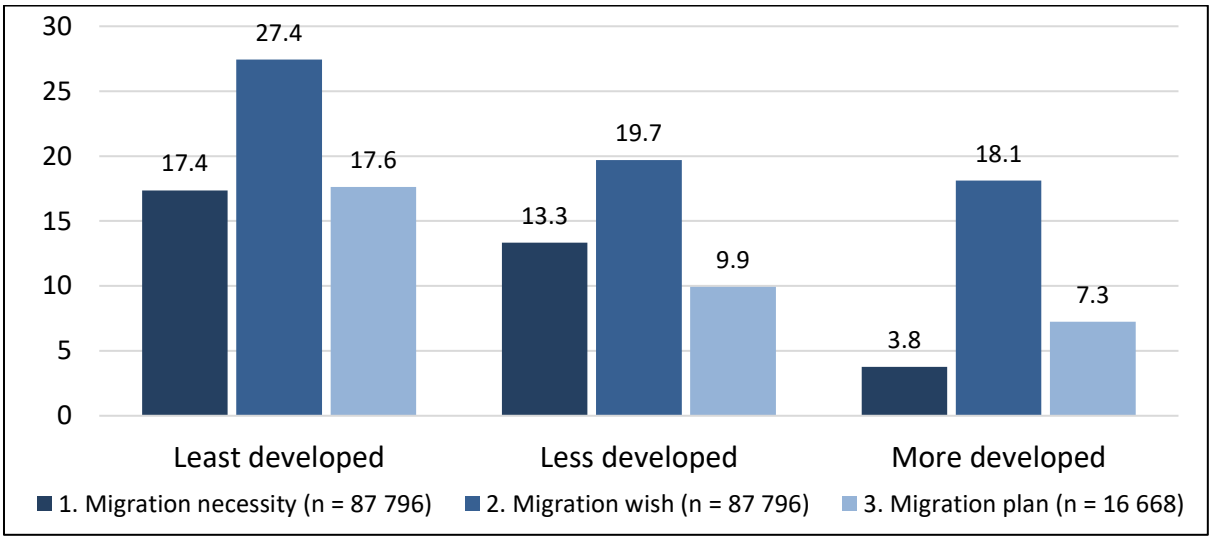
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

NB: This table reports the marginal effects of a probit regression analysis. Variables are derived from the Gallup World Poll. The dependent variable describes expectation of needing to move because of severe environmental problems (migration necessity) and the crucial independent variable consists of the experience of severe environmental problems in the past 12 months (severe environmental problems). The specifications include country fixed effects. Robust standard errors are clustered at country level. Standard errors are shown in parentheses.

Source: Author, based on Gallup World Poll.

Figure 1 shows, for each development group, the weighted share of respondents who anticipated in 2010 needing to move due to severe environmental problems. While at the global level around 10 % of respondents expected that they would have to move in the next five years because of environmental issues, this share amounted to around 17 % in least-developed countries. In less-developed countries (excluding least-developed countries), this share was about 4 percentage points smaller. By contrast, only around 4 % of respondents to the Gallup World Poll in more-developed countries thought that they would have to move in the next five years because of severe environmental problems.

Figure 1. Migration aspirations by development group (%)



NB: This figure depicts, by development group, the share of respondents to the Gallup World Poll who thought that they would need to move because of severe environmental problems (migration necessity), who desired to move permanently to another country (migration wish) and who planned to move permanently to another country in the next 12 months (migration plan).

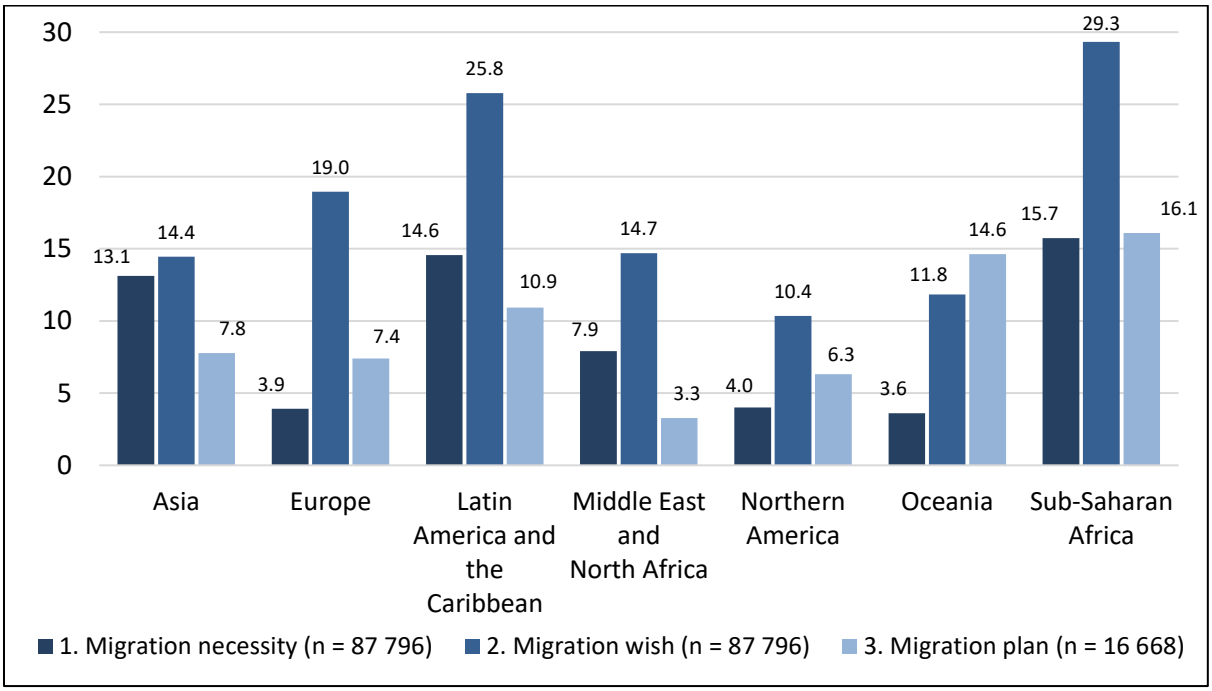
Source: Author, based on Gallup World Poll.

