MEDRC

Water | Environment | Peace

TRANSBOUNDARY ENVIRONMENTS

PRACTITIONER BRIEFING SERIES

Issue 18

Water Security & Migration

The Water Security & Migration Nexus in the Central American Dry Corridor

Introduction

Increasing evidence demonstrates that unusual weather variability, unpredictable seasons, climate change, and extreme climatic events contribute to migration globally. The focus of this brief is on decreased water availability due to drought and the associated El Niño phenomenon in Central American Dry Corridor (CADC) countries as a driver of migration and the wider relationship between water, security, and migration. The reasons people migrate from CADC and Central America more widely are complex and based on a variety of interconnected factors. The linkages between water security and migration in the region are also complex and interconnected with many other factors - including poverty, inequality, instability and violence, and historical migration patterns that also influence people to cross borders.

There is increasing research into the hypotheses that climate change and water insecurity will, directly and indirectly, increase migration and displacement around the world. The World Bank estimates that Latin America, sub-Saharan Africa, and Southeast Asia will generate 143 million more 'climate migrants' by 2050. [1] There is also increasing literature on the emergence of simplistic narratives of causal connections between individual factors and migration, and the negative implications of examining these in isolation.

This issue will examine why people migrate and who migrates; considering how and why water insecurity can influence migration in the CADC, as well as the other factors that influence migration and whether water security challenges change migrant profiles.

The World Bank estimates that Latin America, sub-Saharan Africa, and Southeast Asia will generate 143 million more 'climate migrants' by 2050 [1]

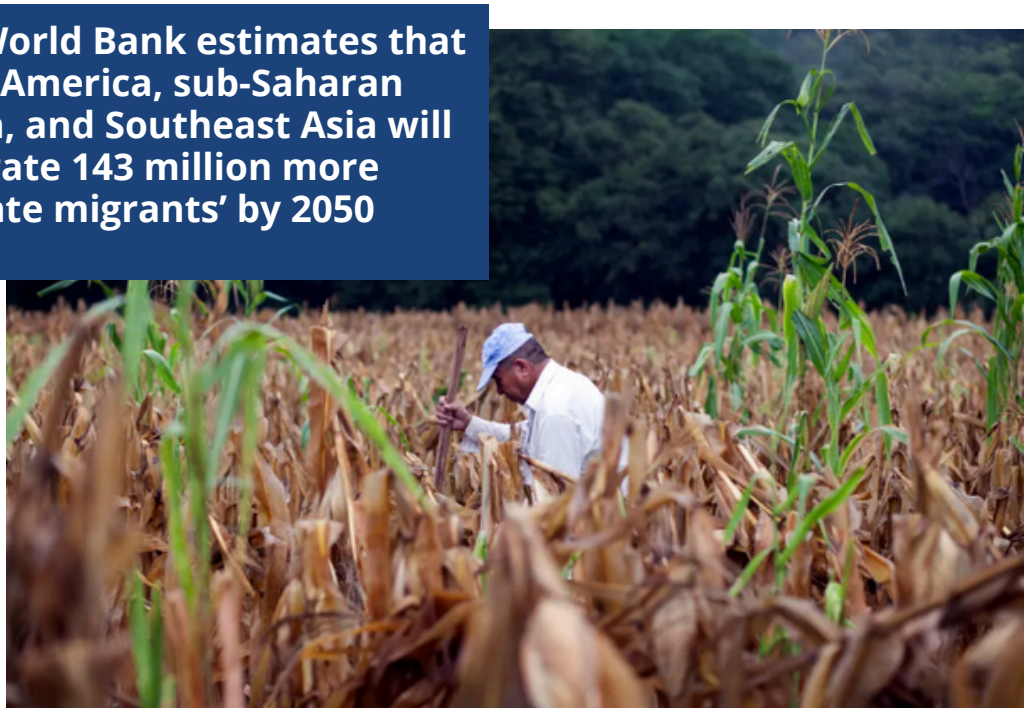


Image: Climatic events, especially drought, have placed 1.4 million subsistence farming families in the Central American Dry Corridor in an urgent food emergency. *Source:* FAO

*This brief focuses on patterns of international migration from CADC countries to USA. Discussion of USA policy on migration is out of scope of this brief.

This brief focuses on the water insecurity and migration in the CADC, a region that is increasingly experiencing increasing and prolonged periods of drought as well as an increase in migration. The water security and migration nexus is an emerging field of study that requires more attention in order to understand the complex interconnections between the two as well as the cumulative effects of other factors in specific contexts to inform policy and action. The CADC is a region that is increasingly experiencing more severe and prolonged periods of drought. The CADC extends through parts of Guatemala, El Salvador, Honduras, and Nicaragua, which are among the top countries of origin for unauthorised migrants to the USA. Migration from Central America is not a new phenomenon. There has been an unprecedented increase in the number of people moving from Central American countries to the USA in recent years, due to various factors that have been exacerbated by the socio-economic impacts of the COVID-19 pandemic, extreme weather events, the ongoing El Niño climate pattern, and political volatility across the region. [2]

Water insecurity is not the sole or direct factor driving migration - a combination of socio-economic, political, environmental, and historical factors cumulatively play a more decisive role than any single factor on its own. However, water insecurity and in the case of the CADC the likelihood of increased water scarcity may significantly heighten the potential for migration, primarily due to its impact on livelihoods and exacerbating existing socio-economic and political challenges that drive people to move.

Practical Summary

- Water insecurity caused by unusual weather variability, unpredictable seasons, and climate change is a significant driver of migration in the CADC, especially among vulnerable rural communities dependent on agriculture - but is one component of a complex web of socio-economic, environmental, and political factors driving migration from the CADC.

