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# The Societal Determinants of Climate Risk:

## A Refugee Corridor Analysis of Hazard Exposure, Vulnerability and Coping Capacity

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## Abstract

Research provides ample evidence on how climate hazards interact with migration patterns, but less attention has been given to climate risks faced by displaced populations. This study addresses this gap by analyzing refugees' climate risks in their origin and destination countries, focusing on global trends and providing a case study of Africa—a region hosting large numbers of refugees and facing severe climate risks. Drawing on the Climate-driven INFORM Risk Index and UNHCR Population Statistics from 2013 to 2022, we study three sub-dimensions of climate risk: hazard exposure, vulnerability, and coping capacity. We then apply a migration corridor analysis to study how climate risks (low, medium, or high) evolve when refugees move from origin to host countries. Our analysis reveals a global rise in the number of refugees originating from countries with high climate risk and finds that 75% of global refugees remain in high or medium climate risk host countries. In Africa, we find that shorter-distance displacement—particularly to neighboring or regional host countries—reduces exposure to hazards but not overall climate risk, as many refugees remain in countries with high levels of social and institutional vulnerability. Those who travel longer distances, particularly intercontinentally, typically encounter lower climate risks. Our findings underscore the societal determinants of climate risk—social and institutional factors in both sending and receiving nations overshadow hazard exposure in determining climate risk—and highlight the possibility of 'societal traps' where entrenched socio-political vulnerability and limited institutional capacity at destination reproduce persistent high-risk environments.

**Keywords:** climate risk, forced migration, refugee, vulnerability, societal determinants, migration corridors, climate hazards

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# Contents

# 1 Introduction

Research interest in the relationship between anthropogenic climate change and human mobility has surged over the last decades. Much of this research initially focused on climate change as an important driver of new population movements. Early, alarmist predictions about mass international climate migration have been largely debunked (Hoffmann et al., 2020), and current research consensus suggests the majority of those most directly affected by climate change will move within their own national borders, if they move at all. The most vulnerable individuals—those with limited financial, social, or informational resources—are often unable to undertake longer-distance moves and may become, in many cases, "trapped" (Zickgraf, 2019; Kaczan & Orgill-Meyer, 2020). Others may choose to remain in place for cultural or livelihood reasons, highlighting the agency of communities in adapting locally (Adams, 2016; Mallick & Schanze, 2020; Iyer & Schewel, 2023). Still others will continue to move for non-climate-related reasons (Schewel 2025). Migration and immobility outcomes vary significantly across contexts according to environmental severity, available adaptation strategies, and broader socioeconomic and political conditions (Kaczan & Orgill-Meyer, 2020; Mukherjee & Fransen, 2024; Schewel et al., 2024; Gray & Wise, 2016).

Within research focused on forced migration, which has historically foregrounded conflict, persecution, or political instability as primary drivers (Fransen & De Haas, 2022; Hatton, 2020; Moore & Shellman, 2004; Schutte et al., 2021), there is increasing concern that climate-related hazards—both rapid-onset events (e.g., floods and storms) and slow-onset processes (e.g., drought, sea-level rise)—are contributing to greater levels of displacement (Internal Displacement Monitoring Centre, 2024; UNHCR, 2024). Research suggests climate change can in some instances operate as an indirect driver of displacement by exacerbating socioeconomic fragility and increasing conflict likelihood (Abel et al., 2019; Buhaug & Von Uexkull, 2021). However, mirroring the more general climate-migration literature, the focus remains primarily on climate-related *drivers* of displacement, rather than on the climate risks that displaced populations face in their host countries.

Addressing this gap, a growing but still limited body of work shows that many refugee settlements are located in regions exposed to climate hazards. Fransen et al. (2024a), for example, report that most of the world's largest refugee settlements, the majority of which are located in Africa, are in unfavorable areas within host countries, with greater exposure to both slow- and rapid- onset weather events. Owen et al. (2023) focusing on East Africa, applied a novel climate and environmental exposure index to seventeen refugee camps in five countries, and found that seven refugee camps faced higher exposure than other (simulated) border regions. Furthermore, most refugees globally reside in low- to medium-income countries (Fransen & De Haas, 2022), which are also often on the frontline of global climate emergencies (Fransen et al., 2024b).

This study spotlights the underexamined reality of climate risk during displacement, focusing on refugees as defined by the 1951 Convention (UNHCR, 1951). Our focus on refugees allows for a systematic analysis of climate risk in both origin and destination countries, enabled by consistent and globally comparable data. We first ask how climate risks differ for refugee populations between origin and destination countries on a global scale. We then continue with a specific focus on Africa, which provides a critical case for two reasons. First, as we will show, Africa consistently hosts among the highest numbers of displaced peoples worldwide. Second, it also has the greatest concentration of countries classified as high or very high in overall climate risk. By comparing the climate risks for refugee populations who move across borders to neighboring countries, those who travel further within the continent, and those who leave the continent, we investigate whether longer-distance movements reduces this risk. Grounded in the aspiration/ability model (Carling & Schewel, 2018), we hypothesize that longer-distance movements—which typically require more resources and broader social networks—are more likely to lead to destinations with lower climate risk, whereas those unable or unwilling to travel far are more likely to remain in high-risk countries.

Crucially, our approach builds on a long-standing and growing body of research that finds socioeconomic vulnerability—such as poverty, inequality, or dependency—and limited institutional coping capacity can substantially compound the dangers related to environmental and climate hazards (see Reisinger et al., 2020, Thomas et all, 2019). We therefore adopt a multidimensional view of risk, drawing on the Climate-driven INFORM Risk Index, which integrates measures of climate hazards, vulnerability, and coping capacity. Combining these data with the United Nations High Commissioner for Refugees (UNHCR) Population Statistics Database allows us to map refugee movements globally and within Africa. We apply corridor analyses to link origin and destination countries, capturing both the volume and direction of displacement between 2013 and 2022.

Our analysis shows that refugees—among the most vulnerable groups globally—face heightened and compounding climate risks. On average, levels of exposure to environmental hazards may reduce when refugees move, but refugees generally face high levels of structural and societal vulnerabilities to climate change in destinations countries. The climate-related risks we assess here, combined with other vulnerabilities that refugees face in their host countries due to for example legal, economic and social exclusion (Sabates-Wheeler, 2019), are likely to exacerbate the precarious conditions that refugees find themselves in, deepening their marginalization (Fransen et al., 2024). Overall, our findings highlight the risk of 'societal traps': socio-political vulnerability and weak institutional capacity can keep large numbers of refugees in persistent high-risk settings.

By adopting a climate risk perspective—which regards risk as a function of hazards, exposure and vulnerability (Reisinger et al., 2020)—we provide a multidimensional understanding of the interplay between refugee displacement and climate hazards. Our aggregated analyses aim to complement a growing body of regional, case study-based research documenting how displaced populations face compounding risks in, for example, Bangladesh (Ahmed, B., 2021; Ahmed, S. et al., 2021; Alam et al., 2020; Chowdhury et al., 2020), Lebanon (Pollock et al., 2019), Iraq (Marzouk et al., 2022), Zimbabwe (Sibanda et al., 2022), and Colombia (Few et al., 2021).

# 2 Data and Methodology

This study draws on two main data sources—national-level refugee statistics and a composite measure of climate risk—to explore the relationship between displacement patterns and climate risk between 2013 and 2022. Due to the shorter time frame of the climate risk data, the final dataset includes information for a total of 150 countries between 2013 and 2022[1]. We combine descriptive analyses of global and regional trends with migration corridor analyses, which match refugee origin and destination countries to compare climate risk categories.

[1] The following countries were excluded from the analysis due to missing data: Cape Verde, Comoros, Equatorial Guinea, Mauritius, Sao Tome and Principe, Seychelles and Sierra Leone (Africa), Antigua and Barbuda, Barbados, Cuba, Dominica, Grenada, Haiti, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Surinam (Americas), Bhutan, Brunei, Cambodia, Laos, Maldives, North Korea, Palestine, Singapore, Timor-Leste, and Vietnam (Asia), Andorra, Finland, Kosovo, Liechtenstein, Luxembourg, Malta, Monaco, and San Marino (Europe), and Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu (Oceania).

## 2.1 Displacement data

We use data on Refugees under UNHCR's mandate from the United Nations High Commissioner for Refugees (UNHCR) Population Statistics Database.[2] Specifically, we rely on end-year stock population totals, which indicate the number of refugees present in a given country at a particular time. These stock data are best used for analyzing longer-term trends in forced displacement. Refugees may have moved for a variety of reasons, and the data do not specify the exact cause of displacement. While stock data do not capture the precise timing or motivations behind individual movements, they provide a reliable basis for identifying major origin–destination corridors and assessing the scale and direction of displacement, linked with climate risk. Unfortunately, due to data constraints, we do not include internally displaced persons (IDPs), who outnumber refugees and are also exposed to climate risks, particularly when displacement occurs within high-risk regions (see, e.g., Chowdhury et al., 2020; Few et al., 2021; Jayawardana et al., 2019; Marzouk et al., 2022).

Although historical refugee statistics have been subject to questions regarding completeness, comparability, and reliability (Bennett, 1998; Crisp, 1999; Fransen & De Haas, 2022), coverage has improved since the early 2000s. Earlier data often did not include data from low- and middle-income countries, and data comparability was limited due to differences in data collection methods and inconsistencies in population definitions (Fransen & De Haas 2022). Since 2010, however, the dataset has more robust global coverage. Nevertheless, these data do not capture all displaced groups, particularly those unrecognized as refugees by official processes such as certain asylum seekers and "survival migrants" (Betts, 2010). Consequently, our analyses likely underestimate the total number of forcibly displaced persons in high-risk areas, providing a conservative picture of climate risks faced by displaced populations.

Figures 1 and 2 illustrate general refugee trends (2013–2022) for the 150 countries included in our dataset. While these do not represent total global figures, they reveal broader cross-border displacement patterns. Asia and Africa remain the primary regions of refugee origin and asylum, though a marked increase in European displacement occurred after 2021 due to the conflict in Ukraine, which led to around 6.5 million refugees fleeing to various European and non-European destinations. Comparatively, North and South America host and produce fewer formally recognized refugees compared to other regions. This statistical difference is partly due to how displacement is categorized in the region, as many individuals—such as those fleeing violence in Central America or the political and economic crisis in Venezuela—are not formally registered as refugees under the 1951 Convention (HRW, 2024; UNHCR, 2024b; IOM, 2023). As a result, the full extent of displacement in these regions may be underrepresented in official statistics, and they appear less prominently in our global refugee figures.