In addition, around 20 % of respondents worldwide expressed a wish to migrate internationally. Among these respondents, around 10 % were also planning to move permanently to another country. In line with Migali and Scipioni (2018), Figure 1 illustrates that the share of individuals declaring a willingness or plan to migrate internationally follows a similar trend to expected migration necessity across development groups. More than 1 out of 4 respondents in least-developed regions said that they would like to move permanently to another

country, compared with 18 % in more-developed regions. Similarly, among those willing to migrate, around 18 % of respondents in least-developed regions had plans for international migration, compared with only around 7 % in more-developed regions.

Figure 2 displays information on migration aspirations disaggregated by seven world macro-regions. This disaggregation shows significant geographical variation in willingness to migrate to another country. While almost 30 % of respondents to the Gallup World Poll in sub-Saharan African countries expressed a desire to migrate internationally, only around 10 % of respondents in Northern America said that they wanted to make such a move. The share of respondents anticipating a need to move because of severe environmental problems was highest in sub-Saharan Africa, at almost 16 %. This share amounted to only around 4 % in Europe, Northern America and Oceania, the most developed regions worldwide.

Figure 2. Migration aspirations by geographical area (%)



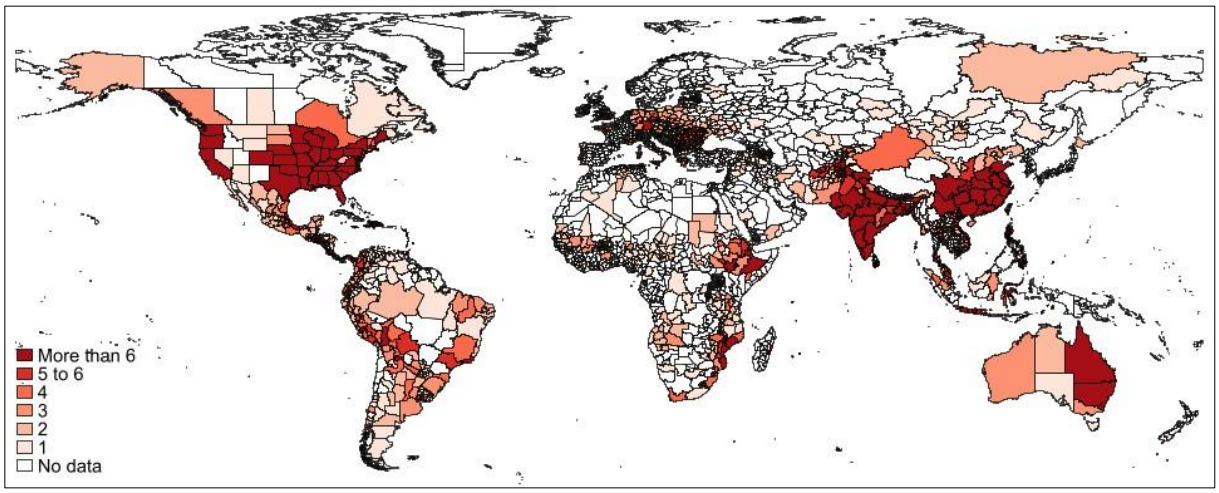
NB: This figure depicts, for seven world macro-regions, the share of respondents to the Gallup World Poll who thought that they would need to move because of severe environmental problems (migration necessity), who desired to move permanently to another country (migration wish) and who planned to move permanently to another country in the next 12 months (migration plan).

Source: Author, based on Gallup World Poll.

Further disaggregating the sample used in this report at country level confirms the significant variation with respect to individual expected need to move because of future environmental problems. In Chad, almost 2 out of 5 respondents to the Gallup World Poll thought that they would have to move as a result of severe environmental issues, and this share amounted to approximately one quarter of respondents in Guatemala (26.9 %), Bolivia (25.8 %), Botswana (24.3 %), Afghanistan (24.1 %) and Tanzania (23.5 %). This contrasts sharply with the less than 2 % of respondents expressing similar expectations in Austria (1.8 %), Luxembourg (1.8 %), Italy (1.7 %), Denmark (1.7 %), Finland (1.5 %), Czechia (1.0 %), Sweden (1.0 %) and Poland (0.5 %).

Finally, Figure 3 illustrates the number of environmental disasters that occurred between 2005 and 2010 by first-level administrative division. The category of environmental disasters includes droughts, extreme temperature events, floods and storms. The figure reveals that all world regions experienced environmental disasters during this period, indicating that no part of the world has been spared by the effects of environmental disasters. In least-developed countries, each division at the first administrative level recorded on average 2.34 environmental disasters between 2005 and 2010, while first-level administrative divisions in more-developed countries faced on average 3.11 disasters each.

Figure 3. Number of environmental disasters between 2005 and 2010 by first-level administrative division



NB: This figure shows the numbers of environmental disasters (including droughts, extreme temperature events, floods and storms) between 2005 and 2010 for each first-level administrative division included in the dataset used in the subsequent analysis. Darker colours indicate a larger number of environmental disasters.

Source: Author, based on Rosvold and Buhaug (2021).

With respect to the disaggregation of environmental disasters by the seven world macro-regions included in Figure 2, the mean number by first-level administrative division was highest in Northern America, where subnational provinces appear to be particularly large, with each division witnessing on average 7.62 environmental disasters between 2005 and 2010 ([8]). By contrast, first-level administrative divisions recorded on average less than two environmental disasters in the Middle East and Northern Africa (1.23), in sub-Saharan Africa (1.56) and in Europe (1.85). Taken together, this suggests that no systematic link between development level and the occurrence of environmental disasters at the level of the first administrative division exists for the sample studied in this report.