- Decreased water availability due to drought and the El Niño phenomenon is a notable migration driver in the region, and can amplify existing migration trends and intensify the challenges encountered by migrants.

- Climate change is expected to result in increasingly variable and unpredictable weather patterns, along with more intense and prolonged droughts in the CADC. These changes will exacerbate the existing vulnerabilities and challenges faced by the region's inhabitants.

- The evolving demographic profile of migrants in the CADC and the wider region reflects the worsening conditions and increased vulnerability within the region.

- Increasing frequency and intensity of El Niño events, along with droughts and other extreme weather caused by climate change, are straining humanitarian resources and infrastructure. There is an urgent need for a coordinated and sustained global effort to strengthen humanitarian response mechanisms.

- Policy responses must adopt a holistic approaches that address the root causes of migration, promote sustainable development, and enhance resilience to meet the needs of the most vulnerable.

Water Security & Migration

Water Security

Access to water is vital for human survival and human society. Water is essential for economic activity that drives the fabric of society, livelihoods, and health and wellbeing – water fuels energy production, agriculture, transportation, and many other activities that sustain not only human life but also human livelihoods and society. Water can also pose significant threats to human life – poor water quality can cause life-threatening illnesses, and flooding and storms are among the most destructive and life-threatening climate-related events. [3]

The concept of water security encompasses various aspects. The World Bank uses the definition "the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems, and production, coupled with an acceptable level of water-related risks to people, environments and economies". In this way, water security focuses on the positive and negative outcomes for people, the economy, and the environment that are influenced by various elements of water management. [4]

Water security goes beyond the availability of water. Good water management and governance processes must be in place to ensure that water is stored, transported, regulated, protected, and conserved efficiently and in a responsible way to ensure water access is reliable and available to all. Water availability must be sustainable, and water governance and processes must ensure that there is sufficient water access and availability. Access to water must remain sustainable in the face of climate change, variability, and other socioeconomic, environmental, and political factors. [5]

Migration

The International Organization for Migration refers to migration as the movement of individuals or groups of people from one place to another, typically across geographic regions or national borders, with the intention of establishing temporary or permanent residence. This movement can occur for various reasons, including economic, social, political, environmental, or personal factors. Migration can be voluntary or involuntary, and it encompasses a wide range of movement patterns, such as rural-to-urban migration, international migration, internal displacement, refugee movements, and seasonal labor migration. Migration / migrant are umbrella terms and are not defined under international law. [6]

Water Security & Migration

Water security and migration are intricately linked in many different contexts around the world, and water availability, access to water, and water-related climate events significantly influence human mobility.

There is an increasing focus on the interconnectedness of water security and human movement. Phrases such as "climate refugees", "environmental refugees", and "climate migrants" have emerged often in response to catastrophic events.

The Century of Climate Migrants: Why we need to plan for the great upheaval - The Guardian, 2022

How Bangladesh is supporting climate refugees - BBC News, 2023

Meet the first climate refugees from the Americas to flee rising seas - Financial Times, 2023

Environmental Refugees - National Geographic, 2024

While climate change and water security contribute to the movement of people (both within and across borders) and will inevitably contribute to migration and exacerbate existing drivers of migration - these phrases are somewhat unhelpful. They simplify complexity and do not capture the multifaceted and interconnected reasons that influence why people move – or not.

Huber et al. argue that migration rarely stems from a single cause or driver but rather emerges from the complex interaction of economic, social, political, cultural, and environmental factors. Furthermore – 'water refugee' and 'climate-refugee' narratives oversimplify and disregard other drivers of migration – including inequality, social exclusion, and conflict / violence. [5] Understanding these nuances is critical to be able to appropriately and effectively respond to water security and migration challenges and impacts.

The Central American Dry Corridor

The Central American Dry Corridor (CADC) is an area of Central America that extends across the low-lying and tropical dry forest zones along the Pacific Coast through Southern Mexico, El Salvador, and Honduras to Nicaragua. The area is 1,600km long and 100-400km wide covering 30% of Central America and 80% of the Northern Triangle countries of El Salvador, Guatemala, and Honduras. It is characterized by mountainous terrain with steep declines to coastal plains along the Pacific Coast. [8]

Image: CADC drought risk. *Source:* Gotlieb et al. (2019)

