


# CLIMATE AND SECURITY IN LATIN AMERICA AND THE CARIBBEAN



Adriana Erthal Abdenur,  
Giovanna Kuele and  
Alice Amorim, eds.

2019

# CLIMATE SECURITY IN LATIN AMERICA AND THE CARIBBEAN: AGGRAVATING DOMESTIC PUBLIC SECURITY RISK IN THE FRAME OF LOW INTERSTATE CONFLICT

Matias Franchini

Eduardo Viola

## ABSTRACT

This article discusses the relationship between security and climate change in Latin America and the Caribbean. We conclude that levels of climate vulnerability in the region, in short and medium-term, will result in an aggravation of the domestic public security situation, rather than increased interstate conflicts. To support our claims, we compared the climate security risk of each country in the region using data on climate vulnerability, state capacity, democracy, and crime. This enabled us to build a climate security risk index for countries in the region.

**Keywords:** climate security, index, Latin America and the Caribbean, public security, interstate conflict.

# INTRODUCTION

In the last decade, studies from different disciplinary areas focused on the relationship between climate change and violence, drawing attention to the potential for interpersonal and intergroup conflict (interstate and intrastate) increase as global temperatures rise and extreme weather events accelerate.

This article discusses this relationship in Latin America and the Caribbean (LAC) for the next two decades. We pose a reflection on the future impact of climate effects on LAC security, extrapolating some of the region's key elements on the issue, particularly its high vulnerability to climate extremes, low inter-state conflict, and high crime rates. We studied a causal - but exploratory - connection between the negative effects of climate change and the worsening violence in the region.

Thus, our discussion is inferential in nature, oriented to anticipate or estimate risks that eventually may not occur. In this sense, there are still great uncertainties regarding the concrete global and local impacts of climate change, and even more uncertainty about its effects on social relations. However, such fluidity should not be a reason to avoid substantial considerations about the social and political impacts of global climate change.

Our main conclusion is that levels of climate vulnerability in the region, in the short and medium-term, will result in aggravation of the domestic public security situation rather than an increase of interstate or civil conflicts in the region. This is mainly because climate effects tend to act as catalysts for existing phenomena. The region's most immediate problem of violence and security is the crime rather than confrontation between states or between civil groups

(although there are exceptions, as in the Colombian case). We choose to focus on domestic security precisely because it is a topic of high relevance to the region and there is scarce literature. At the same time, this provides a necessary delimitation compared to more comprehensive concepts such as human security.

Our discussion operates in two-time horizons. The first is the short and medium-term, i.e. the effects of climate change on the security situation in the region within the next 10 years. The second time horizon is the long term, i.e. beyond 10 years. For the first, we argue that climate impacts will be drivers of crime increase. For the second, we argue that the potential for conflict between countries and civilian populations within states increases when there aren't adequate mitigation measures available at all levels of governance.

Our main source is the research literature on climate security generated from different disciplinary fields and various databases on climate vulnerability, democracy, state capacity and crime in the region.

To achieve our results, we organized the article as follows. In the first part, we summarize findings of the literature on climate and violence; In the second, we detail the climate vulnerability situation in LAC. In the third, we discuss the issue of violence and climate in the region and we justify our focus on crime, including a list of the greatest risks. In the fourth part, we present the Climate Security Risk Index to measure the risk level of each country in the region, to finally conclude the article.

# CLIMATE CHANGE AS A SECURITY VECTOR

Over the past decade, a wide range of academic work focused on the relationship between violence and climate change. This multidisciplinary literature can be divided into two major fields: one that focuses on climate impacts on group violence (political and civil violence, land invasion and war) and one that focuses on interpersonal violence (crime against people and property). There is also a literature that focuses specifically on interstate violence, which shares some basic elements with the literature on group violence.

In all three cases, the literature points the potential for increased violence as a consequence of climate change effects, from hurricanes to rising temperatures, in both developed and developing countries, although the causal mechanisms are still unclear in every case given the complexity of this kind of social process (Burke et al. 2014; Hsiang et al. 2013; Heilmann and Kahn 2019; Ranson 2014; Crank and Jacoby 2014; Plante et al. 2017) Allen, and Anderson 2017.