The disaggregation of actual or perceived environmental pressure and migration aspirations by different regions indicates that a wish and plan to migrate internationally may not fully coincide with the individual expectation of being forced to move as a result of severe environmental problems. It is crucial to note that – although the three key questions analysed in this report refer to individual movement decisions, plans and anticipation – they relate to human mobility at different geographical scales. While the two questions regarding migration intentions and plans specifically address international migration, the key question on the expected need to move as a result of environmental pressure covers different types of human mobility. The need to move may entail migration to another country or simply involve movement within a country. This offers the particular advantage of making it possible to investigate the interplay between different types and spatial scales of climate-induced mobility patterns.

Table 3 cross-tabulates data derived from the Gallup World Poll questions on human mobility analysed in this report. The table shows that, among the survey respondents who thought that they would need to move because of severe environmental problems, more than two thirds did not declare a willingness to move to another country (left panel of Table 3). Among those who wanted to move internationally, around 18 % of those who saw a need to move for environmental reasons did not have a plan for international migration (right panel of Table 3).

In line with the findings provided by the literature discussed in the Introduction, the simple descriptive cross-comparison of perceived environmental pressure and migration aspirations presented in Table 3 points to a complex and most likely context-specific relationship between displacement, international migration and environmental factors. Among the respondents to the Gallup World Poll who expected to need to move because of environmental problems, a minority of only around 32 % expressed a desire to migrate to another country, while less than 27 % said that they had plans for international migration.

([8]) Large states of the United States of America did indeed top the rankings for number of environmental disasters at the level of the first administrative division, with 30 disasters in Texas, 24 in Missouri, 22 in Oklahoma and 18 in Arkansas.

Table 3. Descriptive results – expected need to move and migration aspirations

		International migration intention (n = 87 796)		**International migration plan** (n = 16 668)	
		No	Yes	No	Yes
Migration necessity due to severe environmental problems	No	81.33 %	18.67 %	91.06 %	8.94 %
	Yes	67.67 %	32.33 %	17.71 %	82.29 %

NB: This table cross-tabulates expected need to move due to severe environmental problems and international migration intentions and plans. Rows for each of the category of migration aspirations add up to 100 %.

Source: Author, based on Gallup World Poll.

In the context of the broader discussion about climate change exposure, vulnerability and 'environmental immobility', the descriptive results outlined in this section therefore seem to support the general notion that environmental factors may not exclusively induce movements across national borders. The results depicted above may be indicative, rather, of a strong correlation between environmental disasters and internal displacement or of 'environmental immobility', with individuals being unable or unwilling to move even in light of expected severe environmental problems. Considering the substantially higher shares of individuals expecting to need to move in the poorest parts of the world (see Figure 1), this may particularly affect individuals in less- and least-developed countries.

3. Empirical analysis

The stylised facts derived from simple descriptive analyses as set out in the previous chapter confirm that the relationships between environmental factors and human mobility at various geographical scales are very complex, as suggested by a large number of scientific studies (Beine and Jeusette, 2021; Berlemann and Steinhardt, 2017; Hoffmann et al., 2020; Hunter et al., 2015). There is some degree of consensus in the literature on the direct effect of environmental conditions on human mobility and displacement within countries (Millock, 2015). However, there is more debate about the contexts and conditions under which environmental factors induce migration to foreign countries.

This chapter attempts to study the possible relationship between environmental problems and international migration. It aims to add further nuanced findings relating to the question of whether and how environmental factors and human mobility are interlinked. To this end, the analysis uses rich global survey data provided by the Gallup World Poll. The data make it possible to link individual international migration intentions and plans to a dedicated question on the expectation of needing to move because of severe environmental problems. To the best of the author's knowledge, this report constitutes the first attempt to analyse these links based on individually reported global survey data and relate them to geocoded data on environmental disasters.

Regressing individual international migration aspirations on expected need to move because of severe environmental problems in the future would be likely to lead to biased results, because the desire to migrate internationally and the perception of environmental conditions may be affected by the same unobservable individual characteristics. In particular, specific hidden individual characteristics might shape the perceived risks associated with environmental change and migration aspirations in a similar fashion. Moreover, people who wish or plan to migrate to another country may have biased perceptions of the circumstances characterising their countries of origin, such as local environmental conditions. Consequently, they may overestimate (or underestimate) the pressure to move in the next five years because of severe environmental problems.

In order to account for confounding variables and to address a potential endogeneity bias, the geocoded data on environmental disasters from EM-DAT discussed above are used as an additional variable in the empirical analysis ([9]). The numbers of region-specific disasters provide a purely exogenous source of variation that will prove useful given the empirical approach of this report. This empirical approach is motivated by the seemingly plausible assumption that environmental disasters occurring in the recent past and in the immediate geographical vicinity of survey respondents would have affected respondents' individual expectations about need to move in future because of such problems. In other words, an individual living in a subnational region that has experienced a larger number of environmental disasters in the past few years may be more likely to think that environmental problems will continue to prevail in future and will in turn be more likely to expect to need to move. It is important to note that this assumption is strongly supported by the findings outlined in the previous chapter, which proved that exposure to severe environmental problems is an essential driver of individual expected migration necessity (see Table 2). The empirical approach exploits the relationship between disasters at the subnational level and individual expectations. In simple terms, the effect of environmental disasters on individually reported expected need to move (within a country or to another country) is used to analyse whether such perceived movement pressure also results in more international migration.

Formally, a model with dichotomous dependent variables and an endogenous covariate is fitted. The empirical analysis builds on two regression equations. In the first regression equation – in line with the theoretical justification for the use of the variable of disasters discussed above – the expected need to move is regressed on the geocoded data on environmental disasters. More specifically, the relationship is approximated by a simple linear regression reverting to the ordinary least squares estimator ([10]):

$$(1) \qquad EM_i = \alpha_1 D_{i,p} + X_i A + c_i + v_i,$$

([9]) Alternatively, individual experience of severe environmental problems in the past 12 months could serve as an instrumental variable in the empirical analysis (see Table 2). However, this experience is individually reported in the Gallup World Poll and could suffer from the same individual perception biases that characterise the anticipation of a need to move. For this reason, the empirical analysis resorts to exogenous data on environmental disasters recorded in an official and tested database.