[2] Available at https://www.unhcr.org/refugee-statistics/download/

**Figure 1. Refugees by world region: 2013-2022**

*Figure 1a. Refugees originating from world regions*

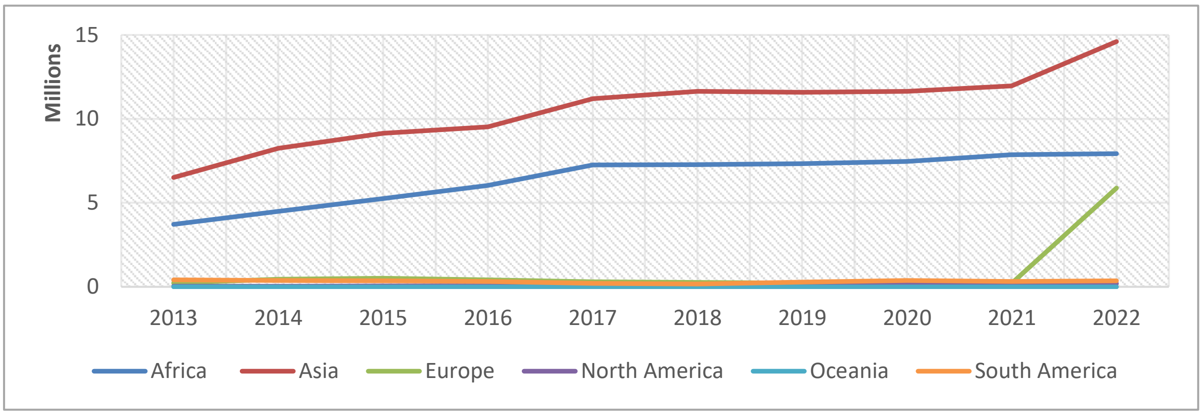
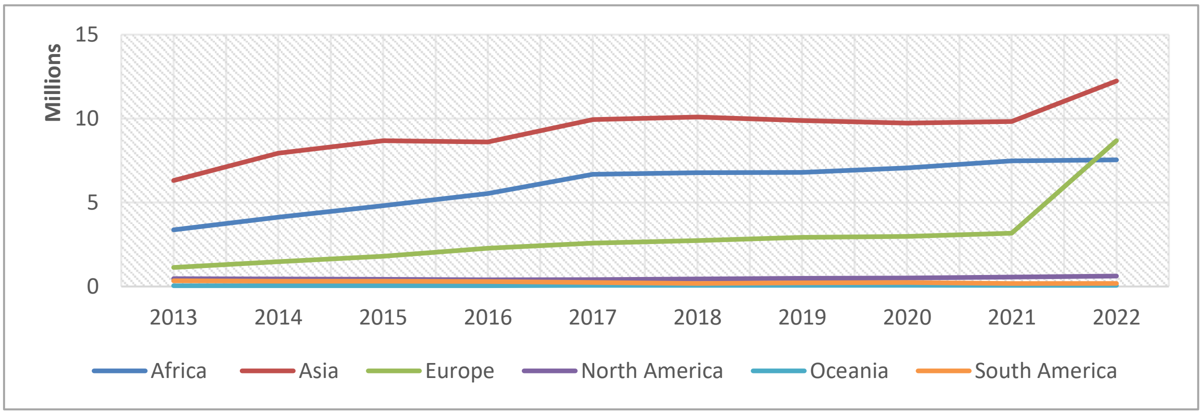



*Figure 1b: Refugees hosted by world regions*




*Notes.* Statistics are based on the 150 countries in our dataset. Data are derived from the UNHCR population statistics database. World Regions are based on the UN geographic scheme classification of world regions (https://unstats.un.org/unsd/methodology/m49/).

## 2.2 Climate risk data

Although there is no single, universally accepted definition or measurement of 'climate risk,' the term generally refers to the potential for adverse impacts on human and natural systems resulting from climate-related hazards, where these risks are shaped not only by the physical characteristics of climate change but also by societal factors (IPCC 2014, Reisinger et al., 2020). One dominant approach to evaluating climate risk is the 'hazard-exposure-vulnerability' framework, developed and endorsed by the Intergovernmental Panel on Climate Change in its 2014 Fifth Assessment Report. That report represented a shift away from vulnerability-focused approach to a risk-focused approach to assessing climate change impacts. In this framework, climate risk refers to a combination of physical *hazards*, or the climate-related events (e.g., extreme temperatures, floods or droughts, or , sea-level rise) that could cause harm; *exposure* of people, infrastructure, ecosystems or assets to these hazards; and *vulnerability*, or the susceptibility of these systems to damage and their capacity to adapt or recover (IPCC 2014, see also Turner et al 2003, Birkman 2007).

This study analyzes climate risks in origin and destination countries using the Climate-driven INFORM Risk Index[3], a composite indicator designed to assess and compare risks arising from climate-related hazards by integrating data on hazards, exposure, and vulnerability. The Climate-driven INFORM Risk Index, hereafter referred to as the CRI, is based on the INFORM Risk Index, which was designed as a global, open-source risk assessment for humanitarian crises and disasters, with the aim to inform decisions about prevention, preparedness and response[4]. The International Monetary Fund (IMF) adjusted the index to capture climate-driven risks only. Whereas the traditional INFORM Risk Index contains information on exposure to both natural and human hazards, the climate-driven index focuses on the probability of physical exposure associated with specific climate-driven hazards, including earthquakes, floods, tsunami's, tropical cycles, droughts, and epidemics.

The vulnerability and lack of coping capacity dimensions of the INFORM Risk Index remained unaltered for the CRI. Vulnerability represents the economic, political and social characteristics of the country that can be destabilized in case of a hazard event. It includes both socio-economic indicators and information on vulnerable groups. The socio-economic indicators include information related to development and deprivation, inequality, and aid dependency, whereas the vulnerable groups indicators focus on uprooted people (refugees, IDPs and returned refugees)[5] and other vulnerable groups such as children under five with underweight, average prevalences of HIV/AIDS, malaria and tuberculosis, and indicators on food insecurity. The lack of coping capacity dimension relates to the ability of a country to cope with disasters in terms of formal, organized activities and the effort of the country's government as well as the existing infrastructure which contribute to the reduction of disaster risk. It is split into institutional (disaster risk reduction and governance) and infrastructure indicators (communication, physical infrastructures and access to health system). While vulnerability and coping capacity are clearly related, this tool allows us to assess different types of societal-level factors that, as we show, are just as if not more consequential than exposure to hazards in determining levels of climate risk.

The CRI ranges from 0.5 to 8.3, 8.4 or 8.5, depending on the year (see Table A1 in the Appendix). Countries were classified into five categories based on their score on the climate-driven risk index: very low (CRI lower than 2.2), low (CRI between 2.2 and 3.1), medium (CRI between 3.2 and 4.8), high (CRI between 4.9 and 6.7), and very high (CRI higher than 6.7). To create sufficient and comparable samples sizes in each risk classification (see Table A2 in the Appendix), the countries in the 'very low' and 'low' categories were merged, as well as those in the 'high' and 'very high'.

The geographic allocation of these categories has been relatively consistent over time. Most high-risk countries are clustered in Africa and South Asia, while many low-risk countries are located in Europe, North America, and Oceania. This pattern already points to entrenched global inequalities that shape differential climate vulnerability and risk across regions. Medium-risk countries appear across multiple continents (Figure 2). An alphabetical overview of the countries and their 2013 and 2022 CRI scores and CRI classifications are included in Table A3 in the Appendix.

This index was chosen for its availability across multiple years (2013 to 2022) and its coverage of different dimensions of risk. However, this data has several limitations. Because the data are aggregated at the national level, they do not capture subnational variations in hazard exposure, vulnerability, or coping capacity. Some refugees may find relatively safer conditions within otherwise high-risk countries, while others may encounter elevated risks in more localized settings. The data also do not account for the distinct experiences of refugees in urban versus rural environments, nor for those

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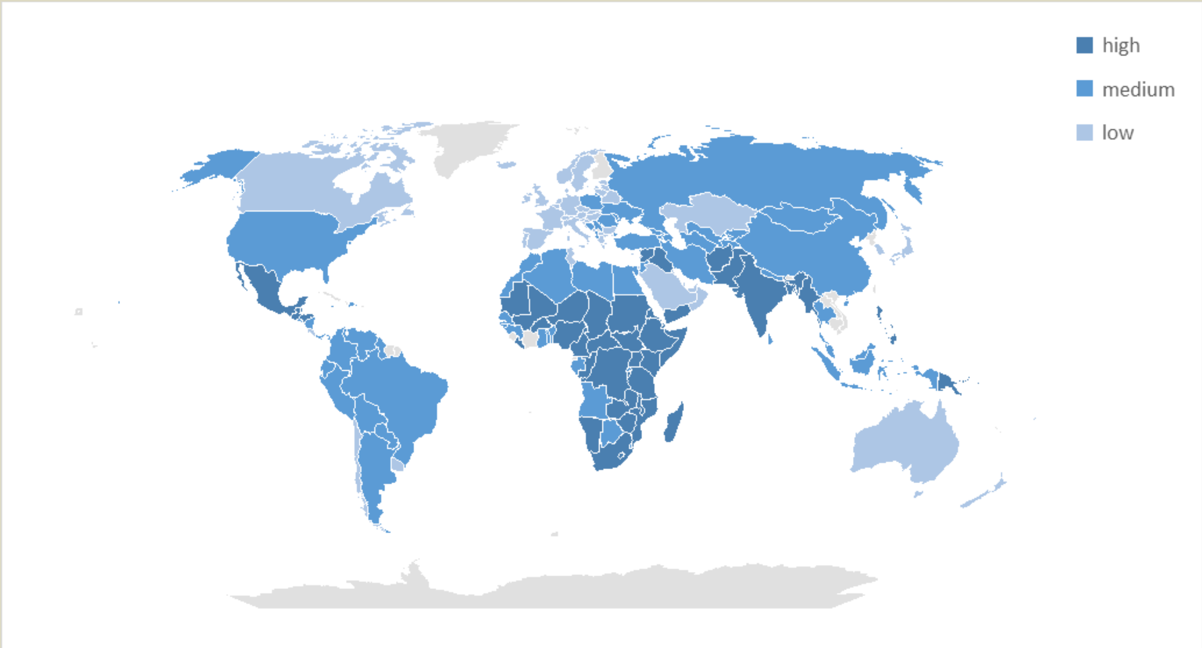
[3] Derived from https://climatedata.imf.org/pages/adaptation#ad2

[4] For more information, see https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Methodology

[5] Refugees are included in the INFORM Risk Index, which might confound the results. However, the refugee indicator is one of 12 indicators in the vulnerability variable. It is therefore unlikely that this indicator skews our findings.

residing in informal camps or settlements. Other common limitations of composite indices also apply here. For example, concepts like vulnerability and coping capacity are complex, multifaceted concepts that are challenging to measure with a limited set of indicators. Here, national-level 'lack of coping capacity' reflects challenges in formal governance and infrastructure, but these formal capacities coexist with diverse, often unmeasured, local and indigenous coping mechanisms and adaptation strategies. Finally, indicators might be chosen based on data availability ("availability bias") rather than their conceptual appropriateness for the specific phenomenon being measured. For these reasons, it is important to stress that our findings reflect only what is measured; our analyses illuminate what the data tells us, while recognizing the limitations of that data and composite indices to capture complex realities.

**Figure 2: Countries by climate risk classification (2022)**




*Notes.* Statistics are based on the 150 countries in our dataset. Data are derived from the INFORM Risk Index.

## 2.3 Analysis

Our analyses proceed in several steps. We first map the distribution of refugees and climate risk globally over the 2013–2022 period, looking at both origin and destination countries. This descriptive approach highlights evolving patterns of cross-border refugee displacement and overlays them with CRI categories to determine where displaced populations cluster. To capture how risk compares across refugee corridors, we then match origin and destination countries each year (2013–2022) and assign the climate risk classification for each "corridor." This yields between 1,549 (in 2013) and 1,895 (in 2022) individual origin-destination pairs. By tracking displacement patterns of refugees in these corridors, we can determine potential shifts in climate risk—from low to high, high to low, or otherwise—and observe broader trends in the global spread of forced displacement (cf. Fransen & De Haas, 2022).

