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## EDITED BY

Aduagna Woyessa,  
Ethiopian Public Health Institute, Ethiopia

## REVIEWED BY

Edward Wilson Ansah,  
University of Cape Coast, Ghana

## \*CORRESPONDENCE

Báltica Cabieses  
✉ bcabieses@udd.cl

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# Effects of climate change on migration in Latin America and Caribbean: a scoping review

Báltica Cabieses<sup>1,2,3\*</sup> and Catalina Huerta<sup>1,2</sup>

<sup>1</sup>Centro de Salud Global Intercultural (CeSGI), ICIM Facultad de Medicina Clínica Alemana, Universidad del Desarrollo, Santiago, Chile, <sup>2</sup>Facultad de Psicología, Universidad del Desarrollo, Santiago, Chile, <sup>3</sup>Department of Health Sciences, University of York, York, United Kingdom

Climate change-induced natural disasters such as hurricanes, landslides, forest fires, and changes in precipitation directly affect rural sectors that depend on field production and other dimensions of everyday life. This generates the mobilization of people from their homes to safer places within the same country or across borders. There is a lack of information on the impacts of climate change on environmental migrants in Latin America and the Caribbean (LAC). This scoping review aims to describe the scientific evidence of the health effects of climate change on migrant in LAC. The review was conducted using databases from PubMed, Web of Science (WoS), and Google Scholar in English, Spanish and Portuguese. After screening the title, abstract, and full text of identified hits ( $n = 726$ ), 31 records were finally included. Evidence indicates that climate change relates to health and healthcare, psychosocial and infrastructure dimensions among migrants in LAC. Health effects refer to limited access to healthcare, underdiagnosis, increased susceptibility to diseases and mental health conditions like stress and anxiety. Psychosocial dimensions refer to a heightened risk of sexual and gender-based violence, social marginalization, family separation, and loss of identity and culture. Infrastructure refers to environmental degradation and agricultural and urban infrastructure destruction. Multiple adaptations to these conditions are described among migrant populations in the region. Recommendations for improvements are presented. This scoping review suggests climate change's significant health, psychosocial, and infrastructural associations with migrants in Latin America.

## KEYWORDS

migrant, Latin America and the Caribbean, health impact, psychosocial impact, infrastructure impact, scoping review

## Introduction

Climate change is affecting the planet in different ways (Frumkin et al., 2008). One of these impacts is on human health, as changes in weather and climate patterns are putting lives at risk (Romanello et al., 2023; Papworth et al., 2015). Heat is one of the deadliest weather phenomena because of the heat stroke it can cause (National Oceanic and Atmospheric Administration, n.d.). As ocean temperatures increase, hurricanes become more vigorous and wetter, leading to direct and indirect fatalities. Drier conditions result in increased wildfires, which present various health risks. In other parts of the world, flooding is increasing, leading to the spread of waterborne diseases, injuries and chemical hazards, and an increase in mosquitoes and ticks, bringing new diseases to previously unaffected areas (National Oceanic and Atmospheric Administration, n.d.). According to the World Health Organization (WHO),

between 2030 and 2050, climate change is expected to cause approximately 250,000 additional deaths per year from malnutrition, malaria, diarrhea, and heat stress alone (World Health Organization, n.d.). These effects interact with existing social vulnerabilities, exacerbating their impact on the health and well-being of populations (Hartinger et al., 2023; Palmeiro-Silva et al., 2023).

Ecological factors in vulnerable populations have led to migration from affected homelands due to rising heat stress and natural disasters. These situations have directly affected rural sectors that depend on field production, mobilizing people from their homes to safer places within the same region or internationally. According to Reuveny (2021), floods and rising sea levels can potentially cause an increase of 200 million climate migrants globally by 2050. In Africa, Latin America, and South Asia, rising sea levels, declining crop yields, and dwindling safe water may result in a net internal migration of 143 million people by 2050 (Reuveny, 2021).

Current data suggests that many people may move within their respective countries, particularly in the southern regions, but many may relocate overseas (Reuveny, 2021). Specifically, in Latin America and the Caribbean (LAC) internal climate migrants could reach 17.1 million by 2050 under the pessimistic reference scenario, representing 2.6% of the region's population. Between 1.4 and 2.1 million individuals in Mexico and Central America are expected to migrate by 2050. However, the highest numbers are projected under the pessimistic reference scenario, with up to 3.9 million individuals migrating due to climate (World Bank Group, 2018).