([10]) Using a linear specification in the first equation is merely a simple approximation, since the empirical analysis focuses on a dependent binary variable at this stage. Nevertheless, in light of the average shares of respondents anticipating a need to move because of environmental problems, as reported above, the linear specification was chosen as a potentially valid approximation.

where EM_i describes individual perceived migration necessity because of environmental conditions as defined above, $D_{i,p}$ is the number of environmental disasters at first administrative division level between 2005 and 2010 (including droughts, extreme temperature events, floods and storms), X_i stands for a list of individual demographic and socioeconomic characteristics ([11]), c_i is a country fixed effect and v_i is the error term. The subscript i denotes the individual respondent.

The second equation focuses on the two dichotomous dependent variables capturing international migration aspirations (i.e. migration intentions and migration plans in two separate sets of estimations):

$$M_i^* = \beta_1 EM_i + X_i B + c_i + u_i, \quad (2)$$

where M_i describes individual migration intentions or plans, X_i stands for the same set of demographic and socioeconomic characteristics as in equation (1), c_i is a country fixed effect and u_i is the error term. As before, the subscript i denotes the individual respondent ([12]).

The two equations postulate that having a desire or a plan to migrate internationally is a function of several individual demographic and socioeconomic characteristics and expected need to move because of severe environmental problems. Since unobserved confounders affecting individual-specific international migration aspirations would probably also affect individual expected need to move, the number of region-specific disasters is used as an instrument. In this context, it is important to remember that expected need to move because of environmental issues could refer to a short-distance move within a country as well as to international migration.

Tables 4 and 5 report the empirical results of the estimation approach described by the equations outlined above. Table 4 illustrates the results for the regression coefficients with international migration wish as a dichotomous dependent variable in equation (2), while Table 5 contains the results for the specifications that focus on international migration plan. The estimation equations (1) and (2) include a large number of individual-specific control variables and fixed effects. This means that the results shown in both tables hold under very restrictive specifications. As discussed in the previous chapter, an analysis of the link between climatic conditions and human mobility responses has to incorporate a focus on socioeconomic and geographical dimensions. It is likely that the connections between environmental disasters and migration aspirations are heterogeneous across development groups and across geographical world regions. In line with the descriptive results set out in the previous chapter and the approach of numerous existing studies (Beine and Jeusette, 2021; Cattaneo and Peri, 2016), the different regressions are therefore run on subsamples of the global dataset derived from the Gallup World Poll. Tables 4 and 5 depict the coefficients for regressions focusing on the subsamples of least-developed, less-developed and more-developed countries as defined by the United Nations ([13]). For three of the regressions, the coefficients for the number of disasters at the level of the first administrative division are statistically significant in the first equation (see columns (3) and (5) of Table 4 and column (1) of Table 5). This supports the theoretical justification proposed above that the number of region-specific disasters has a meaningful impact on the endogenised variable of individual environmental movement anticipation. In the absence of more formalised statistical test outcomes in the context of an instrumental variable probit model, the significant results for the estimation of equation (1) and the theoretical arguments outlined above may be interpreted as confirmation of the validity of the empirical approach. For several specifications, the selected instrument seems to have a noticeable effect on the endogenous variable.

([11]) This report uses a set of covariates that is almost identical to that used by Migali and Scipioni (2018). See Migali and Scipioni (2018) for a global analysis of migration aspirations and an in-depth discussion of the role of each of the individual demographic and socioeconomic characteristics.

([12]) For the sake of comparison, Table A3 in the Annex depicts the regression results for the 'plain' probit model in which the binary dependent variable is given by the migration wish and plan and the set of independent variables includes the control variables specified in equations (1) and (2). This approximately replicates the main regression results based on the standard specifications of Migali and Scipioni (2018) when relying on a probit model instead of a logit model for the estimation.

([13]) For a list of countries by development groups, see Table A2 in the Annex.

Table 4. Empirical results – international migration wish

	(1)	(2)	(3)	(4)	(5)	(6)
	Least developed		Less developed		More developed	
	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)
Variables	Migration necessity	Migration wish	Migration necessity	Migration wish	Migration necessity	Migration wish
Number of disasters	0.00404		0.0027**		0.0017**	
Migration necessity		1.030		– 1.966**		– 1.583
Aged 20–24	– 0.0207	0.0122	– 0.0157	– 0.0873**	– 0.0191	– 0.120
Aged 25–29	0.0111	0.0261	– 0.0124	– 0.137**	– 0.0126	– 0.0638
Aged 30–34	0.0514	– 0.127	– 0.0250	– 0.250***	– 0.0212	– 0.189
Aged 35–39	0.0125	– 0.0994	– 0.0198	– 0.202***	– 0.0210	– 0.309**
Aged 40–44	– 0.0468*	– 0.132	– 0.040***	– 0.320***	– 0.0118	– 0.276**
Aged 45–49	– 0.0305	– 0.284	– 0.0237*	– 0.321***	– 0.0134	– 0.320***
Aged 50–54	– 0.0274	– 0.272	– 0.043***	– 0.379***	– 0.0268*	– 0.435***
Aged 55–59	– 0.0369	– 0.482	– 0.051***	– 0.508***	– 0.0244*	– 0.574***
Aged 60–64	– 0.135***	– 0.551	– 0.0387**	– 0.549***	– 0.0240*	– 0.730***
Aged 65+	– 0.0341	– 0.664	– 0.065***	– 0.725***	– 0.0257**	– 0.983***
Having children	– 0.0262	0.150	0.00449	0.0139	0.00670	0.0158
Gender (female)	– 0.00108	– 0.225	– 0.00496	– 0.097***	0.00168	– 0.0917*
Married	– 0.0118	– 0.375	– 0.00553	– 0.136**	– 0.0100	– 0.154***
Other marital status	0.0187	– 0.489*	0.00624	– 0.0142	– 0.00723	– 0.171***
Network abroad	0.0169	0.448	0.045***	0.412***	0.00975*	0.395***
Foreign born	0.0181	– 0.0849	0.0286	0.150*	0.0182	0.205***
Secondary education	0.0285	0.0824	0.0115*	0.0894**	0.00250	0.00612
Tertiary education	– 0.0294	0.0145	0.0100	0.0970	0.00255	0.0337
Unemployed	0.120*	0.0343	0.040***	0.247***	0.00432	0.366**
Out of workforce	– 0.0228	– 0.0950	– 0.00794	– 0.0761*	– 0.00214	0.0112
2nd income quintile	– 0.0206	– 0.0888	0.000299	0.0117	– 0.0134*	– 0.0591
3rd income quintile	– 0.0695	– 0.0192	0.00169	0.000311	– 0.00987	– 0.0796
4th income quintile	– 0.0607	– 0.0722	– 0.00336	0.00587	– 0.00565	0.00476
5th income quintile	– 0.0589*	0.0373	– 0.00831	0.0101	– 0.0130*	– 0.0489
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5 477	5 477	28 688	28 688	14 356	14 356