Because our data reveals that the African continent contains the highest proportion of high-risk countries and hosts the largest share of the world's refugee populations relative to population size (Figure 1), the third analytical step zooms in on the continent. We classify African refugee displacement corridors by distance travelled—short-distance (to neighbouring countries), medium-distance (within Africa, excluding immediate neighbours), and long-distance (intercontinental). This allows us to assess whether distance from origin is associated with changes in climate risk classification, and whether this association changes over time.[6] While these distance categories simplify the complexities of refugee movements—including varying routes, transit durations, return migration, etc.—they do offer a clear and consistent framework for comparative analysis, which is the focus of this paper. By grouping corridors in this way, we can systematically analyse whether greater geographic distance is associated with greater differences in climate risk, across regions and over time.

# 3 Global overview: Climate risks in origin and host countries

## 3.1 *Overall climate risks for origin and host countries*

Over the last decade, an increasing number of refugees have originated from countries classified as high climate risk. In 2013, approximately 950,000 refugees came from these high-risk contexts, a figure that more than doubled to 2.2 million by 2022 (Figure 3a). Meanwhile, the number of refugees from medium and low risk countries remained relatively stable until 2021. At that point, Russia's invasion of Ukraine—classified as a medium-risk country—prompted a significant outflow of refugees, temporarily shifting the overall distribution of origin countries. Despite this recent shift, the vast majority of refugees (roughly 90%) originated from medium- or high-risk countries throughout most of the 2013–2022 period (Figure 3b). Only a small fraction (0.2% to 0.7%) came from countries with very low or low climate risk. By 2022, that 90% figure dropped to 74%—again reflecting the large-scale displacement from Ukraine.

Most refugees globally were also hosted in high-risk countries from 2013 to 2022 (Figure 3c), followed by medium-risk destinations. This pattern changes notably after 2021 due to the influx of Ukrainian refugees into Europe. Countries such as Germany, Czech Republic, the United Kingdom, and Spain—all classified as having low climate risk—absorb a significant share of Ukrainian displacement, while Russia (considered medium risk) also hosts a substantial number of refugees from Ukraine (around 1.2 million by 2024).

Overall, the influx from Ukraine led to an increase in the proportion of the global refugee population residing in low-risk countries: it rose from 12% in 2013 to 25% in 2022 (Figure 3d). Nevertheless, 75% of refugees remain in medium- or high-risk nations, with around 40% in medium-risk countries and 35% in high-risk countries. It is noteworthy that the conflict in Syria and the subsequent displacement spike around 2015 do not produce a similarly visible "blip" in these data, potentially due to the predominance of hosting states in neighboring regions like Jordan, Lebanon, Turkey, and Iraq also classified as medium or high risk (see Table A3 in the Appendix).

[6] We acknowledge that distance alone is an imperfect proxy for the resource-related obstacles to movement. We expect that it requires less resources to move to a neighboring country than it does to move to a country further afield, and those regional moves require less resources than an intercontinental move. However, some migration corridors may have high migration obstacles yet be relatively short distance. Migration from Morocco to Spain, for example, is a relatively short distance, yet there are often greater financial, legal, and other constraints on inter-continental migration to Europe as compared to other regional movements.

**Figure 3. Refugees originating from and hosted by low, medium and high climate risk countries**

*Figure 3a. Origin countries: Absolute numbers*

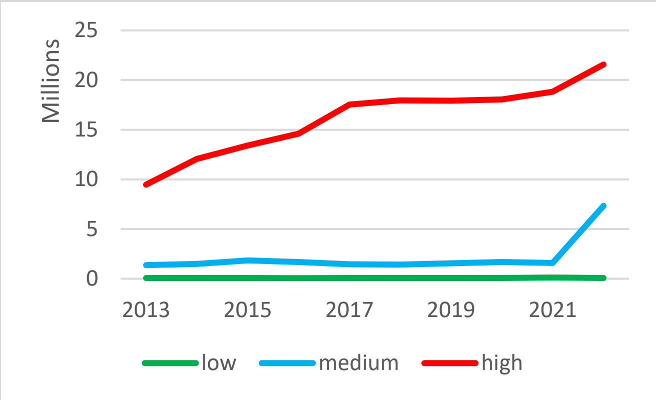



*Figure 3b. Origin countries: Percentages*

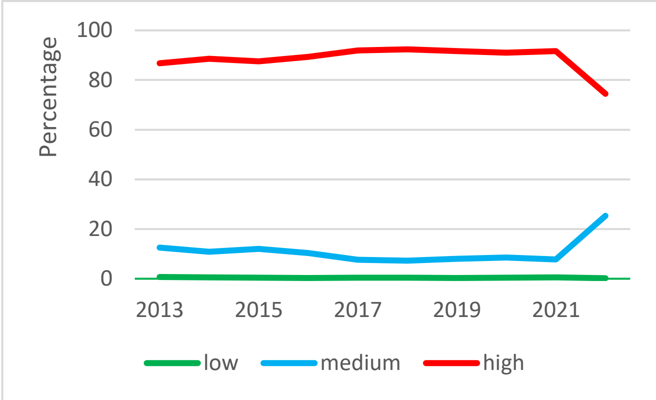



*Figure 3c. Host countries: Absolute numbers*

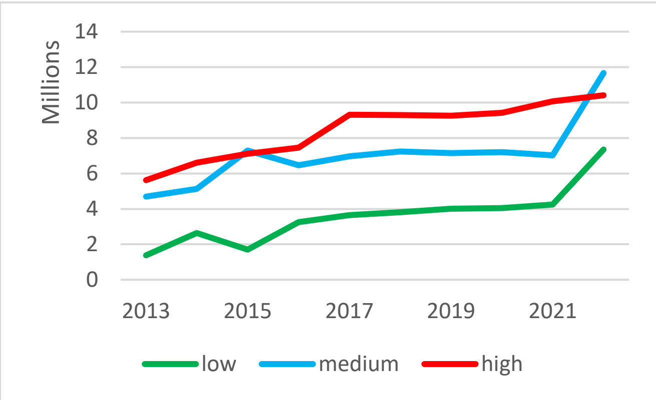
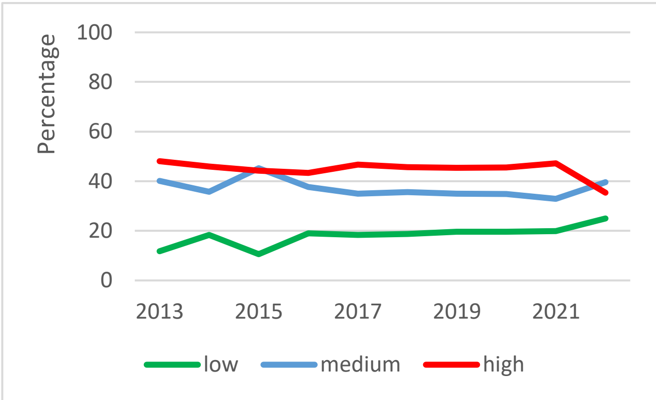



*Figure 3d. Host countries: Percentages*




*Notes.* Statistics are based on the 150 countries in our dataset. Data are derived from the UNHCR Population Database and the INFORM Risk Index.

## 3.2 Climate risks by subdimensions

To illuminate which specific factors drive climate risk in origin and host countries globally, we examined hazard exposure, socioeconomic vulnerability, and lack of coping capacity separately (Figure 4). To be concise, we only include the figures that show shares of refugees that, for example, originate from countries with low, medium or high level of hazard exposure.

Figures 4A to 4C show the results for refugee origin countries. Relating to exposure, we find that most refugees (56% in 2022) originate from countries with high exposure to hazards. This share declined from 77% in 2013, along with an increase in the share of refugees coming from countries with medium exposure to hazards (from 17% in 2013 to 38% in 2022). The share of refugees originating from countries with low exposure to hazards remained relatively stable over time: between 5% and 6% of global refugees came from countries with low exposure to climate hazards between 2013 and 2022. Regarding vulnerability, measures of socioeconomic deprivation, inequality, and the presence of vulnerable groups remained consistently high in origin countries: between 92% and 94% of refugees worldwide originated from highly vulnerable contexts across the entire study period. The same pattern can be observed for the lack of coping capacity dimension of risk. We find that from 2013 to 2020, about 90–95% of refugees came from countries with limited institutional and infrastructural capacity (e.g., disaster risk reduction mechanisms, strong physical infrastructure, access to health systems). After 2021, this dropped to 77%, primarily because Ukraine—though vulnerable—ranks as medium on coping capacity indicators.

A more mixed pattern emerges for refugee destination countries (Figures 4D – 4F). Similar to the origin country results, we find that refugees are hosted by nations with varying levels of hazard exposure, and are predominantly concentrated in countries where vulnerability and lack of coping capacity are relatively high. However, whereas 94% of refugees originated from countries with high vulnerability in 2022, 40% of refugees resided in high vulnerability countries in that year, with an even lower share residing in countries with a lack of coping capacity (35%). These findings suggest that, on a global level, a significant share of refugees experience a reduction in their climate risks when moving from origin to host country – a finding that will be explored in more detail using the corridor analyses in the following section. The results also underscore that conflict and climate risks often overlap with broader structural and governance challenges in both origin and destination countries.