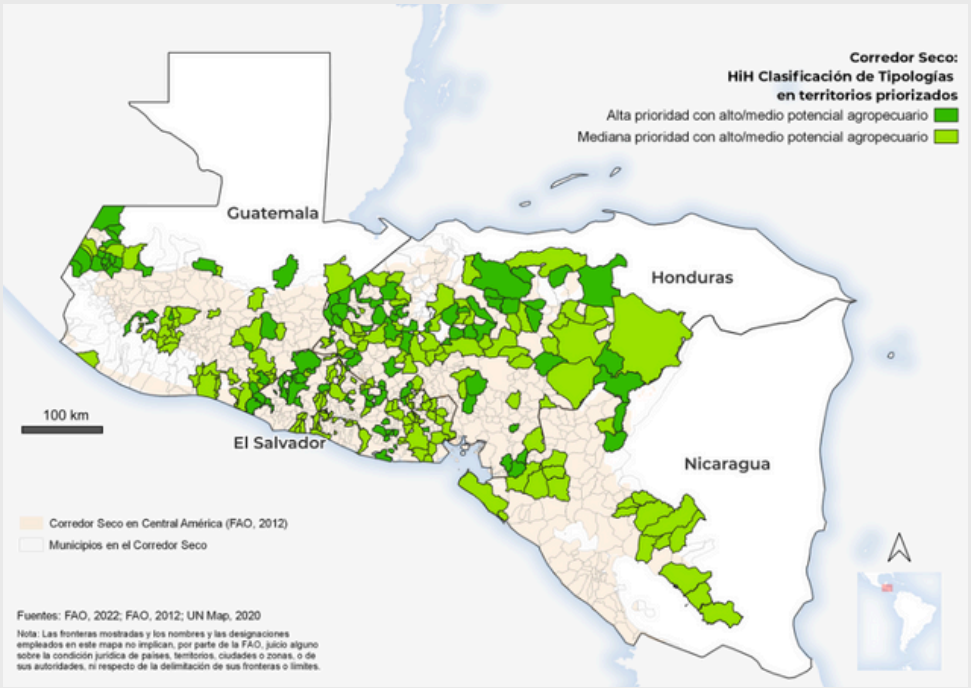


Image: The Dry Corridor-Classification of typologies in priority areas. *Source: FAO (*2022)

The Central American Dry Corridor: Climate Change & Climate Vulnerability

Climate

The CADC experiences a much drier climate compared to other areas in Central America. It is an arid and semi-arid climate and increasingly experiences prolonged period of drought and irregular rainfall patterns. It has a long dry season, typically October-May, and periods of drought during July and August, as well as frequent periods without rain during the wet seasons (May to October). [8] Honduras, Nicaragua, and Guatemala are among the top ten countries in the world most at risk of severe climate change effects.

El Niño Phenomenon

The El Niño-Southern Oscillation (ENSO) is a naturally occurring climate phenomenon associated with the warming of the ocean surface in the central and eastern tropical Pacific Ocean, coupled with changes in the atmosphere. There are three phases of the phenomenon: El Niño refers to a period of warming of sea surface temperatures; La Niña is the opposite and refers to the cooling of the ocean surface temperatures; during neutral periods, ocean surface temperatures are close to average. The oscillation between ENSO warm phase (El Niño) to neutral or cold (La Niña) conditions occurs on average every three to five years, while also ranging from two to seven years. El Niño can last up to 18 months and La Niña up to three years. Both El Niño and La Niña events significantly influence weather and climate patterns around the world with changes in temperature and rainfall being the most common feature of climate variability. It is highly likely that global warming from greenhouse gas emissions makes the extreme weather and climate events associated with El Niño and La Niña patterns more frequent and more severe. [9]

Every El Niño event is unique and in Latin America and the Caribbean, El Niño is usually associated with periods of drought, increased temperatures, unseasonal and heavy rainfall, and flooding. In CADC El Niño typically brings periods of extreme drought and dryness with sporadic rainfall. The ongoing 2023-2024 El Niño phenomenon has been recorded as one of the strongest on record. Although it has peaked, it is projected to last until June 2024 with the impacts lasting well into the subsequent months.

Between April and August 2023, rainfall totals were among the lowest in 43 years in northern areas of Guatemala, western El Salvador, and northwestern Nicaragua, resulting in severe drought, significant vegetation stress, and dry soil conditions. [9]

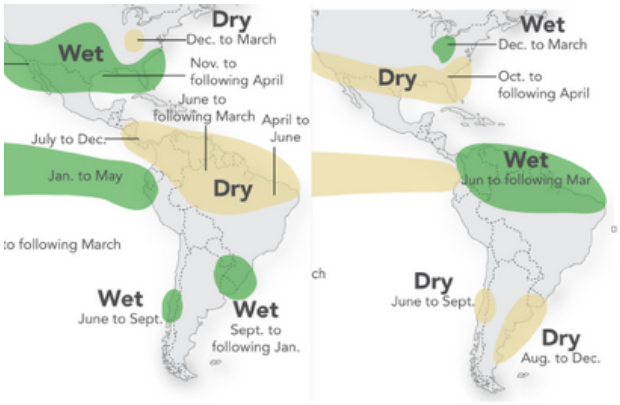


Image: Typical El Niño (left) and La Niña (right) rainfall impacts in Latin America and the Caribbean. *Source:* Muñoz et al, 2016

Demographics & Livelihoods

The CADC is a densely populated region with nearly close to 11 million people which accounts for nearly a quarter of the total population of Central America. A significant number of the population are rural communities with an estimated 1 million people depending on subsistence farming. The FAO estimates that the rural population is 38% in El Salvador and 52% in Honduras and Guatemala. Within this demographic, approximately 62% of rural families produce staple crops such as corn, beans, and sorghum, with variations from 54% in El Salvador and Honduras to 67% in Guatemala. The remaining 38% of the rural population depends on formal wage labor and various agricultural and non-agricultural pursuits. Primarily, rural farmers operate small-scale, rainfed subsistence farms, typically selling their produce surplus. During planting seasons, they tend to stay on their lands but often supplement their incomes by offering their labor, often unskilled, to diverse sectors, commonly commercial farms, which may necessitate relocation. However, the earnings from such endeavors are insufficient, falling short of fulfilling basic needs. Poverty and extreme poverty are widely experienced, affecting more than half of the region's inhabitants, with roughly 80% of small-scale producers living below the poverty line and 30% enduring extreme poverty. [11] [7] FAO estimates that 3.5 million people across the region are in need of humanitarian assistance.

WHY PEOPLE MIGRATE

People migrate for various reasons, including economic opportunities, family reunification, education, political freedom, escape from conflict, persecution, or environmental disasters. Migration in the CADC is driven by a complex array of economic, social, political, and environmental factors that are interconnected and many of which are exacerbated by others and are mutually reinforcing. This section explores some of these factors including water insecurity in the CADC and the impacts on communities and livelihoods; violence, conflict, and political instability; and historical patterns of migration in the region.