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

NB: This table reports the results of the estimation approach described above. Variables are derived from the Gallup World Poll and EM-DAT. The key variables describe expectation of needing to move because of severe environmental problems (migration necessity), intention to move internationally (migration wish) and number of geocoded environmental disasters between 2005 and 2010 aggregated at the first administrative level for those divisions that experienced disasters (number of disasters). Robust standard errors clustered at country level are not reported in the table due to space constraints but are provided in Table A4 in the Annex. Eq., equation.

Sources: Author, based on Gallup World Poll and Rosvold and Buhaug (2021).

Table 5. Empirical results – international migration plan

	(1)	(2)	(3)	(4)	(5)	(6)
	Least developed		Less developed		More developed	
	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)
Variables	Migration necessity	Migration plan	Migration necessity	Migration plan	Migration necessity	Migration plan
Number of disasters	0.0205**		0.00931		0.000103	
Migration necessity		2.358***		– 0.964		3.966***
Aged 20–24	– 0.0799*	0.223**	– 0.0332	0.121	0.00259	0.0001
Aged 25–29	– 0.0605	0.123	– 0.0520**	0.0697	0.0367	– 0.135
Aged 30–34	– 0.0473	0.0793	– 0.0571	0.201	0.0367	– 0.135
Aged 35–39	– 0.0120	0.0835	– 0.0800*	0.104	0.0319	– 0.117
Aged 40–44	– 0.0553	0.201	– 0.0488	0.272	0.0500	– 0.188
Aged 45–49	– 0.00702	0.131	– 0.0391	0.138	0.0560	– 0.215
Aged 50–54	– 0.128	0.393	– 0.128***	– 0.125	0.0205	– 0.0739
Aged 55–59	0.0764	0.0706	– 0.0712	– 0.102	– 0.00938	0.0453
Aged 60–64	– 0.243**	0.575*	– 0.0367	– 0.330*	0.0127	– 0.0417
Aged 65+	– 0.233*	0.478	– 0.0673	– 0.209	0.0678*	– 0.260
Having children	0.0230	– 0.0510	0.00753	0.0213	0.0147	– 0.0578
Gender (female)	0.0102	0.0555	0.0301*	– 0.0863	0.00793	– 0.0314
Married	0.0678	– 0.163	0.0323	– 0.0832	– 0.0310*	0.116
Other marital status	0.255**	– 0.693***	0.0101	– 0.0325	– 0.0187	0.0696
Network abroad	0.0245	0.180	0.0508**	0.521***	– 0.00641	0.0329
Foreign born	0.205	– 0.561**	0.0227	0.579**	0.0489	– 0.194
Secondary education	0.0325	0.0632	0.0220	0.118	– 0.0189	0.0720
Tertiary education	– 0.00213	0.269	0.0272	0.170	– 0.0332	0.131
Unemployed	0.0392	– 0.122	0.0403	0.109	0.00914	– 0.0325
Out of workforce	0.00938	– 0.157	– 0.0398**	– 0.111	0.00692	– 0.0288
2nd income quintile	0.0203	– 0.0602	0.0204	0.128	– 0.0127	0.0498
3rd income quintile	– 0.0853	– 0.0395	0.0278	0.130	0.00421	– 0.0150
4th income quintile	– 0.0957	– 0.0203	0.0101	0.200	– 0.0170	0.0690
5th income quintile	– 0.0990*	0.0882	0.0120	0.181*	– 0.0143	0.0581
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1 418	1 418	4 803	4 803	2 293	2 293

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

NB: This table reports the results of the estimation approach described above. Variables are derived from the Gallup World Poll and EM-DAT. The key variables describe expectation of needing to move because of severe environmental problems (migration necessity); for those with an intention to move internationally, having a plan to move internationally (migration plan); and number of geocoded environmental disasters between 2005 and 2010 aggregated at the first administrative level for those divisions that experienced disasters (number of disasters). Robust standard errors clustered at country level are not reported in the table due to space constraints but are provided in Table A5 in the Annex. Eq., equation.

Sources: Author, based on Gallup World Poll and Rosvold and Buhaug (2021).

When analysing the results of the estimation equations that focus on migration intention, statistically significant results for the variables of main interest can be found only for the subsample of less-developed countries. Interestingly, adverse environmental conditions are linked to migration intention through the moderating variable of anticipated need to move and seem to reduce individual desire to migrate internationally in less-developed regions (see column (4) of Table 4). This potentially reflects binding budget constraints for individuals in less-developed countries. In these countries, candidates for international migration may substitute long-distance movements with less costly movements over shorter distances in the event of exposure to environmental shocks. In a more extreme scenario, a financial shock caused by an environmental disaster could impede any type of movement, reflecting the phenomenon of involuntary 'environmental immobility' (Benveniste et al., 2022).