**Figure 4. Refugees (%) from and hosted by low, medium, and high climate risk countries, by subdimension**

*Figure 4a: Origin countries: Hazard exposure*

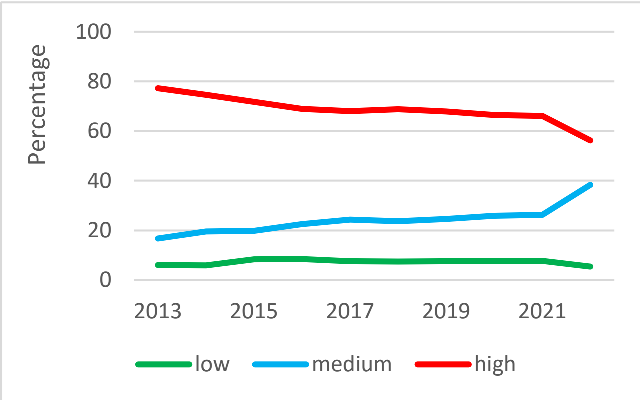



*Figure 4b: Origin countries: Vulnerability*

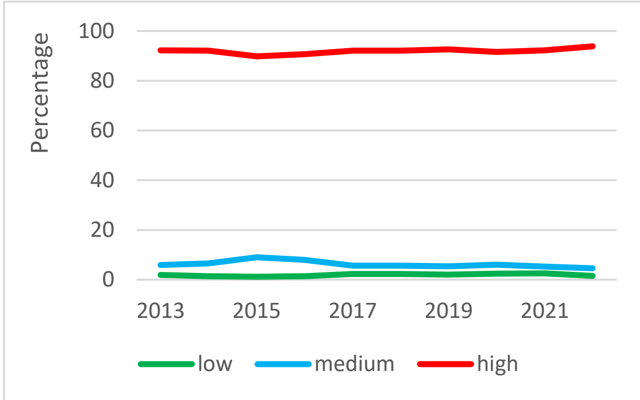



*Figure 4c: Origin countries: Lack of coping capacity*

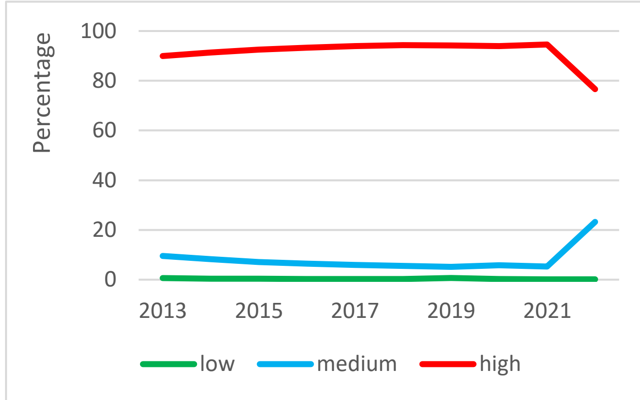



*Figure 4d: Host countries: Hazard exposure*

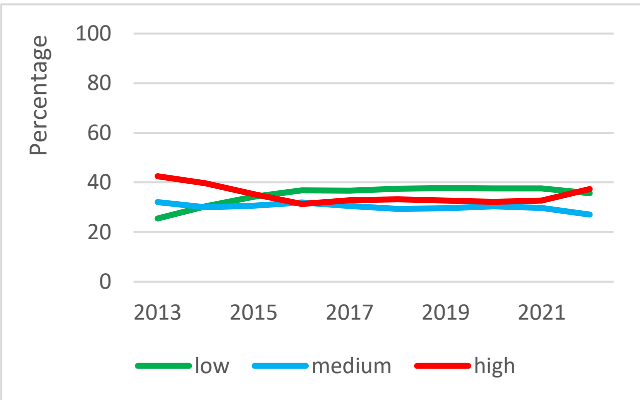



*Figure 4e: Host countries: Vulnerability*

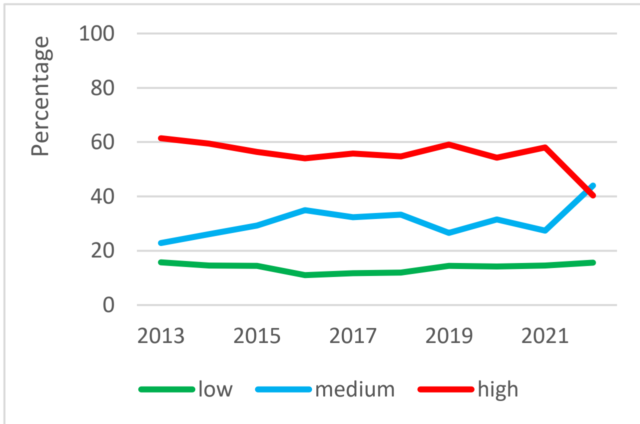
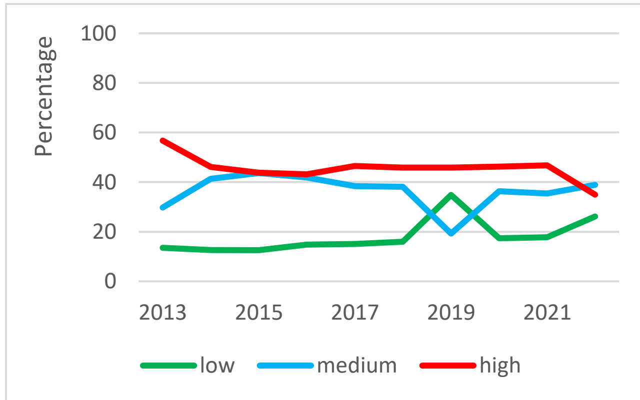



*Figure 4f: Host countries: Lack of coping capacity*



# 4 Climate risks and refugee trajectories: Insights from global corridor analyses

The preceding sections showed that most global refugees originate from high-risk countries and are predominantly hosted in medium- or high-risk countries. However, these aggregated patterns do not provide insights into the extent to which refugee populations move between different risk classifications when crossing borders. To address this, we conducted a global corridor analysis, linking origin and destination countries by their respective climate risk levels (low, medium, or high) for each year from 2013 through 2022. We again provide figures that depict percentages (absolute numbers available upon request).

Figure 5 visualizes the results of the corridor analyses. The greatest shares of refugees (35% in 2022) continue to travel between countries that both fall in the high climate-risk category (Figure 5a). In absolute terms, the number of refugees in this corridor more than doubled over the study period, from about five million in 2013 to ten million in 2022. Although movements from high-risk to medium-risk countries and from high-risk to low-risk countries also increased significantly—rising from 3.6 million to 8.5 million and from 728,000 to 3.2 million, respectively—these flows remain smaller than high-to-high corridors when viewed in relative terms. Thus, while some refugees do relocate to countries with lower climate risk profiles, the majority continue to move between similarly high-risk contexts.

A closer look at the climate risk subdimensions—exposure, vulnerability, and lack of coping capacity—reveals variations in the climate-related challenges that refugees may experience in new locations. Disaggregating the global corridor analysis (Figure 5b – 5d) shows that changes in exposure over time are the most variable aspect. After fluctuating in the mid-2010s, the late 2010s and early 2020s exhibit relatively stable trends, with the majority of refugees moving from high-exposure contexts to low-exposure contexts. The second-largest share of refugees travelled between countries that both have high exposure to hazards. In contrast, the vulnerability and lack of coping capacity dimensions reveal consistent patterns in which large numbers of refugees move between countries that share similarly high levels of socioeconomic fragility and limited disaster management infrastructures. Across most of the observation period, the majority of refugees therefore do not appear to be leaving behind high levels of vulnerability or low levels of national coping capacity when they arrive in host countries, notwithstanding a small but noticeable increase in flows from high-vulnerability to medium-vulnerability destinations, or from low-capacity to somewhat better-equipped contexts.

Altogether, these findings from the corridor analyses suggest that an increasing share of refugee populations are moving to countries that are less exposed to floods, droughts, or other hazards. Yet, a large majority move to environments with high levels of vulnerability and weak institutional support. This suggests that, even when refugees relocate to countries with lower levels of hazard exposure, these may not be more secure destinations, and the trend of high-risk movement persists. Relatedly, the global corridor analysis highlights the complexity of climate risk and illustrates that improvements in one dimension—such as exposure—do not necessarily translate into overall climate risk reduction when factors like socioeconomic fragility, governance, and disaster-management capacity remain unchanged.

## 4.1 Differences across world regions

The global trends presented above mask important regional variations (Figure 6). An estimated 84 percent of refugees originating from Africa in 2022 (Figure 6b) moved between countries that both fall under the high climate risk category, marking an increase from 79 percent in 2013 (Figure 6a). This trend contrasts sharply with movements originating from Europe, where the majority of refugees (predominantly from Ukraine) travel between medium-risk and low-risk countries, and with Asia, where most refugees move from high-risk contexts to medium-risk destinations in 2022.

**Figure 5. Refugees (%) in climate corridors, by subdimension**
*Figure 5a. Overall climate risk*

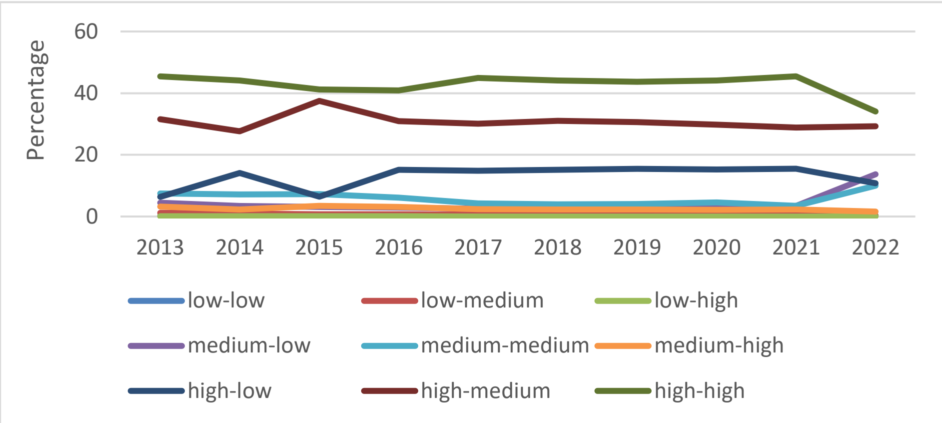



*Figure 5b. Exposure to hazards*

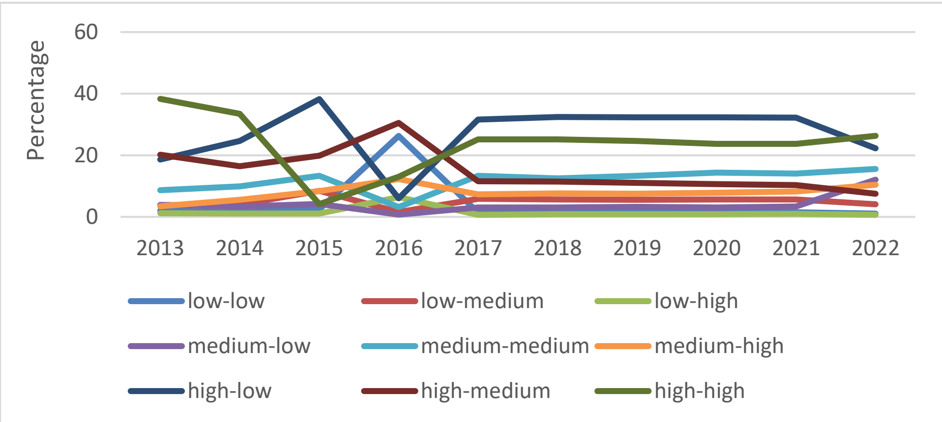



*Figure 5c. Vulnerability*

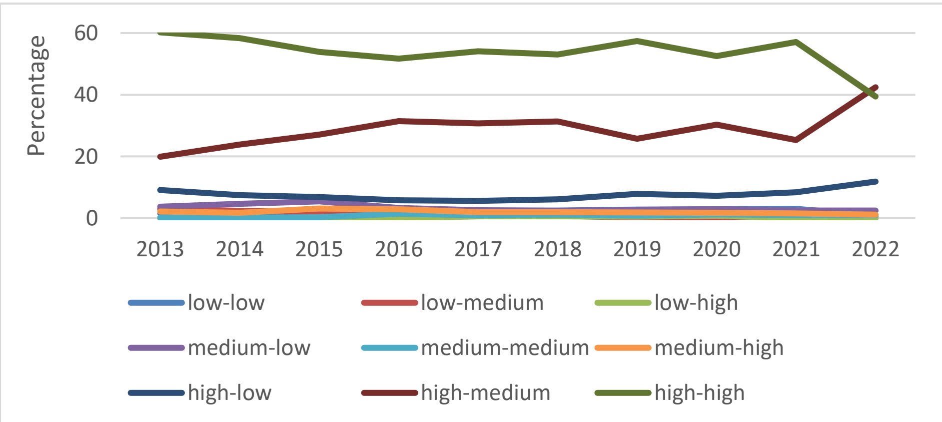
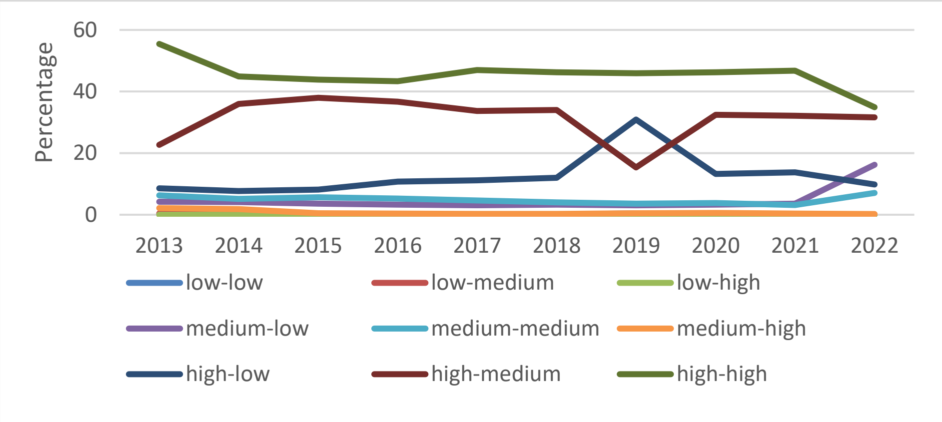


*Figure 5d. Lack of coping capacity*




The three world regions from which the smallest shares of refugees originated (North America, Oceania and South America, see Figure 1), are characterized by a mix of climate risk corridors. Refugees originating from South America primarily move from medium-to-medium climate risk countries, and increasingly from medium-to-low climate risk countries, whereas the largest share of refugees moving from Oceania reduced their climate risks by moving from high to low climate risk countries. Due to the small numbers of refugees originating from these world regions, however, the variations shown in Figure 6 are highly susceptible to small changes in the data.