However, this literature tends to be consensual in assuming that climatic conditions do not operate as isolated causes of conflicts, but as catalysts of pre-existing factors. This conclusion is particularly relevant to our study as it supports our focus on the impact of climate on public security, due to the high crime rates in most LAC countries. Additionally, part of this literature tends to highlight the importance of adaptive capacities (of state and society) as mediators of climate impacts on violence (Burke et al. 2014; Heilmann and Kahn 2019). This is relevant to the construction of the climate security risk index. In this sense, Crank and Jacoby (2014) state that climate effects may have profound impacts on the degradation of state security mechanisms, both in the intrastate (security forces) and interstate (armed forces) dimensions.

Regarding the literature that focuses on group violence, there are some studies correlating climate effects and increasing conflict. After analyzing 55 case studies, Burke, Hsiang, and Miguel (2014) conclude that deviations from moderate temperature patterns and precipitation systematically increase the risk of conflict in societies around the world, raising the potential for civil confrontation and political instability. Hsiang, Burke, and Miguel (2013) noticed that the El Niño climate phenomenon – which tends to aggravate the incidence of climate extremes – is associated with a twofold increase in the risk of civil strife in the most affected countries between 1950 and 2004. One possible explanation is the scarcity of resources generated by El Niño in contexts of populations dependent on agricultural production or fisheries, a feature shared by large proportions of the LAC population. Moreover, Burke et al. (2009) find a strong correlation between civil war and temperature in sub-Saharan Africa.

Regarding the literature that focuses on interstate conflict, it assumes that climate change is starting to change the security context for decades to come. According to Mabey (2008) and Youngs (2009), this change is due to the expected effects of climate destabilization on resource availability, environmental degradation, and extreme weather phenomena. Wallace (2009) and Youngs (2009) point out that part of this production assimilates the climate as a “threat multiplier”, especially regarding food and energy issues.

Similarly, CNA (2007) analyzes the destabilizing effects that climate change can have, exacerbating conflicts around access to water, food and other basic resources; damage to basic infrastructure as a result of extreme weather events and / or sea-level rise; massive internal and cross-border migrations; delegitimized and potentially failed governments; and claims of climate equity that can lead to violent extremes, including terrorism.

There are also studies correlating individual violence with expected effects of climate change, particularly rising temperatures (Schutte and Breetzke 2018; Heilmann and Kahn 2019; Ranson 2014; Hu et al. 2017). First, some experiments in the field of psychology noticed that people tend to behave more violently in high-temperature environments (Burke et al. 2014; Heilmann and Kahn 2019; Plante et al. 2017). In this regard, other studies found that high temperatures tend to increase the incidence of violent crime – such as violations, murder, and domestic violence – in many places such as India, Mexico, the Philippines, the United States, China and Australia (Burke et al. 2014; Heilmann and Kahn 2019; Hu et al. 2017). However, Heilmann and Kahn (2019) suggest that high temperatures negatively impact the intensity of policing.

Although the evidence is restricted to the case of Los Angeles, it is worth mentioning that increasing temperature tends to raise intimate partner violence (Heilmann and Kahn 2019), which increases the incidence of gender violence. This finding is in line with other studies stating that natural disasters are correlated with sexual and gender violence against women increasing (UN Women 2014), a fact particularly worrisome about the potential impacts of such phenomena on LAC, the most violent region for women in the world (UN Women 2017).

There is also evidence that extreme conditions affecting agricultural production are correlated with increasing violence in low-income populations, particularly property crimes (Hu et al. 2017; Burke et al. 2014). The literature correlating climate disasters with increases in crime is scarcer (Burke et al. 2014). However, there is evidence that in the months following Hurricane Katrina in 2005, cities receiving refugees from affected areas experienced increases in crime (Plante et al. 2017). At the same time, there is evidence that in the aftermath of hurricane strikes in Honduras and Saint Martin crime has increased - through criminal groups monopolizing humanitarian aid to launder money in the first case and through increased property crimes in the second (Albaladejo 2017).



# CLIMATE RISKS AND VULNERABILITY IN LATIN AMERICA AND THE CARIBBEAN

A large portion of LAC's population is at high or extreme climate risk, especially in the Caribbean, the Gulf of Mexico and some parts of the endangered Andean glaciers. According to Maplecroft (2018), 10 of the 33 countries in the researched region are at extreme risk, another 8 are at high risk, 7 at medium risk and 8 at low risk.