In addition, with respect to migration plans, the results indicate that in least-developed countries a higher level of expectation of needing to move because of environmental problems among those who would like to migrate internationally leads to a greater probability of planning to move (see column (2) of Table 5). In other words, the results derived from the instrumental variable estimation suggest that environmental conditions will not have the same homogeneous effect on individual international migration aspirations in all world regions. In less-developed countries, the expectation of future severe environmental problems tends to reduce individual migration desires, while in least-developed regions such an expectation increases planning for international migration among those who wish to move anyway. By contrast, no statistically significant coefficients can be recorded for the variables of main interest when focusing on the estimations of both equations in more-developed countries. This suggests that no comparable strong connection between environmental conditions and international migration aspirations exists in the most developed parts of the world.

Turning to the requirement of exclusion, one could realistically assume that environmental disasters in the recent past would have a strong direct effect on international migration intentions or plans. As outlined above, it is important to note that environmental problems observed in the recent past strongly shape expectation about future movement pressure due to such problems. Consequently, migration intentions are most likely inherently linked to the expectation and anticipation of future conditions in origin and destination countries. In the context of this report, the occurrence of environmental disasters may be connected to international migration aspirations, as environmental disasters may indeed lead to direct displacement across national borders (see the discussion of the literature in the Introduction). If such a direct link existed for the data studied in this report, it would not be possible to identify a causal relationship between individual anticipation of needing to move because of environmental problems and international migration aspirations. In the empirical analysis above, however, only disasters that were recorded a few years before 2010 – the year in which respondents were asked about their individual international migration desires and plans – are included in the specifications. Hence, there is a time gap between the environmental disaster incidence and the point in time when individual migration aspirations were asked about. Consequently, it might be more accurate to assume that the environmental disasters studied in this report affected migration intentions and plans through anticipation of future events rather than through direct environmental displacement, which could be expected to take place immediately following a disaster. Moreover, the considerable evidence for disaster-induced internal displacements suggests that the direct effects of environmental disasters on movement aspirations are inextricably linked to short-distance movements ([14]). This is further illustrated by some of the descriptive results discussed in the previous chapter, which proved that, at the individual level, an expected need to move because of environmental problems is not automatically related to international migration aspirations (see Table 3). As a result, the number of disasters at the level of the first administrative division is more likely to indirectly affect international migration aspirations through anticipation of future environmental problems. In summary, these arguments may be interpreted as offering strong suggestive evidence that the exclusion restriction is fulfilled and the empirical analysis described in this chapter yields reliable and valid results.

([14]) The Internal Displacement Monitoring Centre recorded a total of 8.7 million internally displaced people at the end of 2022 as a result of disasters and a total of 32.6 million people internally displaced by disasters during 2022 (IDMC, 2023). IDMC (2019) argues that the majority of 'people displaced by disasters remain in the country where the disaster occurred'.

4. Conclusions

This report contributes to disentangling the complex links between environmental factors and human mobility. The analysis uses global survey data from the Gallup World Poll to study the connection between individual international migration intentions and plans and the expected need to move because of severe future environmental problems. In addition, geocoded information on the occurrence of environmental disasters derived from EM-DAT is exploited to uncover a potential connection between individual international migration aspirations and expectations of environmental conditions.

The report confirms crucial findings of the literature on the environment–migration nexus. The links between environmental factors and human mobility patterns are complex and context specific. The analysis highlights the importance of disaggregating results by development group and geographical region. Expected need to move because of severe future environmental problems is significantly impacted by individual exposure to environmental problems in the recent past. This relationship is stronger in terms of size in less- and least-developed countries. In addition, expected need to move decreases with development level. Similarly, the share of individuals who wish to migrate internationally and the share of individuals who plan to migrate internationally are much larger in least-developed regions than in less- and more-developed regions. At the same time, all world regions appear to be affected by environmental disasters, with no particular patterns or trends across development groups.

An instrumental variable estimation approach is employed in the empirical analysis, which shows that in more-developed world regions no statistically significant links between environmental conditions and individual international migration desires or plans exist. By contrast, the analysis points to causal relationships between environmental expectations and international migration aspirations in less- and least-developed world regions. In least-developed regions, a higher level of expectation of a need to move because of future environmental disasters induces those who wish to migrate internationally to increase their planning for the international migration process. Moreover, in less-developed regions, a higher level of individual anticipation of needing to move because of environmental disasters leads to a lower probability of wishing to migrate internationally. This suggests that in less- and least-developed parts of the world environmental disasters are in fact linked to international migration aspirations through the moderating variable of anticipated need to move.

These crucial findings add additional important nuance to the debate on whether and how climate change and environmental conditions might cause international migration. The report provides further insights feeding into the broader discussion on climate change exposure, vulnerability, 'environmental immobility' and different geographical scales of climate-induced migration and displacement. In line with recent attempts to include environmental concerns in migration policy frameworks, the report reaffirms the importance of targeted policies that address the phenomenon of displacement and environmental mobility specifically in countries with lower levels of development.

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Annex

Table A1. Variables based on questions from the Gallup World Poll

Environmental perception	
Severe environmental problems	WP10256: In the past 12 months, have there been any severe environmental problems in your city or area, or not? For example, pollution, floods, droughts, or long periods of extreme heat or cold?
Migration necessity	WP10257: In the next five years, do you think you will need to move because of severe environmental problems?
Migration aspirations	
Migration wish	WP1325: Ideally, if you had the opportunity, would you like to move permanently to another country, or would you prefer to continue living in this country?
Migration plan	WP10252: Are you planning to move permanently to another country in the next 12 months, or not? (Asked only of those who would like to move to another country.)
Demographic characteristics	
Gender	WP1219: *Male, female*
Age	WP1220: *Years*
Marital status	WP1223: *Single, married, other (including separated, divorced, widowed, domestic partner)*
Foreign born	WP4657: Were you born in this country?
Number of children	WP123: How many children under 15 years of age are now living in your household?
Network abroad	WP3333: Do you have relatives or friends who are living in another country whom you can count on to help you when you need them, or not?
Socioeconomic characteristics	
Education level	WP3117: What is your highest completed level of education? Elementary: *completed elementary education or less (up to 8 years of basic education)* Secondary: *completed some secondary education / up to 3 years tertiary education (9–15 years of education)* Tertiary: *completed 4 years of education beyond 'high school' and/or received a 4-year college degree*
Labour market status	EMP_2010: *Employed, unemployed, out of workforce*
Annual income	INCOME_4: *Per capita annual income in international dollars* INCOME_5: *Per capita income quintiles*

Source: Gallup World Poll.