Water Insecurity & Impact on Communities and Livelihoods

Various studies demonstrate the influence of unusual weather patterns and unpredictable seasons on migration, especially in areas where economies and livelihoods rely heavily on rainfed agriculture. [14] In the CADC, recurrent extreme climate events and prolonged drought put livelihoods at risk, increase pressure on impoverished and insecure communities across the region, and significantly exacerbate existing humanitarian needs. Small-scale subsistence farmers and rural communities across the region continue to face heightened vulnerability to drought. The impacts of drought include loss of livelihoods, depletion of household income, increased poverty, and migration towards overcrowded urban areas and abroad. Over the last 30 years, losses associated with drought in the CADC are estimated to be close to $10 billion - half of which were in the agricultural sector. [12] The subsequent decline in agricultural produce increases the risk of food security and leads to reduced food reserves, reduced dietary diversity, and increased malnutrition, especially among young children. [11] Poor households suffer from reduced access to food, and overall nutrition decreases, increasing the risk of micronutrient deficits. During prolonged periods of drought, limited access to water and potable water are can increase the risk of waterborne diseases as communities turn to unsafe water sources.

Migration has been identified as an adaptation strategy to drought and extreme climatic events. Linke et al. have conducted empirical research on dry growing seasons and migration in the Northern Triangle of Central America that demonstrates how lower-than-average rainfall impacts livelihoods and, in turn, contributes to an increase in rates of migration. [14]

Image: Rural farmers in CADC are highly vulnerable to drought
Source: WFP/Francisco Fion

By examining the connections between arid conditions and failing harvest during the growing season, with US Border Patrol migrant apprehension rates between 2012 and 2019, their research concluded that dry conditions in the CADC increases the likelihood of migration.

"We found 70.7% more emigration to the US when local growing seasons in Central America were recently drier than the historical average since 1901"
[14]

Using ILO data on employment in CADC countries their results showed that agriculture in 2016 employed 32% of the working population in Guatemala, 37% in Honduras, and 30% in El Salvador - with even higher rates proportionally in rural areas. By 2019, they observed that these numbers had decreased to 31% in Guatemala, 29% in Honduras, and 16% in El Salvador.

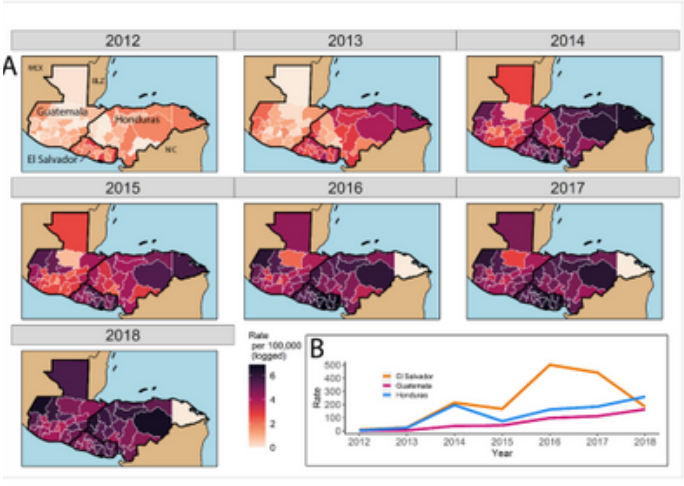
Linke et al. also compared their data with narratives of experiences from interviews and secondary data and found that their data reflected the conditions experienced that drier than usual growing seasons and migration were connected. [14]

Despite the results of their study, Linke et al., echoing the narrative of various researchers and experts, caution against oversimplifying the relationship between climate change and migration. Not everyone affected by climate change can or will migrate. Some households, known as "trapped" households, do not have the financial, institutional, or social resources to move. Strict border controls and perilous migration routes also make international migration dangerous and expensive. The border apprehension data used in their models also likely underestimates how many people migrate due to droughts in areas like the Northern Triangle of Central America. This complexity underscores the need to consider multiple factors and constraints when studying climate-induced migration.

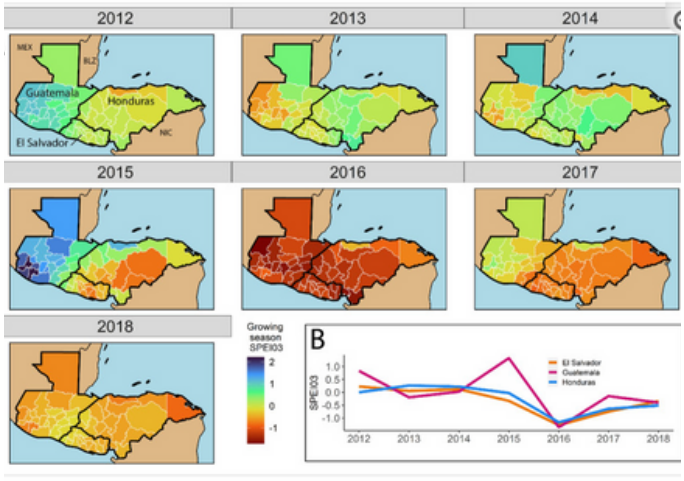
Linke et al. observations on dry growing seasons and migration from Central America

In 2016, residents of Las Marias in Olancho, Honduras, experienced mostly dry water wells, making it difficult to sustain crops. The Famine Early Warning Systems Network raised concerns about hunger and food insecurity in Olancho and nearby areas, aligning with data showing a drier-than-usual growing season and an emigration rate of 379.8 people per 100,000, well above the 90th percentile.