Despite the overall risk situation, however, LAC is a profoundly heterogeneous region: Haiti is the third most vulnerable country in the world, while Uruguay is among the three least vulnerable countries on the planet. In general, South America presents lower risks as a region than Central America and the Caribbean, which are among the most vulnerable in the world, only after Africa (Maplecroft 2018).

These high levels of vulnerability are not only correlated to physical exposure to climate extremes, but also to the limited adaptive capacities – material and human resources – of LAC societies, which makes the development problem not just environmental.

Some negative effects of climate change are already being experienced in the region, such as prolonged Amazon droughts in 2005 and 2010, catastrophic flooding in Colombia in 2010/2011, intensifying cycle of hurricanes and storms in Central America and the Caribbean, drastic loss of tropical glaciers, prolonged droughts in Pampa Argentina and Northeast Brazil (Maplecroft 2018; Magrin et al. 2014). Variations in temperature and precipitation will only tend to increase in the future.

The Andean region and Northeast Brazil are particularly vulnerable in South America, due to the projected reduction in food production capacity. On the other hand, the Andean cryosphere in retreat will generate flood risks and then cause the risk of water scarcity in the vulnerable semi-arid areas of the sub-region. Changes in land use, particularly the deforestation in the Amazon and Cerrado, tend to exacerbate climate risk in the region, including the risk of drought. Rising sea levels, in turn, pose risks to industries such as the tourism industry, and limits to disease control. In this regard, the changes already observed are negatively affecting health in the region, increasing mortality, morbidity and the emergence of diseases in previously non-endemic areas. (Magrin et al. 2014). In the Caribbean and Central America, one of the main threats is the intensity of hurricanes growing, intensified by the expected rise in sea level.

In the medium and long-term, the “savannization” of the Amazon rainforest – due to extreme deforestation and climate change (Nobre et al. 2016) – may trigger major changes in the atmospheric circulation of the area, threatening the economic and social prospects of a region that relies heavily on agriculture, particularly for poverty alleviation and food security.

# CLIMATE RISKS IN A REGION OF LOW INTERSTATE CONFLICT

As stated, the connection between violence and climate change can be considered from three main categories: individual violence, group violence, and interstate violence.

In relation to the latter, LAC has historically been a region of low interstate conflict, although there has been a history of US intervention in Central America and the Caribbean throughout the twentieth century. In South America, larger states less subject to external interference, there has been a positive history of resource management in recent decades, both in the Amazon Basin, where the context was usually cooperative, and in the La Plata Basin, where the high geopolitical rivalry in the 1960s and 1970s was surpassed in the following years (Viola and Franchini 2018). In this context, we do not expect the effects of climate change in the region to act as drivers of interstate conflict – struggle for scarce resources or migration – in the short and medium-term. The fact that this region has not resorted to attacks on the territorial sovereignty of neighbors, even in face of Venezuela's humanitarian tragedy, tilts us in the direction of this analysis.

This situation, however, may change dramatically over the long-term, depending on the dynamics of climate change in the region and the adaptive capacities developed by LAC countries – in the areas of food production, energy and water security, and state responsiveness to stressors related to variations in the weather. The situation of the Amazonian ecosystem, which plays a key role in both regional and global climate regulation, will be particularly relevant in this context. A continued deforestation leading to a savannization of the region

will lead to catastrophic changes in the regional climate, affecting patterns of food production, energy, water supply, etc. Within this framework, conflicts similar to those described by the literature specialized in interstate conflict – confrontation over scarce and migrant resources – could be present in regional politics.

Regarding the group violence, the presence of violent domestic conflicts – in the form of civil wars of different types and intensities – has been a historical consistency in the region until the late 1980s, with the exception of Colombia. As stated, the literature has also found correlations between this type of conflict and climate change, particularly increasing temperature and changes in rainfall patterns. As these two types of phenomena are expected in the region for decades to come, there is potential for a growth in violence in the region. This seems to be a fundamental research theme for LAC in the future, however, as stated, in this article we choose to focus on the most urgent issue of violence in the region.