NB: This table reports the question codes, question texts and response categories (in italics) for the relevant questions for the data derived from the Gallup World Poll used in the analysis.

Table A2. Countries by development group and geographical area

Development groups	
Least developed	Afghanistan, Bangladesh, Burkina Faso, Cambodia, Central African Republic, Chad, Mali, Nepal, Niger, Senegal, Tanzania, Uganda
Less developed	Argentina, Armenia, Bolivia, Botswana, Brazil, Cameroon, Chile, China, Colombia, Costa Rica, Cyprus, Dominican Republic, El Salvador, Georgia, Ghana, Guatemala, Honduras, Hong Kong, India, Indonesia, Israel, Kazakhstan, Kenya, Kyrgyzstan, Malaysia, Mexico, Nicaragua, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Singapore, South Africa, South Korea, Sri Lanka, Taiwan, Tajikistan, Thailand, Türkiye, Uruguay, Uzbekistan, Venezuela, Zimbabwe
More developed	Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Lithuania, Luxembourg, Malta, Moldova, Netherlands, New Zealand, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Ukraine, United Kingdom, United States of America
Geographical areas	
Asia	Afghanistan, Armenia, Bangladesh, Cambodia, China, Georgia, Hong Kong, India, Indonesia, Japan, Kazakhstan, Kyrgyzstan, Malaysia, Nepal, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Tajikistan, Thailand, Uzbekistan
Europe	Austria, Belarus, Belgium, Bulgaria, Cyprus, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Malta, Moldova, Netherlands, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Ukraine, United Kingdom
Latin America and the Caribbean	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela
Middle East and North Africa	Israel, Türkiye
Northern America	Canada, United States of America
Oceania	Australia, New Zealand
Sub-Saharan Africa	Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, Ghana, Kenya, Mali, Niger, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zimbabwe

Source: United Nations.

NB: This table shows the classification of countries by development group, as defined by the United Nations, and by geographical area.

Table A3. Empirical results – international migration aspirations

	(1)	(2)	(3)	(4)	(5)	(6)
	Least developed		Less developed		More developed	
Variables	Migration wish	Migration plan	Migration wish	Migration plan	Migration wish	Migration plan
Aged 20–24	– 0.0107	0.0992	– 0.0841	0.172	– 0.0962	0.816***
Aged 25–29	0.0367	0.0127	– 0.169***	0.135	– 0.0466	0.861**
Aged 30–34	– 0.0806	– 0.0336	– 0.298***	0.292**	– 0.168	0.827**
Aged 35–39	– 0.0894	0.127	– 0.243***	0.208	– 0.297**	0.715**
Aged 40–44	– 0.188	0.184	– 0.357***	0.365**	– 0.274**	0.821**
Aged 45–49	– 0.325*	0.298	– 0.407***	0.209	– 0.320***	0.535
Aged 50–54	– 0.318	0.286	– 0.437***	0.00163	– 0.424***	0.566
Aged 55–59	– 0.537**	0.619	– 0.604***	– 0.0288	– 0.579***	0.620
Aged 60–64	– 0.728***	0.0373	– 0.702***	– 0.357	– 0.747***	0.660*
Aged 65+	– 0.735***	– 0.113	– 0.888***	– 0.160	– 1.013***	0.670*
Having children	0.130	– 0.0393	0.00631	0.0148	0.00669	0.0342
Gender (female)	– 0.236***	0.179*	– 0.127***	– 0.132**	– 0.101*	– 0.00843
Married	– 0.401***	– 0.00842	– 0.183***	– 0.133	– 0.150***	– 0.566***
Other marital status	– 0.476***	– 0.163	– 0.0383	– 0.0491	– 0.174***	– 0.375**
Network abroad	0.484***	0.509***	0.477***	0.541***	0.410***	0.615***
Foreign born	– 0.0632	– 0.0856	0.139	0.636***	0.194***	0.00830
Secondary education	0.117	0.288	0.0993**	0.108	0.00126	– 0.227
Tertiary education	– 0.0148	0.523	0.115	0.164	0.0303	– 0.0743
Unemployed	0.161**	– 0.0520	0.250***	0.0717	0.387***	0.291*
Out of workforce	– 0.122	– 0.282*	– 0.0923***	– 0.0850	0.0140	– 0.112
2nd income quintile	– 0.111	– 0.0317	0.0147	0.118	– 0.0414	– 0.0207
3rd income quintile	– 0.0934	– 0.524	– 0.00649	0.116	– 0.0691	0.138
4th income quintile	– 0.140	– 0.529**	0.0160	0.214	0.0116	0.118
5th income quintile	– 0.0269	– 0.315*	0.0380	0.186*	– 0.0316	0.122
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5 477	1 418	28 688	4 803	14 356	2 293

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

NB: This table reports the marginal effects of a probit regression analysis that includes only the standard covariates as independent variables. Variables are derived from the Gallup World Poll. The key dependent variables describe intention to move internationally (migration wish) and, for those with such an intention, having a plan to move internationally (migration plan). Robust standard errors clustered at country level are not reported due to space constraints.

Source: Author, based on Gallup World Poll.