Given that Africa encompasses such a large proportion of global high-risk corridors, and that the region hosts an ever-growing number of displaced persons, the rest of this paper explores how distance might mitigate or amplify climate risk (and its different subdimensions) among African refugees. We provide an initial sketch of overarching trends, acknowledging that aggregated data, while useful for identifying broad trends, inevitably masks enormous diversity in climate risks, governance structures, socioeconomic conditions, cultural contexts, and refugee experiences across different countries and regions within the continent.

**Figure 6. Percentage of refugees originating from Africa, Asia and Europe, by climate risk corridor**

*Figure 6a: 2013*

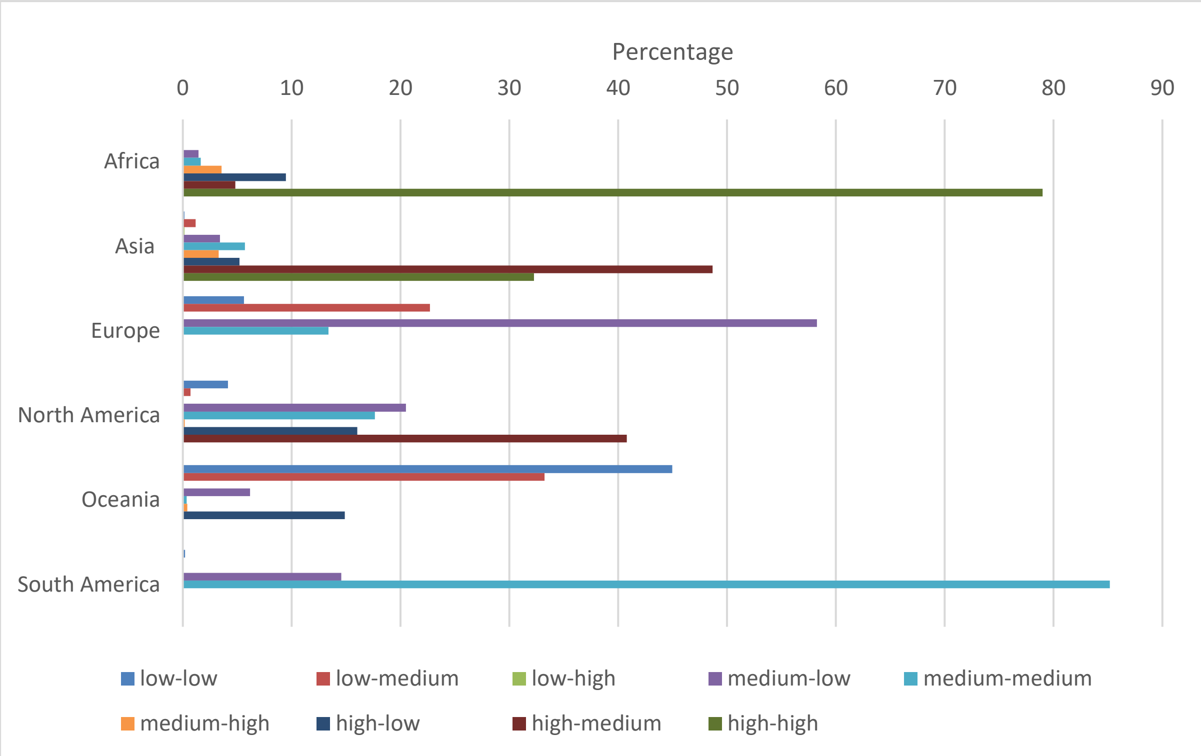
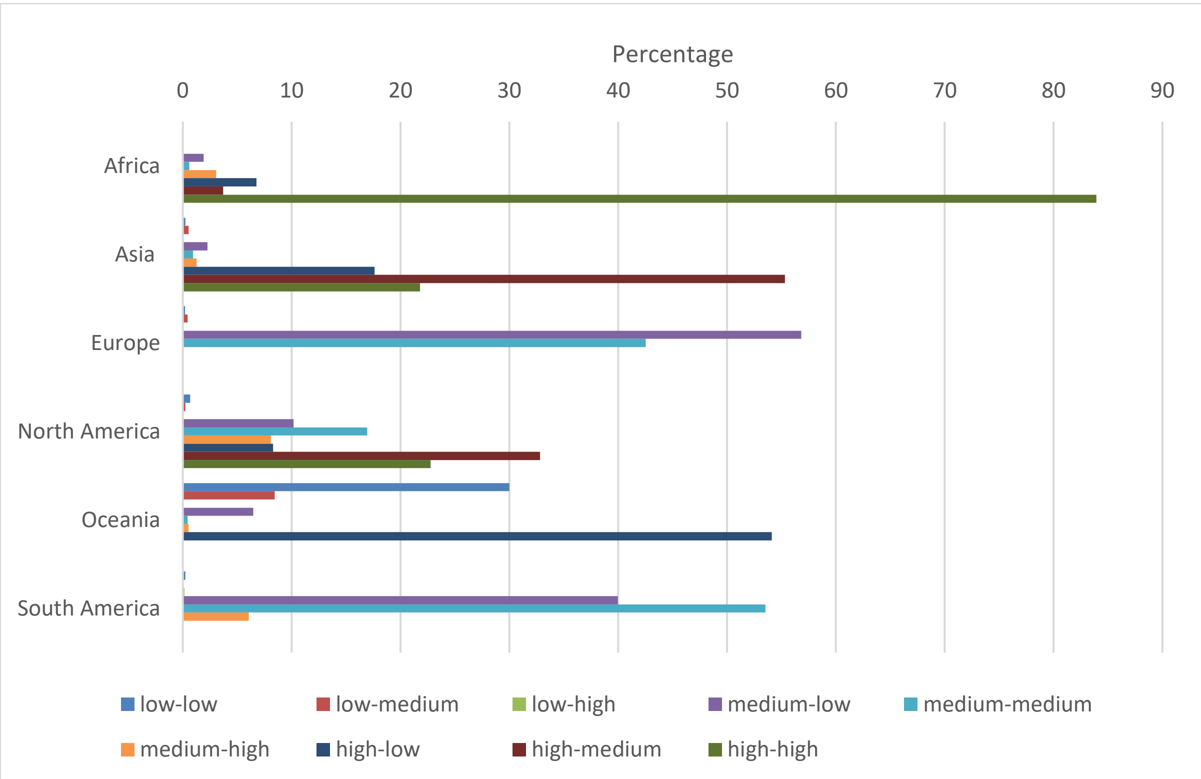



*Figure 6b: 2022*



# 5 Climate risks for refugees in and from Africa

## 5.1 Corridor analyses

Most refugees originating from African countries continue to travel between nations with high overall climate risk, a trend strongly driven by societal conditions rather than exposure to physical hazards. As shown in Figure 7, vulnerability and coping capacity are particularly crucial in shaping the overall climate risk in corridors for refugees originating from Africa. While hazard exposure levels can vary substantially, with some refugees moving between medium-exposure and higher-exposure countries, the majority still face elevated climate risks due to the combination of inadequate infrastructure, weak governance, and pronounced socioeconomic fragility in host countries.

**Figure 7. Climate risks for refugees originating from Africa**

*Figure 7a: 2013*

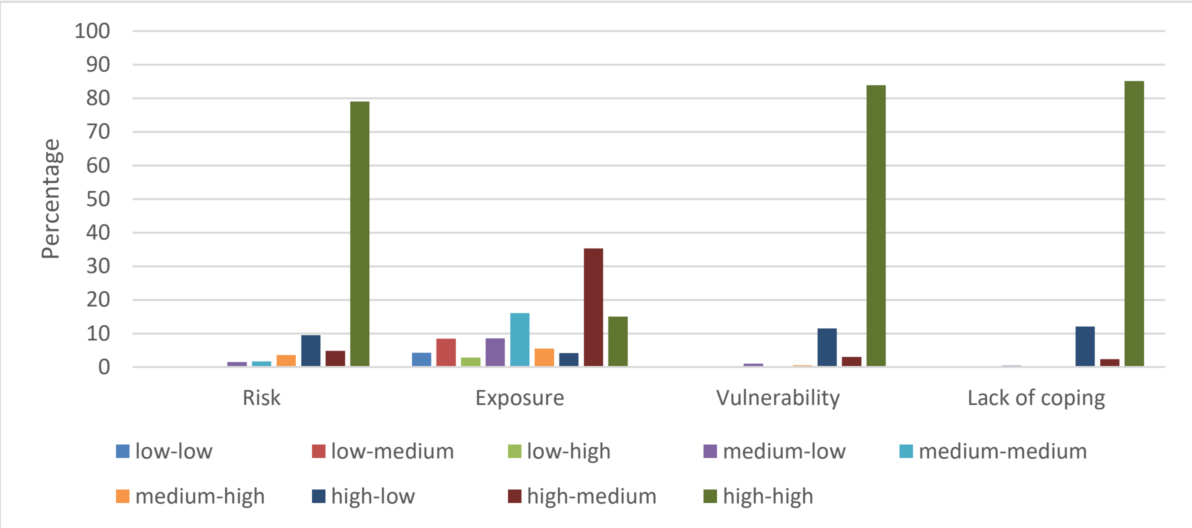
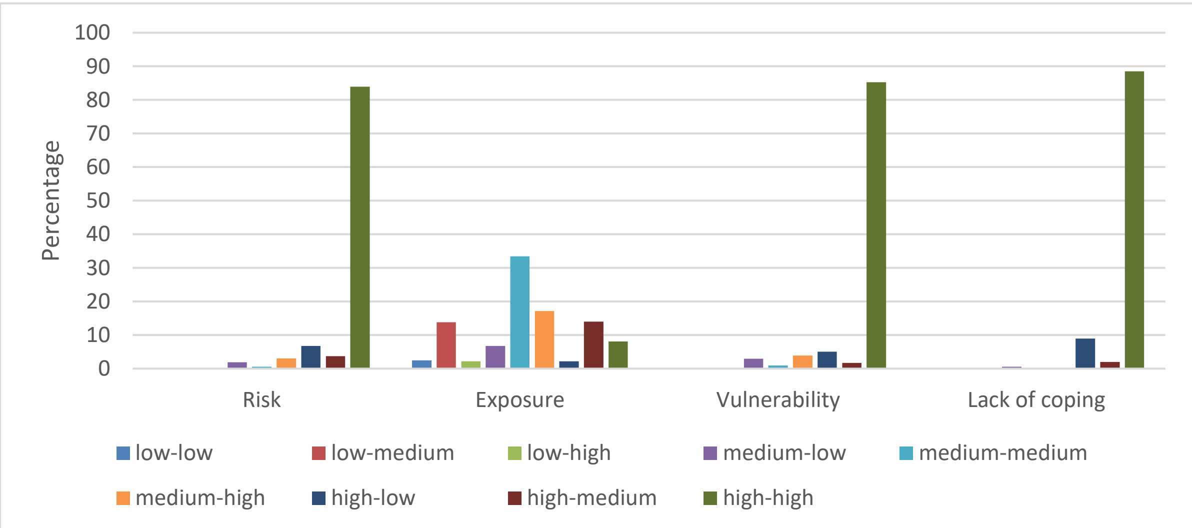