Therefore, climate change must be addressed urgently to mitigate its adverse effects. Evidence suggests that this phenomenon is causing widespread migration as people are forced to leave their homeland for better living conditions. The lack of international public policies mandating nations to receive migrants often leads to dire consequences for the health and safety of affected individuals (World Bank Group, 2018).

This review holds significant implications for future research directions, policy formulation, and practical interventions aimed at mitigating the impacts of climate change on migrants in Latin America and the Caribbean. Extensive research has been conducted on the relationship between climate change and migration. However, there is a lack of information on the impacts of climate change on migrants in LAC and the health impacts of this global public health threat in these regions. Therefore, a scoping review is more appropriate to identify the extent of available research and gaps in knowledge. For these, we included a framework to understand how climate change impacts health based on the Center for Climate Change and Health framework (Rudolph et al., 2015). The following research question was formulated: What is the existing scientific evidence on the effects of climate change on migrants in Latin America and the Caribbean in general and on the health of migrants in particular?

## Methods

### Type of review

We conducted a scoping review (Peters et al., 2020; Mak and Thomas, 2022). This scoping review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), which was revised by the

research team. [Supplementary material S1](#) describes the scoping review checklist.

### Databases

The following bibliographic databases were searched from 2013 to 2024 to identify potentially relevant documents: PubMed, Web of Science (WoS) and Google Scholar. These were used based on availability from Universidad del Desarrollo, place from which the review was conducted, and relevance to LAC region. PubMed and WoS are some of the highest yield databases globally with relevant evidence from LAC, and Google Scholar allowed for the inclusion of relevant gray literature from the region that is often not published in indexed high-impact journals.

### Search strategy

Search strategies were drafted by BC and further refined through team discussions with CH. Search strategies in each database included the terms “climate change,” “migrant,” “asylum,” “refugee,” “Latin America,” “Caribbean,” and “South America.” Searches were conducted in July 2024 in PubMed and WoS in English and Google Scholar in English, Spanish and Portuguese. Search strategies with the highest number of hits per database were finally used. [Box 1 in Supplementary material S2](#) describes the generic search strategy included in this scoping review. We found 281 hits in PubMed, 296 in WoS, and 302 in Google Scholar.

### Selection process and inclusion/exclusion criteria

To be included in the review, papers must focus on climate change, migration and LAC. We included English, Spanish and Portuguese articles. The time frame was from November 2013 onwards, and we included different study types (quantitative, qualitative or mixed-methods). Selected articles were uploaded to Rayyan platform to expedite the screening process. A filter was applied for each paper using the following keywords: Latin America, Migrant, and Climate Change. If these three terms were present in the title or abstract, the full text was selected and read to verify whether the paper was included.

We screened 726 articles after duplicates and articles before November 2013 were removed. After this process, 654 manuscripts were excluded, mainly due to not being related to the topic of interest, not being of human nature and have no open access. After this selection process, 31 papers were finally included in the review analysis. [Supplementary material S3](#) describes the scoping review PRISMA flowchart of this review.

### Data extraction and analysis

We extracted relevant information from each article in a pre-defined Excel sheet. The data extracted from the selected papers included the following: author's name, year, country of publication,

paper title, study objective, type of study, methodology, research instruments, migrant type, sociodemographic characteristics and number of participants, type of climate change, general findings and specific on health impact, infrastructure, and socioeconomics, mechanisms of action of the population, recommendations made by researchers and conclusion. [Supplementary material S4](#) describes the data of selected articles.