Similarly, San Miguel in El Salvador faced severe drought conditions that year, leading to crop failures and reliance on emergency food supplies. Data indicated an average SPEI03 of -1.41 SD and an emigration rate of 624.1 per 100,000, triple the regional average. In 2015, Guatemala experienced severe drought during the El Niño phenomenon, with a midsummer drought affecting rainfall. The Red Cross reported 3.5 million people needed humanitarian assistance, and data showed an SPEI03 of -1.7 SD with an emigration rate of 529.6 per 100,000. [14]



Source: Linke et al., (2023) Emigration Rates from El Salvador, Guatemala and Honduras to the Southern USA Border - Darker regions have higher rates of emigration over time.



Source: Linke et al., (2023) Department-level (N = 54) growing season Standardized Precipitation Evapotranspiration 3-month weather deviations from the historical average (A).

Shifting dynamics of Honduras-USA migration – is drought contributing to migration to the USA?

Drought has a significant impact on vulnerable communities in Honduras and historically the most extreme droughts are linked to El Niño climatic patterns. The severity of drought experienced varies significantly by region – the risk of drought is constant in the southern and western parts of the country that form the Honduran dry corridor. The impacts of drought and the influence of El Niño phenomenon are complex and are difficult to define. Impacts can be summarized as:

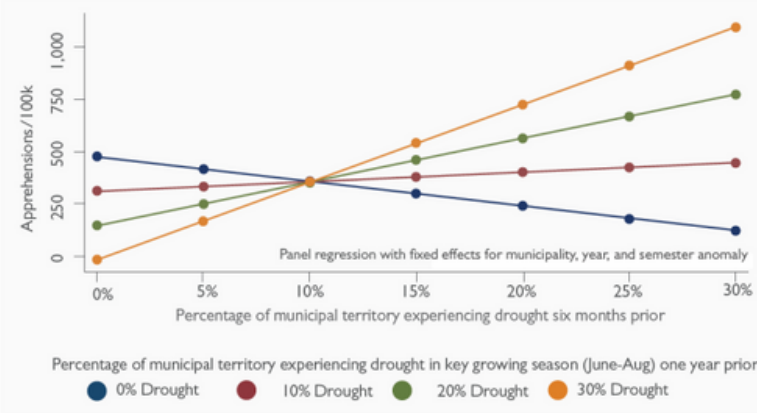
- "Substantial loss of crops and livestock in vulnerable families that are dependent on subsistence agriculture
- Increase in the price of basic commodities
- Limited access to safe water among vulnerable families due to scarcity and increased purchase costs
- Increased incidence of diseases due to consumption of unsafe water or inadequate sanitation conditions" [15]

USAID reports that historically migration to the US from Honduras typically came from urban centres. Rural municipalities, with a higher dependency on agriculture, historically have lower rates of migration to the US compared to areas with more diversified economies. However, the relationship between urban centres and higher rates of migration is shifting and migration from rural areas to the US is increasing. From 2017 to 2020, the average increase in the number of migrants returned as a share of municipal population was almost twice as high for the most rural municipalities (26%) compared to the least rural municipalities (13%). In the 2021 National Security and Migration survey, a higher share of rural residents (43%) than urban dwellers (37%) reported intentions to migrate.' [16]

The region has experienced recurrent droughts, most recently in 2015, 2016-2020, and 2023-2024. These consecutive droughts in the Dry Corridor areas of Honduras increase rates of migration and long-term and cumulative impacts on the US border apprehension rate of migrants from Honduras have been recorded.

> **"Communities in Honduras have faced prolonged droughts, severe flooding due to hurricanes, coastal erosion and coastal inundate due to climate change. This is forcing people to leave their homes and seek more sustainable livelihoods in other countries"**
>
> *Ian Fry, UN Special Rapporteur on the Promotion and Protection of Rights in the Context of Climate Change*

The graph below analyses the correlation between US border apprehensions over time and two measurements of drought – the percentage of municipal territory experiencing drought lagged by 6 months, and the percentage of municipal territory experiencing drought in the key growing season (June-August) lagged by one year. The analysis demonstrates cumulative relationships between rates of apprehensions at the US border with drought and intensity of drought in municipal territory as well as a relationship between drought experienced in the previous year's growing season with emigration. An increase in drought over a sustained period of time would lead to an increase in USA border apprehensions.



Source: DHS/CBP; Normalized Difference Vegetation Index (NDVI) avg. half-yearly and June -August maximum negative anomaly. Analysis by MESCLA.

Source: USAID, 2021: Impact of Drought on the USA Border Apprehension Rate [16]

Violence, Conflict, and Political Instability

Previous conflict in CADC countries and a legacy of violence, criminal activity from gangs and non-state armed groups, and political instability are significant drivers of migration. The Northern Triangle region (El Salvador, Guatemala, and Honduras) is well known as one of the most violent regions globally with homicide and femicide rates amongst the highest in the world. In 2018, El Salvador had a murder rate of 51 per 100,000; Honduras 40 per 100,000; and Guatemala 22 per 100,000 inhabitants. [13] Conflict and gang violence have led to significant numbers of internally displaced people and driven large swathes of migration to Mexico and the US. In the 1980s and 1990s, migration to the US increased due to civil wars and violence in the region and has since steadily continued. Almost 4.6 million residents from El Salvador, Guatemala, and Honduras alone are now in the USA. [13]

Image: A military checkpoint in San Salvador. *Source: Daniele Volpe/The New York Times* (2022)

The rates of gender-based violence, sexual-based violence, and femicide are also amongst the highest in the world, with women disproportionately being exposed to violence. Across the region, gender-based violence is deeply rooted by patriarchal values and stereotypes and exacerbated by gang violence, corruption, weak governance, and ineffective justice systems with a high level of impunity for perpetrators. Across the region, gender-based violence drives internal migration as well as migration to the USA. Although laws against feminicide, harassment, and sexual violence do exist in varying degrees across the region, women's access to justice and protection is extremely limited due to a lack of implementation of policies, corruption, and resource scarcity, as well as toxic masculinity and the normalization of violence towards women.