In this sense, organized and common crime has been a major threat to the security of the region's citizens for the past three decades, particularly in the North Central American Triangle, Jamaica, Trinidad and Tobago, Venezuela, Brazil, and Colombia. The regional homicide average (22,3) was 4 times higher than the world average in 2015 (5.3) and only Chile has lower rates than the global average. In addition, the only full democracies in the region, Costa Rica and Uruguay, have very high rates, 11.6 and 8.5 respectively, compared to other democracies of the sort.

In this context, we conclude that the main security risks associated with LAC climate change impacts in the short and medium-term will be as follows:

- Erosion of public security as a result of weather extremes such as hurricanes, extreme rainfall and flooding, making the action of the state in an already deficient area in most LAC countries even more difficult. If there is a systematic lack of response from the police and civil defense in face of extreme situations, the absence of the state can be translated into organized crime entering places where it previously had no presence. As stated, there is a history of crime increasing following natural disasters, as in the cases of Saint Martin and Honduras.
- Regarding the above, drought and flood cycles in large cities with high crime levels, such as São Paulo or Caracas are particularly relevant as impacts on public security.
- Increased violence against women, associated with rising temperatures and the incidence of extreme weather phenomena.
- The decline in agricultural and fishery production impacting the degradation of food security, employment and exports has the potential to increase crime. In particular, the migration of populations deprived of such economic opportunities can supply criminal networks in the cities. However, there is some evidence that the population growth in large cities tends to increase the incidence of crime. (Gaviria and Pages as cited by Crank and Jacoby 2014)"plainCitation": "(Crank and Jacoby 2014
- The worsening of water scarcity in vulnerable semiarid regions, such as Greater Lima and the Brazilian semiarid, has the potential to yield similar results to the previous point. As stated, there is a correlation between such events and increased crime, particularly regarding property crimes.
- The erosion of energy security through water balance changing (Crank and Jacoby 2014)"plainCitation": "(Crank and Jacoby 2014, since LAC is the most intensely hydroelectric region in the world, can also increase criminal activities by reducing economic opportunities or generating crime-related situations.
- The growth of climate refugees, both predominantly domestic refugees in South America with effects on the growth of urban metropolises, and also cross-border refugees in Central America and the Caribbean, increasing the potential for conflict between them and North American countries, including the militarization of borders.
- In Amazon's case, there is a direct redoubled connection between climate change and public security in all countries of the region: organized crime and corruption are direct actors of deforestation and consequent carbon emissions that are very important as a proportion of the national total of Brazil, Colombia, Peru, and Bolivia.
- Particularly, catastrophic climate change in the Amazon, with the savannization of the Western Amazon and continuing large forest fires, would lead to a profound change in atmospheric circulation in the subcontinent, with drastic effects on food, energy and public security. As suggested, this process does have the potential to incite interstate conflicts in the region along the lines of those stated by the interstate climate security literature: massive migrations and competition for scarce resources.
- Finally, if the negative effects of climate change outweigh the reactive capacities of Latin American and Caribbean states, an erosion of trust in public authorities could endanger governance and democracy in the region, increasing the potential of authoritarian regimes or failed states. It's well known that the level of confidence of Latin American citizens in their institutions – government, congress, political parties, and police forces – is relatively low and declining, as well as the support for democracy as the preferable regime of government (Latinobarómetro 2018).



# CLIMATE RISKS RELATED TO SECURITY

This paper focuses on the effects of climate on crime. Therefore, to clarify the potential risks of each country in the region, we have developed a regional climate security risk index combining the Maplecroft (2018) vulnerability index, government effectiveness measured by the World Bank, the murder rate and

the level of democracy measured by The Economist. The position in the index ranking is the result of the sum of the relative position of each country in each of the selected indicators. Thus, Venezuela is ranked first in the index because it has low scores on the four selected indicators.

**Table 1:** Climate Security Risk Index for Latin America and the Caribbean: Vulnerability (Maplecroft 2018), Government Effectiveness (World Bank 2017); Homicide Rate (World Bank 2015), Democracy (*The Economist* 2018)