## Results

### General description of selected articles

The 31 articles included in the study covered Mexico ( $n=11$ ), Peru ( $n=2$ ), Honduras ( $n=2$ ), Ecuador ( $n=2$ ), Colombia ( $n=1$ ), Bolivia ( $n=1$ ), Barbuda ( $n=1$ ), the Bahamas ( $n=1$ ), Guatemala ( $n=1$ ) and Argentina ( $n=1$ ). Additionally, several of the articles focused on more than one country. Among these, several covered Latin America ( $n=3$ ) and Central America ( $n=2$ ) as a whole, and in some cases Central America as well as Mexico ( $n=1$ ), and Guatemala as well as Mexico ( $n=1$ ), another paper focused on The Caribbean ( $n=1$ ). There were qualitative analyses ( $n=11$ ), quantitative analyses ( $n=8$ ), literature reviews ( $n=9$ ), and mixed studies ( $n=3$ ). In the reviewed articles, there were different ways of referring to the migrants: international migrants ( $n=9$ ), international and domestic migrants ( $n=5$ ), internal migrants ( $n=11$ ), forcibly displaced migrants ( $n=3$ ), irregular migrants ( $n=1$ ), intraregional migrants ( $n=1$ ) and asylum-seekers ( $n=1$ ). Different events were discussed within the climate change phenomena, such as climate change, in general ( $n=10$ ), precipitation variability ( $n=17$ ), extreme temperature ( $n=6$ ), hurricanes ( $n=4$ ), earthquake ( $n=1$ ), volcanic eruptions ( $n=1$ ), and land and environmental degradation ( $n=1$ ). Many academic papers discuss various types of climate change, which explains why there are more numerical data than papers available.

### The relationship between climate change and migration in LAC: general findings

Based on the Center for Climate Change and Health framework, there are different health outcomes from climate change impacts, like living conditions that comprise the social, physical, economic, and service environments in which people are born, live, work, learn, play, and age. On the other hand, health behaviours and health risks, and exposures contribute to adverse health outcomes leading to disability, death, and associated health and social costs (Rudolph et al., 2015).

Social environments are affected by climate change effects (Mostajo, 2014; Rodríguez, 2021; Cárdenas-Vélez et al., 2024; Casillas, 2020; Valencia Hernández, 2014) which heavily influence individual migration decisions. This can also affect mental health, climate migrants can experience adverse psychosocial effects, including social marginalization, exacerbation of family separation (Ortiz et al., 2021; Parry et al., 2019), negative impacts on mental health (Parry et al., 2019; Riosmena et al., 2018; Perdikaris et al., 2021; Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Oswald Spring, 2016; Organización internacional para las migraciones (OIM), 2017) like stress and anxiety (Huber et al., 2023), loss of identity and cultural disintegration (Ortiz et al., 2021), and educational

abandonment (Ortiz et al., 2021). Climate change impacts on economic environment (Mostajo, 2014; Rodríguez, 2021; Cárdenas-Vélez et al., 2024; Casillas, 2020; Valencia Hernández, 2014; Perdikaris et al., 2021). Such factors include unemployment (Cárdenas-Vélez et al., 2024; Ruiz-de-Oña et al., 2019) scarce job opportunities, and work insecurity (Cárdenas-Vélez et al., 2024). Consequently, migration often occurs towards areas that offer better job prospects (Mostajo, 2014; Organización internacional para las migraciones (OIM), 2017). Physical environments, natural and built, are also affected. Regarding the impact of climate change on infrastructure, it was found that events like Hurricane Irma (Perdikaris et al., 2021) could cause environmental degradation and destroy agricultural and urban infrastructure (Perdikaris et al., 2021; Huber et al., 2023; Spring, 2015; Sánchez-R and Riosmena, 2021; Doering-White et al., 2024). Such damage can drive rural-urban migration (Huber et al., 2023; Sánchez-R and Riosmena, 2021) in addition to problems like lack of water storage and difficult crop accessibility (Ortiz et al., 2021), which can also lead to internal migration, as was reported in Honduras (Ortiz et al., 2021). Climate change events can also dispossess agricultural land from communities (Sánchez-R and Riosmena, 2021). Health inequities also arise from differences in living conditions and access to health resources and opportunities. Climate change amplifies pre-existing migration factors such as poverty, violence (Rodríguez, 2021; Huber et al., 2023), insecurity and forced gang recruitment, especially among migrant youth (Oswald Spring, 2016; Huber et al., 2023) (Table 1).