*Figure 7b: 2022*



## 5.2 The role of distance

Figure 1 showed that the number of refugees originating from Africa more than doubled between 2013 and 2022, rising from 3.7 to almost eight million individuals. While some of these African refugees moved to other regions on the continent, the majority remain relatively close to home, with more than sixty percent displaced to neighboring countries (Figure 8). By comparison, only about ten percent of refugees from Africa relocated beyond the continent in 2022, and the proportion of these intercontinental moves has declined over time relative to intra-African movements. A growing share of African refugees who do travel beyond the continent head to European destinations, which in 2022 received around 80 percent of those intercontinental migrants, compared to 45 percent in 2013 (results available upon request). During the same period, the proportion of African refugees hosted in Asian countries dropped from 42 percent in 2013 to below 10 percent in 2022, while the share welcomed in North Africa hovered consistently around 10 percent.

**Figure 8. Distances travelled by refugees originating from African countries**

*Figure 8a. Absolute numbers*

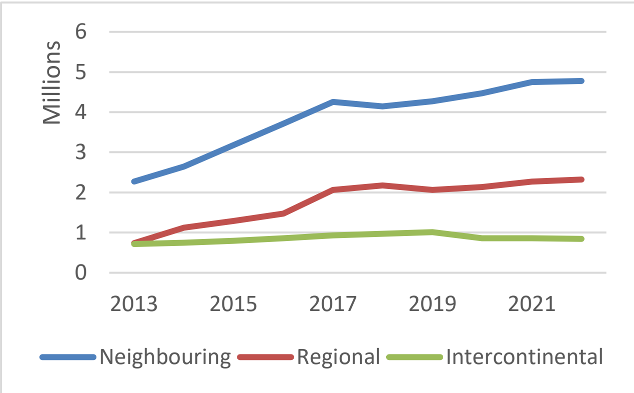
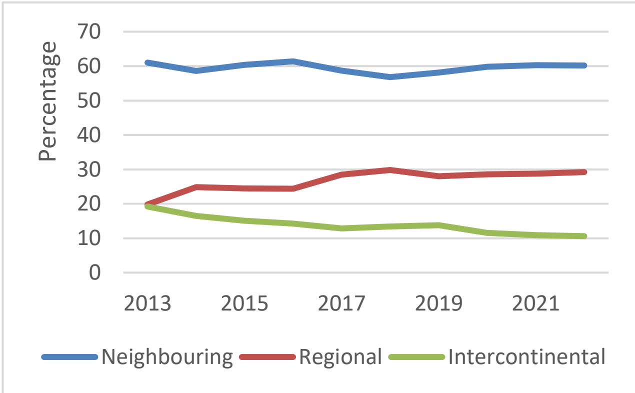



*Figure 8b. Percentages*




To further explore these findings, Table 1 presents the top 10 refugee-hosting countries in Africa in 2022. Uganda, Sudan, and Ethiopia host the largest numbers of refugees and score high on the overall risk index. In contrast, Egypt stands out with medium risk levels across all subdimensions of climate risk, while the other hosting countries experience high or very high levels of risk related to vulnerability and limited coping capacity. Again, it is striking that hazard exposure among these countries varies substantially, ranging from low levels in Rwanda to high levels in Sudan and Chad, while vulnerability and lack of coping capacity are high or very high in every country except Egypt.

These patterns underscore a significant challenge for nations that are already vulnerable to climate change. Many of these countries may struggle to effectively respond to climate-related shocks while simultaneously hosting large refugee populations, potentially leading to the further marginalization of both refugees and local populations. Under certain conditions, this can also intensify tensions over resources, access to services, and social integration (Fransen et al., 2024a; 2024b).

**Table 1. Top-10 refugee-hosting countries in Africa (2022)**

| Country | No. of refugees hosted | No. of refugees originating from country | Risk | Hazard exposure | Vulnerability | Lack of coping capacity |
|---|---|---|---|---|---|---|
| Uganda | 1,463,523 | 7,572 | High | Medium | Very high | Very high |
| Sudan | 1,097,128 | 837,188 | High | High | Very high | Very high |
| Ethiopia | 879,598 | 149,603 | High | Medium | Very high | High |
| Chad | 592,764 | 12,811 | Very high | High | Very high | Very high |
| DRC | 520,544 | 932,680 | High | Medium | Very high | Very high |
| Kenya | 504,473 | 7,595 | High | Medium | High | High |
| Cameroon | 473,887 | 147,352 | High | Medium | High | High |
| South Sudan | 308,369 | 2,295,082 | Very high | Medium | Very high | Very high |
| Egypt | 294,632 | 24,390 | Medium | Medium | Medium | Medium |
| Niger | 255,307 | 21,946 | Very high | High | Very high | Very high |
| Tanzania | 206,229 | 790 | High | Medium | High | High |
| Rwanda | 120,753 | 249,753 | Medium | Low | High | High |

When examining travel distances in more detail, we find that migrating farther from the continent generally is associated with lower climate risk, as compared to moving between neighbouring or nearby countries. As depicted in Figure 9, the high-to-high risk corridor is more common for refugees crossing into adjacent states, reflecting the fact that African nations hosting refugees often share similar structural vulnerabilities and limited coping capacities. Conversely, for intercontinental movements, the corridor from high-risk to low-risk countries is increasingly common, revealing that some refugees face reduced climate risks when reaching destinations in, for example, Europe. These findings complicate the assumption that medium distance moves within Africa necessarily offer a safer environment. Instead, they suggest that meaningful climate risk reduction typically requires crossing to places with stronger institutions and more robust resources—an option available to only a small fraction of those displaced on the continent.

Table 2 shows the percentage of refugees originating from Africa in each climate risk corridor by each subdimension of climate risk in 2022. The table highlights refugees who either relocate to neighboring countries, within the region, or intercontinentally. Regarding exposure to hazards, it shows that the largest share of refugees (approximately 40%) moving to neighboring countries transition from medium-to-medium exposed countries. Another significant portion of refugees moving to neighboring countries goes from low to medium climate risk exposure (21 percent), while 19% move from high to medium-exposure countries. Among refugees moving further within the region, 51% relocate from countries with medium national hazard exposure to those with high exposure. However, 32% move from medium-to-medium exposed countries. For refugees traveling from Africa to intercontinental destinations, the largest share (43%) moves from countries with medium exposure to low-exposed countries, while another 20% experience a larger reduction in exposure, transitioning from high-risk to low-risk countries. Overall, therefore, distance is an important factor in determining climate exposure in host countries: refugees who travel further, particularly intercontinentally, are more likely to move to countries with lower exposure to hazards, as compared to those who move to neighbouring countries.

For the other subdimensions of risk—vulnerability and lack of coping capacity—it is evident that the majority of refugees who move to neighboring countries or within the region relocate from countries classified in our data as high vulnerability and low coping capacity to countries with similar classifications. In contrast, refugees who move intercontinentally generally settle in countries classified with lower vulnerability to climate risks and better coping capacities. While some refugees originating from African countries do experience a reduction in their exposure to climate hazards after relocation, many end up in countries with high climate vulnerability and limited coping capacity, thus perpetuating their overall vulnerability.

**Table 2. Subdimensions of risk by distance travelled (2022)**

| | Exposure | | | Vulnerability | | | Lack of coping capacity | | |
|---|---|---|---|---|---|---|---|---|---|
| | Neigh-bouring | Regional | Inter-continental | Neigh-bouring | Regional | Inter-continental | Neigh-bouring | Regional | Inter-continental |
| low-low | 1.37 | 0.25 | 14.46 | 0.00 | 0.00 | 1.07 | 0.00 | 0.00 | 0.03 |
| low-medium | 20.70 | 4.33 | 0.75 | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 |
| low-high | 2.61 | 1.45 | 1.44 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| medium-low | 3.53 | 0.12 | 43.12 | 0.00 | 0.01 | 28.02 | 0.00 | 0.00 | 5.37 |
| medium-medium | 39.50 | 32.11 | 2.76 | 0.00 | 0.74 | 6.73 | 0.00 | 0.00 | 0.09 |
| medium-high | 2.60 | 51.10 | 6.08 | 0.18 | 12.98 | 0.23 | 0.00 | 0.00 | 0.01 |
| high-low | 0.04 | 0.12 | 20.43 | 0.00 | 0.04 | 47.69 | 0.00 | 0.00 | 84.00 |
| high-medium | 19.04 | 5.08 | 9.60 | 0.70 | 1.78 | 6.95 | 0.61 | 4.98 | 1.84 |
| high-high | 10.62 | 5.45 | 1.36 | 99.12 | 84.45 | 9.13 | 99.39 | 95.01 | 8.66 |
| | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