Country	Vulnerability	Government Effectiveness	Homicide Rate	Democracy	Total Positions	Ranking
Argentina	6,66 (18) <sup>1</sup>	0,16 (17)	6,5 (18)	7,02 (16)	69	19
Bolivia	2,48 (9)	-0,39 (7)	6,3 (20)	5,7 (7)	43	13
Brazil	5,77 (17)	-0,29 (1)	28,4 (7)	6,97 (15)	50	9
Chile	9,54 (22)	0,85 (22)	3 (22)	7,97 (20)	86	22
Colombia	4,98 (15)	0,07 (16)	26,5 (8)	6,96 (14)	53	15
Costa Rica	7,7 (20)	0,25 (18)	11,6 (11)	8,07 (21)	70	20
Cuba	3,9 (12)	-0,20 (12)	5,4 (21)	3 (1)	46	10
Ecuador	3,76 (11)	-0,32 (10)	6,5 (18)	6,27 (11)	50	13
El Salvador	0,79 (3)	-0,37 (8)	105,4 (1)	5,96 (8)	20	5
Guatemala	0,75 (2)	-0,64 (4)	29,4 (6)	5,60 (5)	17	2
Haiti	0,58 (1)	-2,06 (1)	10 (13) <sup>2</sup>	4,91 (4)	19	3
Honduras	0,92 (4)	-0,51 (6)	57,5 (3)	5,63 (6)	19	3
Jamaica	1,5 (7)	0,49 (21)	42 (4)	7,02 (16)	48	12
Mexico	4,47 (14)	-0,03 (14)	16,5 (10)	6,19 (9)	47	11
Nicaragua	1,19 (6)	-0,64 (4)	8,6 (15)	3,63 (3)	28	6
Panama	5,57 (16)	0,01 (15)	11,3 (12)	7,05 (18)	61	17
Paraguay	1,58 (8)	-0,81 (3)	9,3 (14)	6,24 (10)	35	7
Peru	4,3 (13)	-0,13 (13)	7,2 (17)	6,60 (13)	56	16
Dominican Republic	1,01 (5)	-0,35 (9)	17,4 (9) <sup>3</sup>	6,54 (12)	35	7
Trinidad and Tobago	7,22 (19)	0,26 (19)	30,1 (5)	7,16 (19)	62	18
Uruguay	8,33 (21)	0,42 (20)	8,5 (16)	8,38 (22)	79	21
Venezuela	3,64 (10)	-1,40 (2)	61,9 (2) <sup>4</sup>	3,16 (2)	16	1

Source: Own Elaboration based on Maplecroft 2018; World Bank 2017; World Bank 2015; *The Economist* 2018

<sup>1</sup> In quotation marks is the relative position of the country in the respective indicator. In this case Argentina is placed 18 out of 22 in terms of climate vulnerability.

<sup>2</sup> Data from 2012.

<sup>3</sup> Data from 2014.

<sup>4</sup> Data from 2014.

**Table 2:** Relative Position of Climate Security Risk in Latin America and the Caribbean

Country	Score	Ranking
Venezuela	16	1
Guatemala	17	2
Haiti	19	3
Honduras	19	3
El Salvador	20	5
Nicaragua	28	6
Paraguay	35	7
Dominican Republic	35	7
Bolivia	43	9
Cuba	46	10
Mexico	47	11
Jamaica	48	12
Brazil	50	13
Ecuador	50	13
Colombia	53	15
Peru	56	16
Panama	61	17
Trinidad and Tobago	62	18
Argentina	69	19
Costa Rica	70	20
Uruguay	79	21
Chile	86	22

Source: Own elaboration

As shown in the table above, the most vulnerable countries in the region to climate security risks are Venezuela – submerged in a collapse of governance with the region’s biggest humanitarian tragedy in the last half-century; the Northern Triangle countries – hit by the state’s inability to respond to the threat of crime; and Haiti – a failed state. This lack of state capacity results in poor capacity to cope with high levels of climate risk exposure.

On the other hand, Costa Rica, Chile, and Uruguay – the region’s most developed democracies – show the least vulnerability to security risks from climate extremes. The large LAC economies, Brazil and Mexico, occupy intermediate positions, with Mexico being more exposed in terms of overall climate vulnerability and Brazil due to the high homicide rate per capita.

LAC’s level of exposure to climate security risks is aggravated by the lack of preparation of most countries in the region to the negative effects of climate change. This lack of preparation occurs in both the security area and the more general adaptation area. Regarding this last point, most countries in the region have no sound strategies for responding to climate extremes or long-term issues such as infrastructure or energy, nor rapid responses to phenomena such as hurricanes or floods, although the picture is mixed (Franchini 2016).