Not all individuals or all communities are equally affected by climate change. Climate change vulnerability is the degree to which people and places are at risk from the impacts of climate change, and also takes into account how well they can cope with those impacts (Rudolph et al., 2015). Survivors of Hurricane Irma, migrate to different countries and experience exploitation, discrimination, and human rights injustices (Valencia Hernández, 2014; Thomas and Benjamin, 2023) due to their lack of citizenship status (Thomas and Benjamin, 2023). In other areas, women were particularly vulnerable to the impacts of climate change due to quadruple discrimination based on being indigenous, female, migrant, and poor (Oswald Spring, 2016; Spring, 2015). Additionally, there is concern about children's health and safety due to an insecure environment related to climate change (Castilla et al., 2021). Notably, migrant women played a prominent role in distributing social capital in Asentamiento Humano Nuevo Punchana, Peru (Lozano Ramirez, 2016) (Table 1).

Climate change has varied effects on migration patterns, some studies suggested that there can be less migration to the United States (US) from rural Mexico during frequent or severe heat or drought conditions and adverse environmental conditions (Gray and Bilsborrow, 2013). However, climate change may also significantly affect international migration more than internal migration, as specific episodes of heat and drought trigger international migration (Casillas, 2020; Riosmena et al., 2018; Nawrotzki et al., 2013; Nawrotzki et al., 2017; Nawrotzki et al., 2016). Additionally, the population described in studies often from an irregular migratory status (Casillas, 2020). Following a natural disaster, recovery migration showed a notable concentration and spatial intensification. Climate-related migration could be due to an economic crisis in the host country, typically referred to as the US in the case of Central America (Spring, 2015). In the case of Veracruz, Mexico, it was estimated that climate change had around a 2% probability of contributing to migration (Mostajo, 2014).

**TABLE 1 Principal results of climate change effects in Latino American migrants.**

Reference	Health effects											Infrastructure effects			Psychosocial effects								
	Inadequate healthcare access	Lack of treatment	Sexual violence	Infectious diseases	Malnutrition	Allergies	Chronic disease	Injuries	Poisoning	No clean water	Food insecurity	Agricultural destruction	Lack of water storage	Dispossession of land	Family separation	Negative mental health	Loss of identity	Amplifies DSS	Gang recruitment	Socioeconomic impacts	Human rights injustices	Woman doble vulnerability	
Parry et al. (2019) [1]	x	x													x	x							
Riosmena et al. (2018) [2]																x							
Nawrotzki et al. (2016) [3]																							
Nawrotzki et al. (2017) [4]																							
Curtis et al. (2015) [5]																							
Nawrotzki et al. (2013) [6]																							
Gray and Bilsborrow (2013) [7]																							
Huber et al. (2023) [8]	x											x				x		x					
Casillas (2020) [9]																					x		
Cárdenas-Vélez et al. (2024) [10]																							
Thomas and Benjamin (2023) [11]	x									x												x	
Wilson (2020) [12]																							
Ruiz-de-Oña et al. (2019) [13]																						x	
Perdikaris et al. (2021) [14]												x				x						x	
Comisión Económica para la América Latina y el Caribe (CEPAL) (2021) [15]		x	x	x	x	x	x	x	x							x							
Casillas (2020) [16]												x											x
Corona-Jiménez (2018) [17]																							

(Continued)

TABLE 1 (Continued)

Reference	Health effects											Infrastructure effects				Psychosocial effects						
	Inadequate healthcare access	Lack of treatment	Sexual violence	Infectious diseases	Malnutrition	Allergies	Chronic disease	Injuries	Poisoning	No clean water	Food insecurity	Agricultural destruction	Lack of water storage	Dispossession of land	Family separation	Negative mental health	Loss of identity	Amplifies DSS	Gang recruitment	Socioeconomic impacts	Human rights injustices	Woman doble vulnerability
Rodriguez (2021) [18]																				x		
Hosmer-Quint (2017) [19]										x												
Lozano Ramirez (2016) [20]					x					x		x			x		x					
Sánchez-R and Riosmena (2021) [21]										x	x			x								
Lozano Ramirez (2016) [22]				x					x	x												x
Castilla et al. (2021) [23]							x															
Oswald Spring (2015) [24]				x																		x
Oswald Spring (2016) [25]				x							x	x				x		x				x
Bernabé (2018) [26]																						
Organización internacional para las migraciones (OIM) (2017) [27]																x				x		
Gonzaga Valencia Hernández et al. (2014) [28]																				x	x	
Mostajo (2014) [29]																				x		
Lacarte et al. (2023) [30]																						
Doering-White et al. (2024) [31]		x			x					x	x	x								x		