**Figure 9. Climate risks by distances travelled**

*Figure 9a. Refugees moving to neighbouring countries*

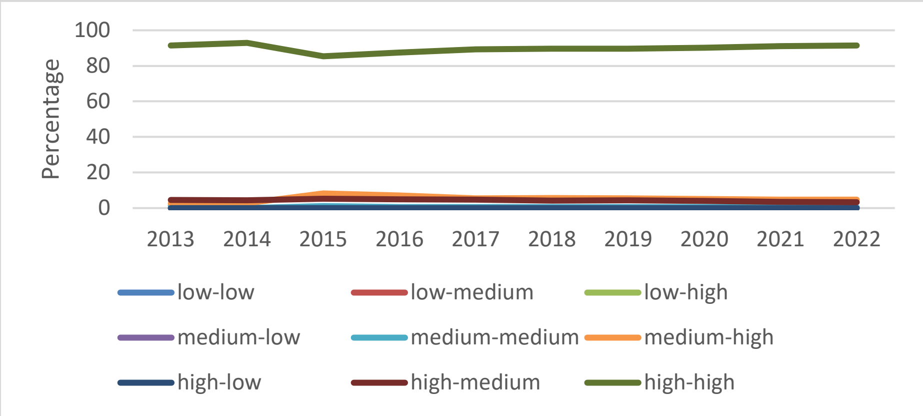



*Figure 9b. Refugees moving to non-neighbouring countries within Africa*

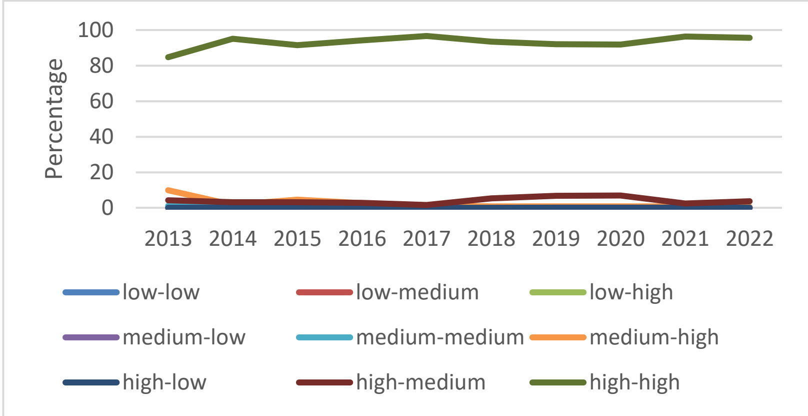
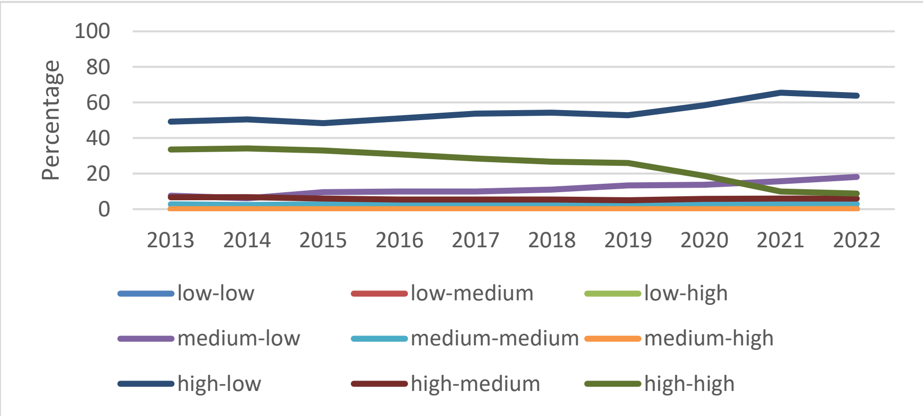



*Figure 9c. Refugees moving intercontinentally*



# 6 Discussion and Conclusion

This study explores the climate risks faced by refugee populations. By examining exposure to hazards, socioeconomic vulnerability, and coping capacity in both origin and destination countries, we show how climate-related risks evolve for refugee populations after relocating. We find a global rise in the number of refugees originating from countries with high climate risk and find that 75% of global refugees remain in high or medium climate risk host countries. These trends have intensified in recent years. In Africa, we find that shorter-distance displacement—particularly to neighboring or regional host countries—can reduce exposure to hazards but often does not reduce overall climate risk, as many refugees remain in countries with high levels of social and institutional vulnerability. However, those who are able to travel longer distances, particularly intercontinentally, typically access destinations with lower overall climate risk.

These findings add to a long-standing and growing body of research that illustrates how climate risk is shaped not only by environmental factors but also—or even primarily—by structural inequalities, development contexts, and institutional capacity (see Reisinger et al 2020). As scholarship at the nexus of climate change, mobility, and development continues to evolve (see Cattaneo et al., 2019, McLeman, 2025), research on the societal determinants of climate risk deserves continued focus and investigation. We bring this perspective to bear to understand the climate risks faced by refugee populations at origin and destination.

There are several specific findings that illustrate the importance of assessing the societal dimensions of climate risk. First, despite a global rise in the number of refugees originating from countries with high climate risk, most refugees come from countries characterized by high vulnerability to climate change and limited coping capacity. Although we cannot derive causal conclusions from these observations, they caution against analyzing environmental and climate factors, such as extreme weather events and environmental degradation, separately from other drivers of displacement such as conflict (Finn & Smith, 2020; Gleditsch, 2012).

Second, and relatedly, while the analysis reaffirms that exposure to hazards such as droughts, floods, and extreme temperatures can significantly affect the lives of refugees in their countries of residence (see Fransen et al., 2024a; Owen et al., 2023), we find that broader social and political dynamics—namely high vulnerability and limited institutional capacity at national levels—often play a more decisive role in shaping assessments of overall climate risk at destination. Even in contexts where refugees do experience lower hazard exposure after moving, insufficient infrastructure, poor governance, and economic marginalization can produce high levels of overall climate risk for both local communities and displaced populations. This corroborates political ecology and environmental justice research showing that populations already experiencing social injustice and fragile governance structures face compounded threats (Vigil, 2024; Schlosberg & Collins, 2014).

Third, our regional analyses with a focus on Africa reveal that distance traveled can impact climate risks. While it is widely recognized that "trapped populations" are unable to leave climate-stressed settings (Black & Collyer, 2014; Zickgraf, 2019), the findings suggest that a similar logic may apply to many refugees who move shorter-distances. We find that most refugees in Africa move to neighbouring countries and between areas classified in our data as having high levels of climate risk. This trend has become more pronounced over the past decade, with many movements involving transitions from one high-vulnerability context to another. Those who manage to travel outside the continent, by contrast, often find destinations with comparatively lower climate risks. These findings highlight the existence of 'societal traps', where entrenched socio-political vulnerability and limited institutional capacity at destination reproduce persistent high-risk environments.

The strengths of this study—its global and regional focus comparing displacement experiences across origin and destination countries—are also arguably its weakness. The findings presented are inevitably partial and incomplete. We could only assess one particular type of legally recognized displacement—refugees—which misses internal displacement trends and the experiences of other displaced peoples who do not receive refugee status. Further, the "vulnerability" and "coping capacity" dimensions, while based on a set of globally available indicators, cannot fully capture the lived realities or specific resilience mechanisms of refugee populations, which can be highly localized, culturally specific, and shaped by the unique circumstances of displacement (Winters et al., 2024). National-level coping capacity or vulnerability scores for a country might conceal deep internal inequalities that render specific groups, such as refugees from particular origins or those settled in certain regions, more or less vulnerable than national averages suggest. However, it is equally important to acknowledge the unmeasured, informal community-based coping mechanisms of refugee populations and the creative agency they use as they navigate these risks. In this light our high-level findings complement but cannot replace the rigor and nuance of county-specific and sub-national research on climate risk and vulnerability (see, for example, Sibanda et al., 2022; Ahmed, B., 2021; Ahmed, S. et al., 2021; Alam et al., 2020; Chowdhury et al., 2020; Pollock et al., 2019; Marzouk et al., 2022; Few et al., 2021).

In highlighting the compounded vulnerabilities faced by refugees in host countries, our findings stress the urgency of long-term strategies that address the root causes of socioeconomic and institutional fragility. There are many locally led innovations that African governments, communities, and refugees themselves are already advancing in this direction, from grassroots refugee-led organizations (Kara et al 2022) to the Intergovernmental Authority on Development's regional climate adaptation framework (IGAD, 2023). The framework aspires to a whole-of-society approach, explicitly addressing climate risks faced by marginalized populations, including displaced people, in Uganda, Kenya, Ethiopia, and South Sudan. The challenges confronting refugee-hosting nations extend beyond the remit of humanitarian assistance and call for integrated policies that promote both climate resilience and refugee support, while also tackling the broader development and governance issues (Cattaneo et al., 2019). Addressing climate risk is thus a long-term challenge to remold its societal determinants.

Finally, these findings affirm calls to reconsider how refugee support systems are designed and implemented in contexts of increasing climate risks (Fransen et al. 2024b). Traditional models that prioritize temporary protection and prolonged encampment are increasingly misaligned with the protracted and structural nature of both displacement and climate vulnerability as well as the agency of refugees (Betts 2021). To reduce climate risks for refugee populations, climate adaptation and displacement responses need be integrated, inclusive, and equity-driven (Fransen et al. 2024b). This includes not only investing in host countries' capacity to manage climate stress but also enabling displaced people to participate fully in social, economic, and environmental systems through long-term integration strategies (cf. Murard 2022, Teicher and Marchman 2024).

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# 8 Appendix

**Table A1. Summary statistics Climate-driven Risk Index and its subdimensions**

| Year | Risk | | | | Hazard and Exposure | | | | Vulnerability | | | | Lack of Coping Capacity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | SD | Min | Max | M | SD | Min | Max | M | SD | Min | Max | M | SD | Min | Max |
| 2013 | 3.9 | 1.6 | 0.5 | 8.5 | 3.8 | 1.6 | 0.1 | 7.9 | 3.7 | 2.0 | 0.6 | 8.8 | 4.8 | 2.0 | 0.9 | 9.1 |
| 2014 | 3.9 | 1.6 | 0.5 | 8.5 | 3.8 | 1.6 | 0.1 | 7.9 | 3.8 | 2.0 | 0.7 | 8.7 | 4.6 | 2.0 | 0.9 | 9.2 |
| 2015 | 3.9 | 1.6 | 0.5 | 8.5 | 3.8 | 1.6 | 0.1 | 7.9 | 3.8 | 2.1 | 0.6 | 8.9 | 4.6 | 2.0 | 0.9 | 9.3 |
| 2016 | 3.9 | 1.6 | 0.5 | 8.4 | 3.8 | 1.6 | 0.1 | 7.9 | 3.8 | 2.1 | 0.6 | 9.0 | 4.5 | 2.0 | 0.9 | 9.5 |
| 2017 | 3.9 | 1.6 | 0.5 | 8.3 | 3.8 | 1.6 | 0.1 | 7.9 | 3.7 | 2.0 | 0.6 | 9.0 | 4.5 | 2.0 | 0.9 | 9.5 |
| 2018 | 3.8 | 1.5 | 0.5 | 8.3 | 3.8 | 1.6 | 0.1 | 7.9 | 3.7 | 2.0 | 0.6 | 8.9 | 4.5 | 2.0 | 0.9 | 9.5 |
| 2019 | 3.9 | 1.6 | 0.5 | 8.4 | 3.8 | 1.6 | 0.1 | 7.9 | 3.8 | 2.1 | 0.6 | 9.0 | 4.4 | 2.0 | 0.9 | 9.5 |
| 2020 | 3.9 | 1.6 | 0.6 | 8.3 | 3.8 | 1.6 | 0.1 | 7.9 | 3.9 | 2.1 | 0.6 | 9.0 | 4.4 | 2.0 | 0.9 | 9.4 |
| 2021 | 3.9 | 1.5 | 0.6 | 8.3 | 3.9 | 1.6 | 0.1 | 7.9 | 4.0 | 2.0 | 0.5 | 9.0 | 4.4 | 2.0 | 0.9 | 9.4 |
| 2022 | 4.0 | 1.5 | 0.6 | 8.3 | 3.9 | 1.6 | 0.1 | 7.9 | 4.1 | 1.9 | 0.7 | 8.8 | 4.4 | 2.0 | 0.9 | 9.4 |