Regarding the specific security issue, most of the region’s police forces are not prepared to deal with the current impacts of crime, much less to respond to an increase in crime due to climate extremes. Therefore, the development of doctrines and practices is necessary to deal with the present

and expected effects of the climate, a scenario that appears to be of low probability as many of these forces are overwhelmed by current threats.

At the same time, as the armed forces are being called in to combat threats to public security – crime in its various expressions – in some countries of the region – particularly Brazil, Mexico and Colombia – they also need to incorporate home security issues into their climate risk doctrine. This would become a regional feature of its own, becoming a

significant difference to the climate security doctrines developed in US and European forces (Viola and Franchini 2018). However, this type of development is not covered in the mainstream climate security literature either, i.e., there is an uncharted and open field of research development in this area, combining the characteristics of LAC as peaceful in their interstate relations, but violent within its borders.

## CONCLUSION

The risk of climate security in Latin American and Caribbean countries will be more associated with domestic citizen security issues related to interpersonal violence than with interstate and civil conflict issues over the next decade. The status of the region as an area of a low interstate conflict and a high incidence of crime are the factors that support this analysis. The main findings of the literature on violence and climate anticipate a growth in crime in the region, further demanding the capabilities of security forces – and in some cases – the armed forces of the region.

The growth of the security risk will be mainly associated with the effects of weather extremes events and increasing temperature on crime, particularly in large cities. The deterioration of food security and depreciation of jobs in agricultural and fisheries areas, leading to domestic or cross-border migrations. In addition to the deterioration of energy security by water stress. In this context, the most vulnerable populations, particularly women and children, affected by the potential increase in domestic violence, are of particular concern. If LAC states are unable to deal with these effects, their legitimacy may deteriorate even further, with negative effects on democratic governance within the region.

Nonetheless, in the medium and long-term, the eventual destabilization of the regional climate due to the savannization of the Amazon rainforest could aggravate the panorama to the point of operating as a catalyst for interstate conflicts. Within this framework, the literature on climate security that focuses on inter-group violence may offer better analytical resources to examine the potential escalation of conflicts over scarce resources and migrant populations.

As a way of assessing climate security risk with the features of countries in the LAC region, we propose an index that combines data on climate vulnerability, state efficiency, homicide rate and level of democracy. As a result, we find that Venezuela, Haiti, and the Northern Triangle countries are the most vulnerable countries in the region, while Chile, Costa Rica, and Uruguay – LAC's most consolidated democracies – occupy the opposite place in the spectrum.

The climate-related security risk situation worsens as most countries in the region have not been able to develop strategies to reduce these risks, including sound adaptation strategies or incorporating climate risk into doctrines of military and police forces.