Regional rates of impunity of gender-based incidents are high and an estimated 95% of crimes against women and girls in El Salvador, Guatemala, and Honduras go unpunished. [13] As a result, more women and girls than ever before are fleeing the region. According to the US Border Patrol data between 2018 and 2019 the number of women caught crossing the Mexico-US border tripled. [17]

Armed Conflict and Violence in El Salvador

Civil war erupted in El Salvador in 1979 lasting until 1992; 1 million inhabitants were displaced, over 75,000 inhabitants were killed, and thousands more were disappeared. According to a UN Truth Commission Report, 85% of these atrocities were carried out by the government. The extreme levels of state sanctioned violence left a legacy of trauma, normalization of violence, and widespread availability of weapons. Peace Accords signed in 1992 did not address the country's unequal economic structure that ignited the Civil War 12 years earlier. In the 1990s, the country implemented austerity policies under the direction of USAID, IMF, and World Bank leading to a decline in public spending – particularly on education and the privatization of public institutions and services. In 2001, the country adopted the US dollar as it's official currency causing growth rates to plummet and making everyday life for the majority of the country's population more expensive. Limited opportunities for employment, and economic policies that increase poverty and inequality combined with a legacy of violence, led many youth to become involved with criminal gangs. These groups offered alternative financial and social opportunities that the state systematically could not. (MPI) Mara Salvatrucha (MS-13), and the 18th Street Gang (Mara 18) are some of the most notorious gangs in El Salvador. Although their origins stem from security needs of El Salvadorian migrants in Los Angeles during the 1960s and 1980s, following the end of the Civil War, a number of El Salvadorians were deported from the US to El Salvador, where gang violence thrived in the absence of opportunities for youth, increasing poverty, a militarized society, and a high availability of weapons. Levels of violence and homicide in El Salvador are higher now than those experienced during war time. These extreme rates of violence are characterized by gang violence, but have deep roots in economic and social inequalities that have existed and have further been entrenched - most notably by foreign influence and economic policies pursued since El Salvador's independence from Spain in 1831. [18]

Historical Patterns of Migration to the USA

Migration from the CADC to the US has ebbed and flowed in the last century and steadily increased since the 1960s and 1970s. Some researchers suggest that migration flows can be self-reinforcing over time as families seek reunification. [18] Established immigrant communities in the US can serve as support networks not just through remittances, but in the decision making and process of moving to the US. Families and friends can provide information on the process as well as financial support, and direct sponsorship to assist others to make the journey. As socio-political and economic conditions worsen and are exacerbated by the increase in extreme weather and climatic events, the perception of better opportunities and a better future in the US may also drive migration.

As discussed, migration is often considered as an adaptation strategy to cope with water shocks and to diversify income when agricultural livelihoods are eroded by drought, and other factors. Government and aid organizations adaptation strategies to combat water insecurity in the region have focused on installing irrigation, using stress-resistant crop varieties, and income diversification and education programs. Impacts of these programs and interventions are hindered by limited resources, unsustainability of projects, shifting government and donor priorities, and the prolonged and increasing frequency of drought. In the absence of other viable alternative adaptation strategies, migration is pursued to adapt to growing stresses, especially to generate remittances.

Huber et al. examine the significance of migration within smallholder communities in the CADC. In rural Nicaragua, they observed that households with greater food security tended to rely less on farming activities, engage less in agricultural wage labor, and participate less in migration.

“For the CADC, the depoliticized and simplistic narrative of migration serving as adaptation must be questioned” [7]

Similarly, in Guatemala, they found a positive correlation between agricultural dependency and households having one or more members abroad, underscoring the importance of migration for smallholder agriculture. However, migration can also have maladaptive consequences. For instance, following Hurricane Mitch in 1998, migration from rural communities in Honduras hindered the recovery of social-ecological systems. This occurred due to a "downgrading effect" on key producers in the rural economy, leading to a shift from a production-based economy to one reliant on remittances. This shift increased inequalities within the sending community and created poverty traps for those lacking access to remittances. [17]

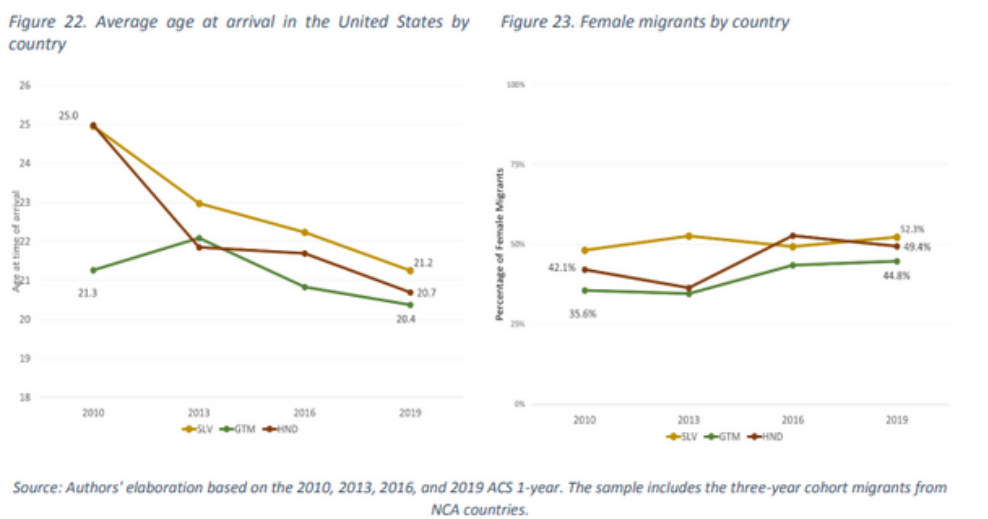
People choose to migrate or are forced to migrate based on the ability to migrate and pre-existing factors and vulnerabilities. Making monocausal links between water insecurity and migration is devoid of nuance and the complexities of the interconnectedness of the two. As shown, water insecurity is not the single driving force of migration and interacts with economic, social, and political factors, as well as poverty, unemployment, weak governance, violence and conflict, and a legacy of international migration across and from Central America more widely.