Table A4. Empirical results – international migration wish – standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
	Least developed		Less developed		More developed	
	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)
Variables	Migration necessity	Migration wish	Migration necessity	Migration wish	Migration necessity	Migration wish
Number of disasters	(0.00694)		(0.00125)		(0.00082)	
Migration necessity		(5.481)		(0.814)		(3.581)
Aged 20–24	(0.0198)	(0.129)	(0.0134)	(0.038)	(0.0158)	(0.099)
Aged 25–29	(0.0156)	(0.126)	(0.0140)	(0.064)	(0.0176)	(0.097)
Aged 30–34	(0.0316)	(0.303)	(0.0150)	(0.083)	(0.0183)	(0.121)
Aged 35–39	(0.0379)	(0.078)	(0.0137)	(0.073)	(0.0173)	(0.125)
Aged 40–44	(0.0239)	(0.411)	(0.0134)	(0.096)	(0.0144)	(0.108)
Aged 45–49	(0.0289)	(0.404)	(0.0119)	(0.116)	(0.0161)	(0.082)
Aged 50–54	(0.0341)	(0.360)	(0.0141)	(0.095)	(0.0136)	(0.122)
Aged 55–59	(0.0326)	(0.530)	(0.0141)	(0.149)	(0.0136)	(0.114)
Aged 60–64	(0.0316)	(1.246)	(0.0170)	(0.184)	(0.0135)	(0.184)
Aged 65+	(0.0327)	(0.778)	(0.0138)	(0.228)	(0.0118)	(0.212)
Having children	(0.0326)	(0.082)	(0.0070)	(0.025)	(0.0062)	(0.041)
Gender (female)	(0.0198)	(0.193)	(0.0092)	(0.032)	(0.0044)	(0.047)
Married	(0.0206)	(0.311)	(0.0098)	(0.058)	(0.0059)	(0.039)
Other marital status	(0.0365)	(0.231)	(0.0100)	(0.039)	(0.0055)	(0.057)
Network abroad	(0.0227)	(0.381)	(0.0099)	(0.092)	(0.0050)	(0.070)
Foreign born	(0.0603)	(0.133)	(0.0199)	(0.076)	(0.0126)	(0.063)
Secondary education	(0.0243)	(0.278)	(0.0066)	(0.033)	(0.0088)	(0.051)
Tertiary education	(0.0699)	(0.168)	(0.0092)	(0.065)	(0.0118)	(0.072)
Unemployed	(0.0545)	(0.697)	(0.0112)	(0.070)	(0.0155)	(0.135)
Out of workforce	(0.0195)	(0.184)	(0.0067)	(0.038)	(0.0071)	(0.059)
2nd income quintile	(0.0184)	(0.239)	(0.0095)	(0.037)	(0.0067)	(0.069)
3rd income quintile	(0.0375)	(0.531)	(0.0128)	(0.037)	(0.0072)	(0.066)
4th income quintile	(0.0345)	(0.476)	(0.0113)	(0.035)	(0.0064)	(0.076)
5th income quintile	(0.0286)	(0.348)	(0.0181)	(0.057)	(0.0075)	(0.078)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5 477	5 477	28 688	28 688	14 356	14 356

NB: This table reports in parentheses the respective robust standard errors clustered at country level for the empirical results depicted in Table 4. Eq., equation.

Sources: Author, based on Gallup World Poll and Rosvold and Buhaug (2021).

Table A5. Empirical results – international migration plan – standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
	Least developed		Less developed		More developed	
	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)	Eq. (1)	Eq. (2)
Variables	Migration necessity	Migration plan	Migration necessity	Migration plan	Migration necessity	Migration plan
Number of disasters	(0.00826)		(0.00556)		(0.00312)	
Migration necessity		(0.223)		(1.101)		(0.248)
Aged 20–24	(0.0349)	(0.067)	(0.0241)	(0.127)	(0.0337)	(0.297)
Aged 25–29	(0.0416)	(0.139)	(0.0209)	(0.131)	(0.0569)	(0.318)
Aged 30–34	(0.0733)	(0.155)	(0.0413)	(0.182)	(0.0532)	(0.246)
Aged 35–39	(0.0759)	(0.170)	(0.0455)	(0.205)	(0.0474)	(0.262)
Aged 40–44	(0.1020)	(0.254)	(0.0377)	(0.201)	(0.0431)	(0.289)
Aged 45–49	(0.0806)	(0.219)	(0.0360)	(0.137)	(0.0430)	(0.188)
Aged 50–54	(0.0896)	(0.299)	(0.0433)	(0.186)	(0.0447)	(0.191)
Aged 55–59	(0.1330)	(0.407)	(0.0512)	(0.211)	(0.0408)	(0.190)
Aged 60–64	(0.0764)	(0.273)	(0.0630)	(0.192)	(0.0445)	(0.222)
Aged 65+	(0.1100)	(0.313)	(0.0484)	(0.209)	(0.0349)	(0.277)
Having children	(0.0567)	(0.142)	(0.0210)	(0.088)	(0.0217)	(0.083)
Gender (female)	(0.0255)	(0.092)	(0.0172)	(0.088)	(0.0133)	(0.052)
Married	(0.0447)	(0.117)	(0.0277)	(0.105)	(0.0153)	(0.202)
Other marital status	(0.0813)	(0.124)	(0.0258)	(0.102)	(0.0214)	(0.128)
Network abroad	(0.0200)	(0.117)	(0.0190)	(0.101)	(0.0164)	(0.246)
Foreign born	(0.1160)	(0.230)	(0.0398)	(0.214)	(0.0327)	(0.130)
Secondary education	(0.0401)	(0.116)	(0.0153)	(0.099)	(0.0364)	(0.137)
Tertiary education	(0.1350)	(0.569)	(0.0193)	(0.124)	(0.0454)	(0.161)
Unemployed	(0.0611)	(0.219)	(0.0299)	(0.100)	(0.0312)	(0.140)
Out of workforce	(0.0324)	(0.140)	(0.0157)	(0.068)	(0.0222)	(0.106)
2nd income quintile	(0.0313)	(0.118)	(0.0203)	(0.089)	(0.0258)	(0.106)
3rd income quintile	(0.0753)	(0.195)	(0.0266)	(0.086)	(0.0274)	(0.100)
4th income quintile	(0.0596)	(0.128)	(0.0217)	(0.132)	(0.0215)	(0.104)
5th income quintile	(0.0532)	(0.095)	(0.0243)	(0.093)	(0.0223)	(0.088)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1 418	1 418	4 803	4 803	2 293	2 293

NB: This table reports in parentheses the respective robust standard errors clustered at country level for the empirical results depicted in Table 5. Eq., equation.

Sources: Author, based on Gallup World Poll and Rosvold and Buhaug (2021).

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