# REFERENCES

- Albaladejo, Angelika (2017) 'The Perfect Storm: How Climate Change Exacerbates Crime and Insecurity in LatAm', *InSight Crime*, 22 September. Available at: <https://www.insightcrime.org/news/analysis/perfect-storm-climate-change-exacerbates-crime-insecurity-latin-america-caribbean/>.
- Burke, Marshall; Hsiang, Solomon and Miguel, Edward (2014) *Climate and Conflict* (working paper). Cambridge, MA: National Bureau of Economic Research. Available at: <https://www.nber.org/papers/w20598.pdf>.
- Burke, Marshall; Miguel, Edward; Shanker, Satyanath; Dykema, John, A. and Lobell, David B. (2009) 'Warming Increases the Risk of Civil War in Africa', *Proceedings of the National Academy of Sciences* 106 (49): 20670. DOI: <https://doi.org/10.1073/pnas.0907998106>.
- CNA (2007) *National Security and the Threat of Climate Change*. Accessed 29 January 2011 <<http://www.cna.org/reports/climate>>.
- Crank, John P. and Jacoby, Linda S. (2014) *Crime, Violence, and Global Warming* (1st ed.). London; New York: Anderson.
- Franchini, Matías (2016) 'Trajetória e Condicionantes do Compromisso Climático nas Potências Latino-Americanas: Argentina, Brasil, Colômbia, México e Venezuela. 2007-2015'. PhD thesis. Brasília: University of Brasília. DOI: <https://doi.org/10.13140/RG.2.2.18167.62889>.
- Heilmann, Kilian and Kahn, Matthew E. (2019) *The Urban Crime and Heat Gradient in High and Low Poverty Areas* (working paper 25961). Cambridge, MA: National Bureau of Economic Research. DOI: <https://doi.org/10.3386/w25961>.
- Hsiang, Solomon; Burke, Marshall and Miguel, Edward (2013) 'Quantifying the Influence of Climate on Human Conflict', *Science* 341. Available at: [https://www.researchgate.net/publication/256541640\\_Quantifying\\_the\\_Influence\\_of\\_Climate\\_on\\_Human\\_Conflict](https://www.researchgate.net/publication/256541640_Quantifying_the_Influence_of_Climate_on_Human_Conflict).
- Hu, Xiaofeng; Wu, Jiansong; Chen, Peng; Sun, Ting and Li, Dan (2017) 'Impact of Climate Variability and Change on Crime Rates in Tangshan, China', *The Science of the Total Environment* 609: 1041-48. DOI: <https://doi.org/10.1016/j.scitotenv.2017.07.163>.
- IADB (Inter-American Development Bank) (2014). *Índice de vulnerabilidad y adaptación al cambio climático en la región de América Latina y el Caribe 2014*. Inter-American Development Bank. Available at: <http://www20.iadb.org/intal/catalogo/PE/2014/15019es.pdf>.
- Latinobarómetro (2018) *Informe 2018*. Santiago de Chile.
- Mabey, Nick. (2008) *Delivering Climate Change Security. International Security Responses to a Climate Changed World* (Whitehall paper 69). London: Royal United Services Institute (RUSI).
- Magrin, G. O. et al (2014) 'Central and South America', *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects*. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, pp. 1499-1566. Cambridge: Cambridge University Press.
- Maplecroft (2018) *Climate Change Vulnerability Index 2017*. Maplecroft. Available at: <https://reliefweb.int/sites/>

reliefweb.int/files/resources/verisk%20index.pdf.

Nobre, Carlos A.; Sampaio, Gilvan; Borma, Laura S.; Castilla-Rubio, Juan Carlos; Silva, José S. and Cardoso, Manoel (2016) 'Land-Use and Climate Change Risks in the Amazon and the Need of a Novel Sustainable Development Paradigm', *Proceedings of the National Academy of Sciences* 113 (39): 10759. DOI: <https://doi.org/10.1073/pnas.1605516113>.

Plante, Courtney; Allen, Johnie J. and Anderson, Craig A. (2017) 'Effects of Rapid Climate Change on Violence and Conflict', *Oxford Research Encyclopedia of Climate Science*. DOI: <https://doi.org/10.1093/acrefore/9780190228620.013.344>.

Ranson, Matthew (2014) 'Crime, Weather, and Climate Change', *Journal of Environmental Economics and Management* 67 (3): 274-302. DOI: <https://doi.org/10.1016/j.jeem.2013.11.008>.

Schutte, Francois H. and Breetzke, Gregory D. (2018) 'The Influence of Extreme Weather Conditions on the Magnitude and Spatial Distribution of Crime in Tshwane (2001–2006)', *South African Geographical Journal* 100 (3): 364-77. DOI: <https://doi.org/10.1080/03736245.2018.1498384>.

UN Women (2014) *Climate Change, Disasters and Gender-Based Violence in the Pacific*. UN Women. Available at: <https://www.unccllearn.org/sites/default/files/inventory/unwomen701.pdf>.

UN Women and PNUD (2017) *Del compromiso a la Acción. Políticas para erradicar la violencia contra las mujeres en América Latina y el Caribe, 2016*. UN Women; PNUD. Available at: <https://www.undp.org/content/dam/uruguay/docs/Genero/undp-uy-inf-reg-vbg-2017.pdf>.

Viola, Eduardo and Franchini, Matías A. (2018) *Brazil and Climate Change: Beyond the Amazon*. New York: Routledge.

Wallace, Jennifer (2009) 'The security Dimension of Climate Change', *State of the World 2009: Into a Warming World*. Worldwatch Institute. Available at: <http://www.worldwatch.org/bookstore/publication/state-world-2009-warming-world>.

Youngs, Richard (2009) *Beyond Copenhagen: Securitising Climate Change* (Policy Brief 22). Brussels: Foundation for International Relations and Foreign Dialogue (FRIDE).