**Table A2. Global average risk classifications by year**

| Year | Low | | Medium | | High | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Freq. | Perc. | Freq. | Perc. | Freq. | Perc. | Freq. | Perc. |
| 2013 | 53 | 35.33 | 54 | 36.00 | 43 | 28.67 | 150 | 100.00 |
| 2014 | 54 | 36.00 | 50 | 33.33 | 46 | 30.67 | 150 | 100.00 |
| 2015 | 54 | 36.00 | 53 | 35.33 | 43 | 28.67 | 150 | 100.00 |
| 2016 | 55 | 36.67 | 51 | 34.00 | 44 | 29.33 | 150 | 100.00 |
| 2017 | 57 | 38.00 | 48 | 32.00 | 45 | 30.00 | 150 | 100.00 |
| 2018 | 56 | 37.33 | 52 | 34.67 | 42 | 28.00 | 150 | 100.00 |
| 2019 | 53 | 35.33 | 56 | 37.33 | 41 | 27.33 | 150 | 100.00 |
| 2020 | 54 | 36.00 | 55 | 36.67 | 41 | 27.33 | 150 | 100.00 |
| 2021 | 53 | 35.33 | 53 | 35.33 | 44 | 29.33 | 150 | 100.00 |
| 2022 | 50 | 33.33 | 57 | 38.00 | 43 | 28.67 | 150 | 100.00 |

**Table A3. Countries included in the analysis**

| Country | CRI 2013 | Climate class 2013 | CRI 2022 | Climate class 2022 |
|---|---|---|---|---|
| Afghanistan | 7.3 | high/very high | 7.3 | high/very high |
| Albania | 3.4 | medium | 3.2 | medium |
| Algeria | 3.3 | medium | 3.3 | medium |
| Angola | 4.9 | high/very high | 4.8 | medium |
| Argentina | 2.8 | very low/low | 3.5 | medium |
| Armenia | 3.6 | medium | 3.4 | medium |
| Australia | 2.7 | very low/low | 2.9 | very low/low |
| Austria | 2.1 | very low/low | 2.3 | very low/low |
| Azerbaijan | 4.5 | medium | 4.4 | medium |
| The Bahamas | 3 | very low/low | 3 | very low/low |
| Bahrain | 0.7 | very low/low | 0.7 | very low/low |
| Bangladesh | 6.2 | high/very high | 6 | high/very high |
| Belarus | 2.3 | very low/low | 2.5 | very low/low |
| Belgium | 1.7 | very low/low | 2 | very low/low |
| Belize | 4.5 | medium | 5 | high/very high |
| Benin | 4.2 | medium | 4.2 | medium |

| | | | | |
|---|---|---|---|---|
| Bolivia | 4.4 | medium | 4.5 | medium |
| Bosnia and Herzegovina | 4.1 | medium | 4.2 | medium |
| Botswana | 4.3 | medium | 4 | medium |
| Brazil | 3.8 | medium | 4.4 | medium |
| Bulgaria | 2.8 | very low/low | 3.1 | very low/low |
| Burkina Faso | 5.3 | high/very high | 5.7 | high/very high |
| Burundi | 5.1 | high/very high | 4.9 | high/very high |
| Cameroon | 5.1 | high/very high | 5.1 | high/very high |
| Canada | 2.8 | very low/low | 2.7 | very low/low |
| Central African Republic | 5.8 | high/very high | 5.8 | high/very high |
| Chad | 7 | high/very high | 6.9 | high/very high |
| Chile | 2.3 | very low/low | 2.9 | very low/low |
| China | 4.5 | medium | 4.2 | medium |
| Colombia | 4.8 | medium | 4.7 | medium |
| DRC | 6.2 | high/very high | 6 | high/very high |
| Republic of the Congo | 5.9 | high/very high | 6.1 | high/very high |
| Costa Rica | 2.5 | very low/low | 2.9 | very low/low |
| Croatia | 2.4 | very low/low | 2.8 | very low/low |
| Cyprus | 2.2 | very low/low | 2.3 | very low/low |
| Czech Republic | 2.5 | very low/low | 2.6 | very low/low |
| Ivory Coast | 4.8 | medium | 4.6 | medium |
| Denmark | 1.3 | very low/low | 1.7 | very low/low |
| Djibouti | 5.3 | high/very high | 5.1 | high/very high |
| Dominican Republic | 4.1 | medium | 4.4 | medium |
| Ecuador | 4 | medium | 4.3 | medium |
| Egypt | 4.3 | medium | 4.2 | medium |
| El Salvador | 3.7 | medium | 4.1 | medium |
| Eritrea | 5.4 | high/very high | 4.9 | high/very high |
| Estonia | 1.4 | very low/low | 1.8 | very low/low |
| Eswatini | 4.6 | medium | 4.3 | medium |
| Ethiopia | 5.8 | high/very high | 5.8 | high/very high |
| Fiji | 2.8 | very low/low | 2.6 | very low/low |
| France | 2.5 | very low/low | 2.6 | very low/low |
| Gabon | 3.8 | medium | 3.6 | medium |
| The Gambia | 4.7 | medium | 4.1 | medium |
| Georgia | 4 | medium | 3.8 | medium |
| Germany | 2.3 | very low/low | 2.6 | very low/low |
| Ghana | 3.9 | medium | 3.6 | medium |
| Greece | 2.2 | very low/low | 2.2 | very low/low |
| Guatemala | 5.2 | high/very high | 5.2 | high/very high |
| Guinea | 4.5 | medium | 4.1 | medium |
| Guinea-Bissau | 4.6 | medium | 4.2 | medium |
| Guyana | 3.8 | medium | 4.2 | medium |
| Honduras | 4.5 | medium | 5.4 | high/very high |
| Hungary | 2.3 | very low/low | 2.6 | very low/low |
| Iceland | 0.5 | very low/low | 0.6 | very low/low |
| India | 5.7 | high/very high | 5.3 | high/very high |
| Indonesia | 4.7 | medium | 4.5 | medium |
| Iran | 4.6 | medium | 4.7 | medium |
| Iraq | 6.4 | high/very high | 6.4 | high/very high |
| Ireland | 1.6 | very low/low | 1.8 | very low/low |
| Israel | 2.3 | very low/low | 2.2 | very low/low |
| Italy | 2.5 | very low/low | 2.5 | very low/low |
| Jamaica | 3.8 | medium | 3.5 | medium |
| Japan | 2.3 | very low/low | 2.4 | very low/low |
| Jordan | 4.6 | medium | 4.6 | medium |
| Kazakhstan | 2.4 | very low/low | 2.3 | very low/low |
| Kenya | 5.9 | high/very high | 5.5 | high/very high |

| | | | | |
|---|---|---|---|---|
| South Korea | 2.1 | very low/low | 2.2 | very low/low |
| Kuwait | 2.1 | very low/low | 2.1 | very low/low |
| Kyrgyzstan | 3.7 | medium | 3.5 | medium |
| Latvia | 2.3 | very low/low | 2.8 | very low/low |
| Lebanon | 3.2 | medium | 3.1 | very low/low |
| Lesotho | 5.4 | high/very high | 5.3 | high/very high |
| Liberia | 5.3 | high/very high | 5.1 | high/very high |
| Libya | 3.9 | medium | 4.3 | medium |
| Lithuania | 2 | very low/low | 2.5 | very low/low |
| Madagascar | 6.1 | high/very high | 6.3 | high/very high |
| Malawi | 5.6 | high/very high | 5.3 | high/very high |
| Malaysia | 3.5 | medium | 3.4 | medium |
| Mali | 6.5 | high/very high | 6.3 | high/very high |
| Mauritania | 6.6 | high/very high | 6.2 | high/very high |
| Mexico | 4.4 | medium | 4.9 | high/very high |
| Moldova | 3.5 | medium | 4.1 | medium |
| Mongolia | 3.8 | medium | 3.5 | medium |
| Montenegro | 2.8 | very low/low | 2.7 | very low/low |
| Morocco | 4.1 | medium | 4 | medium |
| Mozambique | 6.4 | high/very high | 6.6 | high/very high |
| Myanmar | 6.8 | high/very high | 6.2 | high/very high |
| Namibia | 5.7 | high/very high | 5.4 | high/very high |
| Nepal | 5 | high/very high | 4.6 | medium |
| Netherlands | 1.9 | very low/low | 2 | very low/low |
| New Zealand | 1.7 | very low/low | 1.7 | very low/low |
| Nicaragua | 4.3 | medium | 4.4 | medium |
| Niger | 6.4 | high/very high | 6.8 | high/very high |
| Nigeria | 5.6 | high/very high | 5.3 | high/very high |
| North Macedonia | 2.8 | very low/low | 2.8 | very low/low |
| Norway | 1.3 | very low/low | 1.2 | very low/low |
| Oman | 2.7 | very low/low | 2.7 | very low/low |
| Pakistan | 6 | high/very high | 5.9 | high/very high |
| Panama | 3.1 | very low/low | 3.3 | medium |
| Papua New Guinea | 5.1 | high/very high | 5.2 | high/very high |
| Paraguay | 3.7 | medium | 3.3 | medium |
| Peru | 4.2 | medium | 4.6 | medium |
| Philippines | 5.7 | high/very high | 5.2 | high/very high |
| Poland | 2.5 | very low/low | 3.4 | medium |
| Portugal | 1.9 | very low/low | 2.2 | very low/low |
| Qatar | 1.9 | very low/low | 1.7 | very low/low |
| Romania | 2.9 | very low/low | 3.2 | medium |
| Russia | 4.1 | medium | 4.7 | medium |
| Rwanda | 4.7 | medium | 4.5 | medium |
| Saudi Arabia | 2.2 | very low/low | 2.6 | very low/low |
| Senegal | 5 | high/very high | 4.8 | medium |
| Serbia | 4.2 | medium | 3.6 | medium |
| Slovakia | 2.1 | very low/low | 2.8 | very low/low |
| Slovenia | 1.2 | very low/low | 1.5 | very low/low |
| Somalia | 8.5 | high/very high | 8.3 | high/very high |
| South Africa | 5.1 | high/very high | 5.1 | high/very high |
| South Sudan | 6.5 | high/very high | 7 | high/very high |
| Spain | 2.1 | very low/low | 2.5 | very low/low |
| Sri Lanka | 4.4 | medium | 3.7 | medium |
| Sudan | 6.5 | high/very high | 6.3 | high/very high |
| Sweden | 1.7 | very low/low | 1.9 | very low/low |
| Switzerland | 1.6 | very low/low | 1.7 | very low/low |
| Syria | 5.7 | high/very high | 6 | high/very high |

| | | | | |
|---|---|---|---|---|
| Tajikistan | 4.5 | medium | 4.5 | medium |
| Tanzania | 5.5 | high/very high | 5.2 | high/very high |
| Thailand | 4.6 | medium | 4.3 | medium |
| Togo | 4.7 | medium | 4.6 | medium |
| Trinidad and Tobago | 2.2 | very low/low | 2.8 | very low/low |
| Tunisia | 2.8 | very low/low | 3 | very low/low |
| Turkmenistan | 3.6 | medium | 3.4 | medium |
| Turkey | 3.5 | medium | 3.6 | medium |
| Uganda | 5.8 | high/very high | 5.9 | high/very high |
| Ukraine | 3.2 | medium | 4.6 | medium |
| United Arab Emirates | 2.1 | very low/low | 2 | very low/low |
| United Kingdom | 1.9 | very low/low | 2 | very low/low |
| United States of America | 3.2 | medium | 3.5 | medium |
| Uruguay | 2.1 | very low/low | 2.4 | very low/low |
| Uzbekistan | 3.7 | medium | 3.9 | medium |
| Venezuela | 4.4 | medium | 4.3 | medium |
| Yemen | 5.5 | high/very high | 6 | high/very high |
| Zambia | 5 | high/very high | 5.1 | high/very high |
| Zimbabwe | 6.3 | high/very high | 5.9 | high/very high |