Regarding the impact of climate change on the health of migrants in LAC, 13 articles included this topic. They found that climate migrants often experience barriers to effective access to healthcare (Parry et al., 2019; Huber et al., 2023; Doering-White et al., 2024; Thomas and Benjamin, 2023), leading to underdiagnosis and poor disease control due to lack of treatment (Parry et al., 2019; Comisión Económica para la América Latina y el Caribe (CEPAL), 2021). Additionally, climate migrants may become more susceptible to sexual and gender-based violence as well as post-traumatic stress disorders (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021). Climate change and natural disasters can increase infectious diseases like acute diarrhea (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021) and diseases transmitted by vectors (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Organización Internacional para las Migraciones (OIM), 2017; Spring, 2015; Lozano Ramirez, 2016). It can also increase the risk of malnutrition (Ortiz et al., 2021; Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Doering-White et al., 2024), allergies (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021), cardiovascular diseases (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021), respiratory infections (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Castilla et al., 2021), skin conditions (Castilla et al., 2021), injuries (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021), and poisoning (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Lozano Ramirez, 2016). Evidence in LAC also indicated that climate migrants might experience a lack of access to clean running water (Doering-White et al., 2024; Thomas and Benjamin, 2023; Lozano Ramirez, 2016), food insecurity (Casillas, 2020; Ortiz et al., 2021; Oswald Spring, 2016; Sánchez-R and Riosmena, 2021; Doering-White et al., 2024; Hosmer-Quint, 2017) and crop diseases (Hosmer-Quint, 2017), which lead to increased rates of morbidity and mortality due to displacement and stress (Perdikaris et al., 2021) (Table 1).

## Adaptation and mitigation measures from climate change by migrants in LAC

Adaptation, according to the Center for Climate Change and Health, is an “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (Rudolph et al., 2015). The most prominent adaptation measure for climate change in LAC was migration, either internal (Riosmena et al., 2018; Nawrotzki et al., 2013; Lacarte et al., 2023) or international (Huber et al., 2023; Spring, 2015; Sánchez-R and Riosmena, 2021; Doering-White et al., 2024). The type of individuals and communities that tended to migrate in these contexts varied, as it was not exclusive to the most vulnerable individuals or families (Cárdenas-Vélez et al., 2024). Other forms of adaptation included reassignment of domestic work (Riosmena et al., 2018), *in-situ* survival strategies such as shifting or adapting cultivation (Riosmena et al., 2018; Ruiz-de-Oña et al., 2019; Spring, 2015), selling livestock (Riosmena et al., 2018), and receiving public assistance (Riosmena et al., 2018). Adapting to degraded and vulnerable environments by using resources from garbage, foraging for food and materials for shelter was also reported (Castilla et al., 2021; Corona-Jiménez, 2018), as well as taking care of water supplies

(Corona-Jiménez, 2018) and preserving forests as a fundamental source of life (Corona-Jiménez, 2018).

For example, a Peru community developed community-based actions, including traditional medicine with plants and vegetables with healing properties. They also carried out *mingas* (cooperative work) and created soup kitchens and *vasos de leche* (jars of milk) (Lozano Ramirez, 2016). Another example is a community in Mexico that installed a siren to warn of rising river levels, an early warning by municipal civil protection, and empowered women in local public service roles related to climate change emergencies (Oswald Spring, 2016).