WHO MIGRATES?

Migration flows from CADC countries to the US have increased in the past 10 years. In 2021, around 3.8 million from these countries (40% from El Salvador, 32% from Guatemala, 21% from Honduras, and 7% from Nicaragua) were living in the USA. [20]. The profile of who is migrating in Central America as whole has shifted in recent years with people moving at a younger age, with a significant increase in women migrating.

In 2015, FAO reported that migration is predominantly male with 26% more men migrating than females. The average age of migrants from El Salvador, Guatemala, and Honduras was 24 years of age. Those migrating had lower levels of education with 55% of recorded migrants not completing high school education and only 20% having higher education levels. [20] The World Bank reports that in the early 2010s the migrants from El Salvador and Honduras typically began their journey to the United States at around the age of 25. However, nearly a decade later, people are moving at a younger age at an average of 22 years old. [20]

The World Bank also reports that over the past decade, there has been a rise in the number of female migrants from El Salvador, Honduras, and Guatemala. In 2019, approximately half of the migrants from El Salvador and Honduras were women, marking an increase of 4% and 7% respectively, compared to 2010. Similarly, the proportion of female migrants from Guatemala increased from 35.6% to 44.8%, indicating a rise of over 9%. [20]



Source: World Bank, 2022: *World Bank graphs demonstrating average age on arrival in the USA and female migrants by country.*

The change in profile of migrants from the CADC countries suggests an increase in population vulnerability over the last ten years. The increase in female migration in a context that has predominantly been (not exclusively) characterized by male migration suggests worsening conditions for females.

There is limited research into changes in migrants profiles in the CADC countries due to drought and water insecurity. Most studies focus on Central or Latin America as a whole, or individual countries. A potential correlation between the change in profiles of migrants and the increase in drought conditions and impacts on livelihoods in the region over the last 10 years exists. It is an important area that merits further research for national and regional policies and relief and humanitarian intervention given the increasingly treacherous and risky conditions faced in migration routes to the US.

CONCLUSION

The intricate relationship between water security and migration CADC highlights and echoes the complexity of population movement in the region and around the world. While there is increasing evidence linking water insecurity caused by unusual weather variability, unpredictable seasons, and climate change to migration it is essential to understand that migration is influenced by a multitude of interconnected factors. It is clear that decreased water availability due to drought, compounded by the El Niño phenomenon, is a significant driver of migration in the region, particularly among vulnerable rural communities dependent on agriculture. However, it is crucial to recognize that water insecurity is just one component of a complex web of socio-economic, environmental, and political factors driving migration from the CADC. While a lack of water is not the sole or primary catalyst for migration, it possesses the capability to magnify existing population movements and intensify the challenges encountered by migrants.

The demographic profile of migrants from the region is evolving, with a notable increase in female migrants and a shift towards younger ages among migrants. This change in migration patterns reflects worsening conditions and increased vulnerability within the region. It is essential to acknowledge the intersectionality of factors influencing migration, including poverty, inequality, violence, and historical migration patterns, which shape the decision-making process of individuals and families.

Climate change and the likelihood of ongoing variable and unpredictable weather patterns and increased intensity and duration of drought in CADC will only further compound vulnerabilities and challenges that CADC inhabitants already face. Policy responses to migration from the CADC must adopt a holistic approach that addresses the root causes of migration and promotes sustainable development and resilience in the region.

While water insecurity can amplify existing migration trends and drivers, effective interventions must go beyond emergency responses to disasters and focus on long-term development initiatives. By recognizing the multi-causal nature of population movement and adopting comprehensive strategies, policymakers can work towards fostering stability, prosperity, and resilience in the region, ultimately easing the flow of migration from the CADC countries.

The humanitarian response plans for all CADC countries demonstrate that agencies are coordinated and do address the multifactor and interconnected challenges that the region faces to varying extents. They also prioritize both the immediate needs of the population and medium and long-term solutions to ensure that affected individuals can achieve resilience. However, there are significant funding gaps in humanitarian response. In the 2023 funding coverage was less than a quarter of funding requirements as outlined in the Humanitarian Response Plans for each country. Honduras had an 85% total funding gap, El Salvador and Guatemala both had a funding gap of 76%. [22] These figures are not unique to the region and echo the chronic shortfalls in development and humanitarian funding globally.

The increasing frequency and intensity of crises exacerbated by climate change strain humanitarian resources and infrastructure, making it challenging to respond effectively to multiple simultaneous crises. These interconnected challenges underscore the urgent need for a more coordinated and sustained global effort to strengthen humanitarian response mechanisms and long-term development to ensure that the needs of the most vulnerable are met.