## Evidence-based recommendations to mitigate climate change impacts on migrants in LAC

There are seven different climate change intervention strategies to mitigate climate change impacts on the population (Rudolph et al., 2015) and in these outcomes, we found four of the seven interventions recommended. Policy and system change include changes in standards, regulations, and laws, funding distribution, financial and other incentives. We found a paper that establishes climate change adaptation programs to help stabilise rural household livelihoods and reduce undocumented migration (Nawrotzki et al., 2013; Nawrotzki et al., 2016), in some countries of the Caribbean governments have developed measures to address migrants in irregular status and to support migrants' access to basic education and health services (Lacarte et al., 2023). Further research on the topic emphasises the need for policy guidelines to recognise and address climate-induced migration as a multidimensional and transnational reality (Cárdenas-Vélez et al., 2024; Casillas, 2020; Valencia Hernández, 2014; Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Huber et al., 2023; Ruiz-de-Oña et al., 2019; Spring, 2015; Thomas and Benjamin, 2023; Castilla et al., 2021; Corona-Jiménez, 2018; Bernabé, 2018.), incorporating indigenous ethnicity (Hosmer-Quint, 2017) and gender (Oswald Spring, 2016) perspectives. This research on nomadic identities should include studying people who have been displaced and then returned home, focusing on social and environmental justice (Perdikaris et al., 2021) and using their knowledge and new strategies to recover productive systems and increase income (Ortiz et al., 2021). These public policies could create a regional committee on migration and climate change to develop national population plans (Organización Internacional para las Migraciones (OIM), 2017; Lacarte et al., 2023). For example, in some Pacific Island nations, the government has purchased land in relatively disaster-safe parts of the country to facilitate the movement of their nationals (Lacarte et al., 2023). Other recommendations include global ecological cooperation through international agreements, adherence to quotas for regulating carbon emissions, and continuation of initiatives to protect species and ecological diversity (Mostajo, 2014; Sánchez-R and Riosmena, 2021).

Climate change mitigation strategies are those that slow climate change and reduce the long-term magnitude of climate change impacts. One research study recommended alternative energy generation (Sánchez-R and Riosmena, 2021). Strengthening community development and climate change education is recommended (Mostajo, 2014). This provides information through

multiple forums to increase individual and community knowledge about the science of climate change and its impacts, and strategies to address it, and to influence attitudes about climate change action (Rudolph et al., 2015).

Disaster risk reduction seeks to reduce harm and damage from climate change (Rudolph et al., 2015). We found that sustainable irrigation systems (Nawrotzki et al., 2013) were being created to offset the population impacts (Nawrotzki et al., 2017), also subsidising drought-resistant crops (Nawrotzki et al., 2013), and creating “resilient cities” with new models of urban development (Lozano Ramirez, 2016). Similarly, governments could support climate aid policies focusing on real-time monitoring of environmental conditions in vulnerable areas (Comisión Económica para la América Latina y el Caribe (CEPAL), 2021; Gray and Bilsborrow, 2013). Another recommendation was to improve the implementation of the intersectionality theory to understand better how invisibilities affect health and how to address them (Parry et al., 2019).

## Discussion

Health effects may be direct and indirect, most caused by heat waves, droughts, severe storms, and rising sea levels (Pan American Health Organization, n.d.). These include increased infectious diseases, malnutrition, allergies and chronic diseases of the lungs, skin and heart, inadequate healthcare access, underdiagnosis, increased susceptibility to diseases, and heightened risk of sexual and gender-based violence. The region reported that climate change significantly affected variations in migration patterns and affected a wide range of communities and countries (Ammann et al., 2021). Hence, climate change appeared as a relevant determinant of migration, and both were relevant determinants of individuals’ and communities’ health in LAC.

This review suggested some effects of climate change on infrastructure in the region through three main mechanisms: (i) temperature increases that can reduce the reliability of existing electrical power systems, (ii) sea level rise can increase storm surges and cause damage to bridges and low-lying roads during hurricanes, and (iii) increased rainfall intensity and frequency can overload urban drainage systems and pipelines (Zhang et al., 2022).

We found evidence around the possible psychosocial effects of climate change and migration in LAC. A 2021 global review of 120 publications published by Charlson et al. (2021) revealed that most studies were conducted in high-income countries. The results indicated that distress ( $n = 17$ ) was a common mental health issue and was linked to a higher number of psychiatric hospital admissions during periods of increased temperature and heat waves, particularly in older people and those with a history of mental illness. The study also found an increased risk of suicide with rising ambient temperatures. Also, exposure to trauma during disasters and pandemics can negatively impact an individual’s well-being, sleep, psychological health, and cognitive function. As seen in this scoping review psychosocial effects of climate change and migration in LAC can lead to increased rates of high-risk behaviours, such as domestic violence, alcohol and substance use. Additionally, distant effects include diffuse mental and physical health consequences of displacements, community disruptions, migration, environmental decline, conflicts, and violence (Gawrych, 2022).