References

[[1] World Bank Group (2018) Groundswell: Preparing for Internal Climate Migration https://openknowledge.worldbank.org/entities/publication/2be91c76-d023-5809-9c94-d41b71c25635

[2] ILO (2023) Unprecedented Migrant Surge in Central America and Mexico; IOM Calls for Regional Action https://www.iom.int/news/unprecedented-migrant-surge-central-america-and-mexico-iom-calls-regional-action#:~:text=Migration%20drivers%20are%20complex%2C%20ranging,unrest%20in%20countries%20of%20origin.

[3] LSE (2023) What is water security and how is it impacted by climate change? https://www.lse.ac.uk/granthaminstitute/explainers/what-is-water-security-and-how-is-it-impacted-by-climate-change/

[4] World Bank Peru - Strategic Actions Toward Water Security : Executive Summary (English). Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/099060623153512366/P1736361b9bb4f08c1b0e31b8478add5b52

[5] USAID, (2022) Sustainable Water Partnership Final Report https://www.globalwaters.org/sites/default/files/swp_final_report.pdf

[6] IOM webpage "About Migration" https://www.iom.int/about-migration.

[7] Huber, J., Madurga-Lopez, I., Murray, U. et al. Climate-related migration and the climate-security-migration nexus in the Central American Dry Corridor. Climatic Change 176, 79 (2023). https://doi.org/10.1007/s10584-023-03549-6

[8] Gotlieb, Y., Pérez-Briceño, P., Hidalgo, H. and Alfaro, E. (2019). The Central American Dry Corridor: a consensus statement and its background. Revista Yu'am 3(5): 42-51. https://revistayuam.com/the-central-american-dry-corridor-a-consensus-statement-and-its-background/

[9] World Meteorological Organization El Niño/ Southern Oscillation https://wmo.int/media/news/el-nino-weakens-impacts-continue

[10] OCHA (2023) Latin America and The Caribbean Situation Update July 2023 https://www.unocha.org/publications/report/guatemala/latin-america-caribbean-weekly-situation-update-7-august-2023

[11] FAO (2016) Dry Corridor Central America Situation Report https://www.fao.org/3/br092e/br092e.pdf

[12] CGIAR (2022) Is climate a "risk multiplier" in the Central American dry corridor https://www.wfp.org/publications/climate-risk-multiplier-central-american-dry-corridor

[13] Wilson Centre (2016) No Justice: Gender-Based Violence and Migration in Central America https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/No_Justice.pdf

[14] Linke, A., Leutert, S., Busby, J. et al. Dry growing seasons predicted Central American migration to the USA from 2012 to 2018. Sci Rep 13, 18400 (2023). https://doi.org/10.1038/s41598-023-43668-9

[15] IFRC (2024) Early Action Protocol Activation Final Report: Honduras – Droughts https://reliefweb.int/report/honduras/honduras-droughts-early-action-protocol-activation-final-report-operation-no-mdrhn018

[16] USAID (2021) Honduras: Climate Change, Food Security, and Migration https://pdf.usaid.gov/pdf_docs/PA00XXBJ.pdf

[17] New Humanitarian News Feature (2020) How Mexico and Central America's femicide epidemic drives and complicated the migrant crisis https://www.thenewhumanitarian.org/news-feature/2020/02/27/Femicide-migration-Central-America-Mexico-USA-Mexico-women-violence

[18] Menjivar, C., Cervantes, A,. (2018) El Salvador: Civil War, Natural Disasters, and Gang Violence Drive Migration. Migration Policy Institute https://www.migrationpolicy.org/article/el-salvador-civil-war-natural-disasters-and-gang-violence-drive-migration

[19] Congressional Research Service (2023) In Focus: Central American Migration https://sgp.fas.org/crs/row/IF11151.pdf

[20] World Bank (2022) Understanding Migration in North Central America Countries: El Salvador, Guatemala, Honduras, and Nicaragua. Washington, DC: World Bank. http://hdl.handle.net/10986/38444

[21] FAO (2021) Land of Opportunities: Dry Corridor in El Salvador, Guatemala and Honduras https://www.fao.org/publications/card/en/c/CB5228en

[22] Humanitarian Action (2023) Global Humanitarian Response Plans https://humanitarianaction.info/document/global-humanitarian-overview-2024/article/response-plans-results-2023

Acknowledgements

MEDRC's Transboundary Environments Practitioner Briefing series has been developed for industry practitioners and government officials at the request of MEDRC's member countries, with sponsorship provided by the Netherlands. The briefings are meant to be informative and practical, providing an overview of the subject matter material, while remaining accessible to various backgrounds and disciplines. The briefings serve to develop shared knowledge and serve as a basis for further discussions between partners.

Briefs in the Series

Developed for water industry practitioners and government officials at the request of MEDRC's member countries, MEDRC's Practitioner Briefing series serve as a guide to trends in transboundary environmental cooperation. The initiative is intended to bridge the academic-practitioner gap in the sector by providing short, accessible and practical overviews, focusing on a different theme.

To date, 18 issues have been released examining the following topics;

Issue 1 - Water Accounting+
Issue 2 - Wastewater
Issue 3 - Climate Finance
Issue 4 - The Water-Energy-Food Nexus
Issue 5 - Water Cyber Security
Issue 6 - Transboundary Dams
Issue 7 - International Water Law
Issue 8 - Gender and Transboundary Water
Issue 9 - Transboundary Water Technology
Issue 10 - Water and Urban Development
Issue 11 - Private Sector Support for Transboundary Water
Issue 12 - Groundwater
Issue 13 - Water Finance
Issue 14 - Peace Parks & Integrated Water Resources Management
Issue 15 - Transboundary Carbon - Cooperation
Issue 16 - Transboundary Carbon - Technology
Issue 17 - Transboundary Carbon - Valuation
Issue 18 - Water Security & Migration

A full archive is available to read on the MEDRC website medrc.org/developmentcooperation