Concerning adaptation and mitigation efforts in LAC to climate change effects, findings emphasized the importance of the family and the community’s role in survival and emergency planning. Also, some studies highlighted women’s role in organizing and caring for the community (Magali et al., 2019). One prominent adaptation measure was migration, which occurred across socioeconomic layers in the region. Migration appeared to result from the adverse effects of direct climate change. However, it was also intertwined with other indirect determinants like poverty, hunger, and lack of work opportunities in the place of residence. Hence, our review suggests that climate change and migration are complex, dynamic, multidimensional phenomena that need further investigation in the region and globally.

A review of 36 empirical papers from South Asia, Africa, Pan America, Oceania, Europe and Middle East (Mcmichael, 2023) suggests that climate change impacts interact with other factors to shape mobility. It is challenging to disentangle climate change impacts from other socioeconomic, political, demographic, and environmental factors that enable and constrain human mobility. In these countries, climate is rarely cited by migrants as the primary factor influencing their decision to migrate, even in regions with high climate vulnerability. Not seen in this investigation. Additionally, climatic events do not directly cause mobility but rather prompt it through associated effects such as reduced land productivity, disrupted livelihoods, food and water insecurity, and decreased habitability of the area.

Individuals who relocate may face health risks, including limited access to healthcare, increased incidence of water- and foodborne illnesses, mental health risks, threats to sexual and reproductive health, disrupted social networks, loss of place attachment, skin diseases, and food insecurity, both during transit and in settlement sites (Mcmichael, 2023). These outcomes are observed in different world regions, and our findings are placed in the context of the multifaceted migration decision. This trend is expected to continue in the coming years.

In Canada, a report shows that the impacts of climate change could cost Canada’s healthcare system billions of dollars and reduce economic activity by tens of billions of dollars by later this century. Climate change exacerbates social and health inequities. The projections are poor air quality, increased cases of Lyme disease, heat stress, and mental illness. The recommendations are that governments should also implement policies that address the root causes of vulnerability and exposure to climate health hazards. These policies should be provincial, territorial, Indigenous, and local government partners to identify bodies that make policy decisions to improve health resilience. Different governments should also invest in better understanding climate change’s regional and local health implications, including the exposure and sensitivity of disadvantaged groups (Canadian Institute for Climate Choices, n.d.).

The study has limitations due to the limited databases reviewed, which may have led to more extensive results than those obtained. The inclusion of gray literature allowed the inclusion of some articles in Spanish and Portuguese. Additionally, we did not conduct a critical appraisal of the reviewed papers, as our scoping review aimed at mapping and describing the reality of this topic in the region, and a variety of research paradigms and study designs, including reviews, were included.

The framework used stated that living conditions comprise the social, physical, economic, and service environments in which people are born, live, work, learn, play, and age. These living conditions engender exposure to health risks and access to health resources and also shape health behaviours. All these 3 concepts together are the greatest contributors to adverse health outcomes that lead to disability, death, and associated health and social costs also known as health inequities. This can be seen in the results of our investigation. On the other hand, there were seven intervention strategies available to reduce the magnitude of climate change and its impacts, policy and systems change, mitigation, climate education, geoengineering, adaptation, disaster risk reduction, and disaster recovery, we found four of these interventions recommended to use in LAC (Lacarte et al., 2023).

## Conclusion

We conducted a scoping review around the effects of climate change on migrants in LAC in general and their health. We found emerging yet significant migration, psychosocial, infrastructural, and health impacts of climate change on migrants in Latin America. Limited access to healthcare, underdiagnosis, increased susceptibility to diseases, and heightened risk of sexual and gender-based violence were reported in the region. Additionally, psychosocial effects include social marginalization, family separation, mental health impacts such as stress and anxiety, and loss of identity and culture. Infrastructure impacts were also noted, including environmental degradation and agricultural and urban infrastructure destruction, which drives rural-urban migration. This study highlights the complex nature of climate-induced migration and the need for comprehensive policy responses to prevent the multidimensional impacts of climate-induced disasters and to protect forcibly displaced people in case they choose to live elsewhere, as climate change exacerbates social determinants and leads to the mobilization of people around the world.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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## Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fclim.2024.1412285/full#supplementary-material>



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